## Torres-Rojas, Genara

**From:** sgravlin@jhreidgc.com
**Sent:** Friday, June 26, 2015 1:02 PM
**To:** Olivencia, Mildred
**Cc:** Torres-Rojas, Genara; Van Duyne, Sheree; Ng, Danny
**Subject:** Freedom of Information Online Request Form

Information:

First Name: Steven
Last Name: Gravlin
Company: JH Reid General Contractor
Mailing Address 1: 3230 Hamilton Blvd
Mailing Address 2: PO Box 324
City: South Plainfield
State: NJ
Zip Code: 07080
Email Address: sgravlin@jhreidgc.com
Phone: 732-752-4050
Required copies of the records: Yes

List of specific record(s):
Contract Plans Specifications for Contract AK-179. Asbestos Abatement Plans and Records of Asbestos Removal Disposal from Contract AK-179. Complete test sampling report and results for asbestos containing materials cited in Appendix B of Contract AK-179. Environmental reports for assessment and or testing for suspect contaminants on the Goethals Bridge used for Contract AK-179.

**THE PORT AUTHORITY** OF NY & NJ

*FOI Administrator*

August 17, 2015

Mr. Steven Gravlin
JH Reid General Contractor
3230 Hamilton Blvd.
South Plainfield, NJ 07080

Re: Freedom of Information Reference No. 16116

Dear Mr. Gravlin:

This is in response to your June 26, 2015 request, which has been processed under the Port Authority's Freedom of Information Code (the "Code", copy enclosed) for copies of the following records: Contract Plans Specifications for Contract No. AK-179. Asbestos Abatement Plans and records of asbestos removal disposal from Contract No. AK-179. Complete test sampling report and results for asbestos containing materials cited in Appendix B of Contract No. AK-179. Environmental reports for assessment and or testing for suspect contaminants on the Goethals Bridge used for Contract No. AK-179.

Material responsive to your request and available under the Code can be found on the Port Authority's website at http://www.panynj.gov/corporate-information/foi/16116-C.pdf. Paper copies of the available records are available upon request.

Pursuant to the Code, certain portions of the material responsive to your request are exempt from disclosure as, among other classifications, privacy and security.

Please refer to the above FOI reference number in any future correspondence relating to your request.

Very truly yours,

Danny Ng
FOI Administrator

Enclosure

*4 World Trade Center, 18th Floor*
*150 Greenwich Street*
*New York, NY 10007*
*T: 212 435 7348 F: 212 435 7555*

**THE PORT AUTHORITY** OF NY & NJ

*Engineering Department*

November 17, 2006

**VIA FACSIMILE AND DHL NEXT DAY DELIVERY**

J. G. Salas & Sons, Inc.
601 Union Avenue
Union Beach, NJ 07735

SUBJECT: STATEN ISLAND BRIDGES – LIGHT POLE AND LIGHT POLE SUPPORT REPAIRS – CONTRACT AK-179
**PURCHASE ORDER UAK179**

Gentlemen:

The Port Authority of New York and New Jersey hereby accepts your proposal on the above Contract.

Your attention is directed to the clause of the Contract entitled "Time for Completion and Damages for Delay" and to the fact that before you may commence performance of the work you must furnish whichever of the documents mentioned in that clause are applicable.

Subject to the provisions of the Form of Contract, including those of the clause entitled "Extra Work Orders", the Chief Engineer shall have the authority to order any item of Extra Work if the cost thereof to the Authority, together with the cost of all other Extra Work previously ordered, will not be in the aggregate in excess of $17,622.

Forwarded herewith for your use and compliance are "General Instructions Relating to the Direction and Processing of Correspondence and of Those Other Items Specified to be Submitted to the Port Authority Under the Terms of the Contract".

**In order to ensure that payments are processed properly, please include the above-referenced Purchase Order No. on all payment invoices and correspondence.**

Very truly yours,

THE PORT AUTHORITY OF NEW YORK
AND NEW JERSEY

BY _____
BL Chief Engineer

*Two Gateway Center*
*Newark, New Jersey 07102*

J.G. SALAST + SONS, INC.

THE PORT AUTHORITY OF NY & NJ

1

CB07-274.074
MBE

#
S.A.A.

STATEN ISLAND BRIDGES

# LIGHT POLE AND LIGHT POLE SUPPORT REPAIRS

## CONTRACT AK-179

AUGUST 2006

**This proposal is not complete unless bidder's Signature appears on page 16**

**THE PORT AUTHORITY** OF NY & NJ

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Wilfred Chabrier, Director, Office of Regional and Economic Development

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**SCHEDULE OF MINIMUM WAGE RATES (NJ)**

**SCHEDULE OF MINIMUM WAGE RATES (NY)**

**ANALYSIS OF BID**

# INFORMATION FOR BIDDERS

## 1. FORM AND SUBMISSION OF PROPOSALS

The Port Authority of New York and New Jersey, hereinafter called "the Authority", invites Proposals in the annexed form. Proposals will be received until 2:30 P.M. on Wednesday, August 30, 2006 in the office of the Director of Procurement, Attn: Bid Custodian, One Madison Avenue, 7th Floor, New York, NY 10010 at which time they will be opened and publicly read in the Bid Room. Each Proposal must be contained in the envelope furnished by the Authority, which shall be sealed and conspicuously endorsed with the bidder's name and the number of this Contract in the space provided. This Contract booklet shall not be unstapled or taken apart.

The Proposal must be submitted upon the blank form bound herewith and must give all information required. [1] The Proposal must be signed and the acknowledgment taken on the appropriate form following the Proposal.

No effort is made to emphasize any particular provision of the Contract, but bidders must familiarize themselves with every provision and its effect.

## 2. PREREQUISITES

This contract is set aside for bidding under the Port Authority's M/WBE Program. The Bidder shall be certified by the Port Authority as a Minority Business Enterprise (MBE) or Women Business Enterprise (WBE) by the day before the bid opening date, and, the certified firm must have their primary business office located in either New York or New Jersey.

The Port Authority may request information at any time prior to or after bid opening to verify a firm's current eligibility to participate in the M/WBE Program.

## 3. PAPERS ACCOMPANYING PROPOSALS

Each Proposal must be accompanied by the following papers, which, unless otherwise indicated, should be enclosed with the Proposal:

A. If the bidder be a corporation, a statement of the names and residences of its officers, which should be included on the page following the Proposal.

If the bidder be a partnership, a statement of the names and residences of its members, indicating which are general and which are special partners, which should be included on the page following the Proposal.

If the bidder be an individual, a statement of his residence, which should be included on the page following the Proposal.

---

[1] While two or more copies of this booklet may be furnished to each prospective bidder, only one should be submitted. The extra copies are for the bidders use.

B.

1.) Certified financial statements, including applicable notes, reflecting the bidder's assets, liabilities, net worth, revenues, expenses, profit or loss and cash flow for the most recent calendar year or the bidder's most recent fiscal year.

2.) Where such certified financial statements are not available, then either reviewed or compiled statements from an independent accountant setting forth the information described in Paragraph 1, above.

3.) Where neither certified financial statements nor financial statements from an independent accountant are available, then financial statements containing the information described in Paragraph 1, above, prepared directly by the bidder. However, such financial statements must be accompanied by a signed copy of the bidder's most recent Federal income tax return and a statement in writing, signed by a duly authorized representative of the bidder, that such statements accurately reflect the current financial condition of the bidder.

Where statements submitted pursuant to either Paragraph 1 or 2, above, show the position of the bidder as of a date more than forty-five (45) days prior to the date on which Proposals are opened, the bidder shall also submit a statement in writing signed by a duly authorized representative of the bidder, that the present financial condition of the bidder is at least as good as that shown on the statements submitted.

4.) A statement of work which the bidder has on hand, including any work on which a bid has been submitted, containing a description of the work, the dollar value, the location by city and state, the current percentage of completion and the expected date for completion.

5.) Fill in below the name and address of the bidder's chief banking representative handling the bidder's account.

Banking Institution: PNC Bank

Address: 1040 Route 70
Brick New Jersey

Bank Representative: STANLEY Federowicz

Telephone Number: 732 206 1551

6.) Fill in below the bidder's Federal Employer Identification Number (i.e., the number assigned to firms by the Federal Government for tax purposes); the bidder's Dun and Bradstreet number, if any; the name of any other credit service to which the bidder has furnished information and the number, if any, assigned by such service to the bidder's account.

[redacted]

Federal Employer Identification No.

06 202 7404

Dun and Bradstreet No.

Other Credit Service

Account No

C. The Form of Contract bound herewith, with the bidder's Lump Sum inserted in the clause thereof entitled "General Agreement". The amount must be given both in figures and in writing and, in case of discrepancy, the writing shall control. One copy of each addendum, if any, issued during the bidding period shall be initialled and attached to the Proposal, but any Proposal submitted without such addendum initialled and attached will nevertheless be construed as though such addendum had been initialled and attached.

D. The bidder's analysis of bid filled in on the form furnished herewith. The Contractor will be required to furnish a more detailed analysis of bid at a later date in accordance with the requirements of the Section of Division 1 of the Specifications referring to the Analysis of Bid.

## 4. QUALIFICATION INFORMATION

At any time after the opening of Proposals, the Chief Engineer may give oral or written notice to one or more bidders to attend a pre-award meeting and to furnish the Authority with information relating to his qualifications to perform the Work, including the following, which information shall be furnished within seven (7) days thereafter:

A. A detailed list of all anticipated material suppliers and subcontractors and a detailed list of the plant and equipment which the bidder proposes to use, indicating which portions it already possesses.

B. Detailed information relating to work which the bidder has completed for others, including personal and corporate references, sufficient to the Authority to determine the Contractor's responsibility, experience and capacity to perform the Work. If required by the Chief Engineer, the foregoing information shall include information to demonstrate to the satisfaction of the Chief Engineer that the contractor has within the past five years been a contractor on at least one contract of the same general type, extent and complexity as the Contract on which the Proposal has been submitted, and completed the work skillfully, in a satisfactory manner and on time.

C. Information to supplement a) data shown in the financial statements and the statement of work on hand required to be submitted with the Proposal; and b) any statement submitted under the clause hereof entitled "Certification of No Investigation (Criminal or Civil Anti-Trust), Indictment, Conviction, Suspension, Debarment, Disqualification, Prequalification Denial or Termination, etc, Disclosure of Other Required Information", or "Non-Collusive Bidding and Code of Ethics Certification; Certification of No Solicitation Based on Commission, Percentage, Brokerage, Contingent Fee or Other Fee".

D. Moreover, in the event that the bidder's performance on a past Port Authority or PATH contract or contracts has been rated less than satisfactory, the Chief Engineer may give oral or written notice to the bidder to furnish information demonstrating to the satisfaction of the Chief Engineer that, notwithstanding such rating, such performance was, in fact, satisfactory, or that the circumstances which gave rise to such unsatisfactory rating have changed or will not apply to performance of the Contract, and that such performance will be satisfactory.

E. If the bidder has performed a contract for the States of New York or New Jersey, or any governmental entity within such States and has filed a questionnaire or other document required to be submitted in order for the bidder to qualify to perform the contract, the bidder may be requested by the Chief Engineer to submit the most recent completed questionnaire or other such document, or if the most recent completed questionnaire or other such document is not available, to submit a written statement indicating the approximate date of the contract and the name of the governmental entity which awarded them the contract.

F. Any additional information relevant to the bidder's Proposal including information to supplement the bidder's initial analysis of bid.

G. Detailed information in writing setting forth the affirmative action which the bidder proposes to take to ensure equal employment opportunities as required by clause A of the clause of the Form of Contract entitled "No Discrimination in Employment". This action which for the purpose of convenience is referred to as an "Affirmative Action Program", shall be in addition to the action required under clauses B through G thereof. Solely for the information of the bidder and without in any way limiting or defining the affirmative action program to be proposed by the bidder, there are available for inspection in the office of the General Manager, Business and Job Opportunity, Office of Regional and Economic Development of the Port Authority of New York and New Jersey, copies of sample affirmative action programs.

In the event that any of the foregoing is requested and is not furnished within seven days thereafter or within such additional time as the Chief Engineer, in his sole discretion, may allow, the Authority may not be in a position to determine whether the bidder is qualified, whether the bidder understands the requirements of the contract or whether the bid is responsive and may, in its sole discretion, reject the bidder's Proposal.

The giving of such notice to the bidder in connection with any of the foregoing lists, statement or information shall not be construed as an acceptance of his Proposal. However, the Authority reserves the right in its sole and absolute discretion, to accept the Proposal of a bidder despite the fact that said bidder has not submitted any information, list or statement required pursuant to this Section within the above-stated time period.

## 5. ACCEPTANCE OR REJECTION OF PROPOSAL

Within sixty (60) days after the opening of the Proposals, the Authority will accept one of the Proposals, if it accepts any. The acceptance of a Proposal will be only by mailing to or delivering at the office designated in the Proposal a notice in writing specifically indicating acceptance signed by an authorized representative on behalf of the Authority. No other act of the Authority, its Commissioners, officers, agents, or employees shall constitute acceptance of a Proposal. Rejection of a Proposal will be only by either (a) a notice in writing specifically stating that the Proposal is rejected, signed by an authorized representative on behalf of the Authority and mailed to or delivered at the office designated in the Proposal or (b) omission of the Authority to accept a Proposal within sixty (60) days after the opening of Proposals; and no other act of the Authority, its Commissioners, officers, agents or employees shall constitute rejection of a Proposal, including any counter offer or other act of the Authority, its Commissioners, officers, agents or employees.

The Authority reserves the unqualified right, in its sole and absolute discretion, to reject all Proposals or to accept that Proposal if any, which in its judgment will under all the circumstances best serve the public interest and to waive defects in any Proposal.

## 6. DISPOSAL OF CONTRACT DOCUMENTS

All recipients of Contract documents, including bidders and those who do not bid and their prospective subcontractors and suppliers who may receive all or a part of the Contract documents or copies thereof, shall make every effort to ensure the secure and appropriate disposal of the Contract documents to prevent further disclosure of the information contained in the documents. Secure and appropriate disposal includes methods of document destruction such as shredding or arrangements with refuse handlers that ensure that third persons will not have access to the documents' contents either before, during, or after disposal. Documents may also be returned for disposal purposes to the Contract Desk on the 3rd Floor, 3 Gateway Center, Newark NJ 07102 or the office of the Director of Procurement, One Madison Avenue, 7th Floor, New York NY 10010.

## 7. INSPECTION OF SITE

Each bidder or his authorized representative must make proper arrangements with the Resident Engineer at the construction site before inspecting the construction site. To make such arrangements call Jim Massett, at 718-390-2598.

## 8. QUESTIONS BY BIDDERS

Questions by prospective bidders concerning the Contract may be addressed to Sultan Aslam, at 973-792-3775; FAX: (973) 792-3906, who however is authorized only to direct the attention of prospective bidders to various portions of the Contract so that they may read and interpret such portions for themselves. Neither Sultan Aslam nor any other employee or representative of the Authority is authorized to give interpretations of any portion of the Contract or to give information as to the requirements of the Contract in addition to that contained in the Contract. Interpretations of the Contract or additional information as to its requirements, where necessary, shall be communicated to bidders only by written addendum issued over the name of the Chief Engineer, which addendum shall be considered part of this Contract. Accordingly, nothing contained herein and no representation, statement or promise, oral or in writing, of the Authority, its Commissioners, officers, agents, representatives or employees shall impair or limit the effect of the warranties of the Contractor contained in the clause of the Form of Contract entitled "Contractor's Warranties" or elsewhere in this Contract. The provisions of this clause shall apply to questions addressed by prospective bidders both before and after their receipt of Contract Documents.

## 9. PORT AUTHORITY SECURITY REQUIREMENTS

The Port Authority of New York and New Jersey operates facilities and systems at which terrorism or other criminal acts may have a significant impact on life safety and key infrastructures. The Authority reserves the right to impose multiple layers of security requirements on the performance of the contract work, including on the Contractor, its staff and subcontractors and their staffs depending upon the level of security required, as determined by the Authority. The Contractor shall, and shall instruct its subcontractors, to cooperate with Authority staff in adopting security requirements. These security requirements may include but are not limited to the following.

A. Identity Checks and Background Screening:

Contractor/subcontractor identity checks and background screening shall include but shall not be limited to: (1) inspection of not less than two forms of valid and current government issued identification (at least one having an official photograph) to verify staff's name and residence; (2) screening federal, state and local criminal justice agency information databases and files; (3) screening of any terrorist identification files; (4) multi-year check of personal, employment and/or credit history; (5) access identification to include some form of biometric security methodology such as fingerprint, facial or iris scanning.

The Contractor may be required to have its staff, and any subcontractor's staff, authorize the Authority or its designee to perform background checks. Such authorization shall be in a form acceptable to the Authority. If the Engineer directs the Contractor to have identity checks and background screening performed by a particular firm designated by the Engineer, the Authority will compensate the Contractor for the cost of such screening at the Net Cost of such screening. "Net Cost" shall be computed in the same manner as is compensation for extra work, including any percentage addition to cost, as set forth in the clause of the contract providing compensation for extra work. Perform-ance of such Net Cost work shall be as directed by the Engineer and shall be subject to all provisions of the contract relating to performance of extra work. Compensation for said Net Cost work shall not be charged against the total amount of compensation authorized for extra work.

B. Issuance of Photo Identification Badges:

No person will be permitted on or about the construction site without a photo identification badge approved by the Engineer. The Contractor shall provide such badges for employees, subcontractors and materialmen. All employees of the Contractor, subcontractors and materialmen shall wear identification badges in a conspicuous and clearly visible position whenever they are working at the construction site.

If the Authority requires facility-specific identification badges for the Contractor's and subcontractors' staffs, the Authority will supply such identification badges at no cost to the Contractor.

C. Construction Site Access Control:

1.) The Authority may provide for construction site access control, inspection and monitoring by Authority retained security guards. However, this provision shall not relieve the Contractor of its responsibility to secure its equipment and work at the construction site at its own expense.

2.) At the beginning of each work period the Contractor shall furnish to the security guards, if any, or to the Engineer a memorandum showing for that work period:

a. The name and company affiliation of each employee of the Contractor or of a subcontractor who is expected to enter the site and,

b. The name of any firm anticipated to be delivering materials or servicing equipment that day and a description of such materials or services.

The Authority may impose, increase, and/or upgrade security requirements for the Contractor, subcontractors and their staffs during the term of this contract to address changing security conditions and/or new governmental regulations.

## 10. PREVAILING RATE OF WAGE CERTIFICATION

The bidders' attention is directed specifically to the clause of the Form of Contract entitled "Prevailing Rate of Wage" and to the fact that the Authority requires a certification in writing from the successful bidder, in such form as may be required pursuant to such clause, that he has paid and caused his subcontractors to pay at least the prevailing rate of wage and supplements required by such clause. This certification is required prior to his receipt of any payment from the Authority hereunder as provided in the clauses of the Form of Contract entitled "Monthly Advances" and "Final Payment" or at any other time.

## 11. CERTIFICATION OF NO INVESTIGATION (CRIMINAL OR CIVIL ANTI-TRUST), INDICTMENT, CONVICTION, SUSPENSION, DEBARMENT, DISQUALIFICATION, PREQUALIFICATION DENIAL OR TERMINATION, ETC; DISCLOSURE OF OTHER REQUIRED INFORMATION

By bidding on this Contract, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, that the bidder and each parent and/or affiliate of the bidder has not (a) been indicted or convicted in any jurisdiction; (b) been suspended, debarred, found not responsible or otherwise disqualified from entering into contracts with any governmental agency or been denied a government contract for failure to meet prequalification standards; (c) had a contract terminated by any governmental agency for breach of contract or for any cause related directly or indirectly to an indictment or conviction; (d) changed its name and/or Employer Identification Number (taxpayer identification number) following its having been indicted, convicted, suspended, debarred or otherwise disqualified, or had a contract terminated as more fully provided in (a), (b) and (c) above; (e) ever used a name, trade name or abbreviated name, or an Employer Identification Number different from those inserted in the Proposal; (f) been denied a contract by any governmental agency for failure to provide the required security, including bid, payment or performance bonds or any alternative security deemed acceptable by the agency letting the contract; (g) failed to file any required tax returns or failed to pay any applicable federal, state or local taxes; (h) had a lien imposed upon its property based on taxes owed and fines and penalties assessed by any agency of the federal, state or local government; (i) been, and is not currently, the subject of a criminal investigation by any federal, state or local prosecuting or investigative agency and/or a civil anti-trust investigation by any federal, state or local prosecuting or investigative agency, including an inspector general of a governmental agency or public authority; (j) had any sanctions imposed as a result of a judicial or administrative proceeding with respect to any professional license held or with respect to any violation of a federal, state or local environmental law, rule or regulation; and (k) shared space, staff, or equipment with any business entity.

The foregoing certification as to "(a)" through "(k)" shall be deemed to have been made by the bidder as follows: if the bidder is a corporation, such certification shall be deemed to have been made not only with respect to the bidder itself, but also with respect to each director and officer, as well as, to the best of the certifier's knowledge and belief, each stockholder with an ownership interest in excess of 10%; if the bidder is a partnership, such certification shall be deemed to have been made not only with respect to the bidder itself, but also with respect to each partner. Moreover, the foregoing certification, if made by a corporate bidder, shall be deemed to have been authorized by the Board of Directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of such certification as the act and deed of the corporation.

In any case where the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the signed bid a signed statement which sets forth in detail the reasons therefor. If the bidder is uncertain as to whether it can make the foregoing certification, it shall so indicate in a signed statement furnished with its bid, setting forth an explanation for its uncertainty.

Notwithstanding that the certification may be an accurate representation of the bidder's status with respect to the enumerated circumstances provided for in this clause as requiring disclosure at the time that the bid is submitted, the bidder agrees to immediately notify the Authority in writing of any change in circumstances during the period of irrevocability, or any extension thereof.

The foregoing certification or signed statement shall be deemed to have been made by the bidder with full knowledge that it would become a part of the records of the Authority and that the Authority will rely on its truth and accuracy in awarding this Contract. In the event that the Authority determines at any time prior or subsequent to the award of the Contract that the bidder has falsely certified as to any material item in the foregoing certification; willfully or fraudulently submitted any signed statement pursuant to this clause which is false in any material respect; or has not completely and accurately represented its status with respect to the circumstances provided for in this clause as requiring disclosure, the Authority may determine that the bidder is not a responsible bidder with respect to its bid on this Contract or with respect to future bids and may, in addition to exercising any other rights or remedies available to it, exercise any of the rights or remedies set forth in the clause of the Form of Contract entitled "Rights and Remedies of Authority". In addition, bidders are advised that knowingly providing a false certification or statement pursuant hereto may be the basis for prosecution for offering a false instrument for filing (see e.g., New York Penal Law, Section 175.30 et seq.). Bidders are also advised that the inability to make such certification will not in and of itself disqualify a bidder, and that in each instance the Authority will evaluate the reasons therefor provided by the bidder.

Under certain circumstances the bidder may be required as a condition of this contract award to enter into a Monitoring Agreement under which it will be required to take certain specified actions, including compensating an independent Monitor to be selected by the Port Authority. Said Monitor shall be charged with, among other things, auditing the actions of the bidder to determine whether its business practices and relationships indicate a level of integrity sufficient to permit it to continue business with the Port Authority.

As used in this clause, the following terms shall mean:

Affiliate - An entity in which the parent of the bidder owns more than fifty percent of the voting stock, or an entity in which a group of principal owners which owns more than fifty percent of the bidder also owns more than fifty percent of the voting stock.

Agency or Governmental Agency - Any federal, state, city or other local agency, including departments, offices, quasi-public agencies, public authorities and corporations, boards of education and higher education, public development corporations, local development corporations and others.

Employer Identification Number - The tax identification number assigned to firms by the Federal government for tax purposes.

Investigation - Any inquiries made by any federal, state or local criminal prosecuting or investigative agency, including an inspector general of a governmental agency or public authority, and any inquiries concerning civil anti-trust investigations made by any federal, state or local governmental agency. Except for inquiries concerning civil anti-trust investigations, the term does not include inquiries made by any civil government agency concerning compliance with any regulation, the nature of which does not carry criminal penalties, nor does it include any background investigations for employment, or Federal, state, and local inquiries into tax returns.

Officer - Any individual who serves as chief executive officer, chief financial officer, or chief operating officer of the bidder by whatever titles known.

Parent - An individual, partnership, joint venture or corporation which owns more than 50% of the voting stock of the bidder.

Space Sharing - Space shall be considered to be shared when any part of the floor space utilized by the submitting business at any of its sites is also utilized on a regular or intermittent basis for any purpose by any other business or not-for-profit organization, and where there is no lease or sublease in effect between the submitting business and any other business or not-for-profit organization that is sharing space with the submitting business.

Staff Sharing - Staff shall be considered to be shared when any individual provides the services of an employee, whether paid or unpaid, to the bidder and also, on either a regular or irregular basis, provides the services of an employee, paid or unpaid, to one or more other business(es) and/or not-for-profit organization(s), if such services are provided during any part of the same hours the individual is providing services to the bidder or if such services are provided on an alternating or interchangeable basis between the bidder and the other business(es) or not-for-profit organization(s). "The services of an employee" should be understood to include services of any type or level, including managerial or supervisory. This type of sharing may include, but is not limited to, individuals who provide the following services: telephone answering, receptionist, delivery, custodial, and driving.

Equipment Sharing - Equipment shall be considered to be shared whenever the bidder shares the ownership and/or the use of any equipment with any other business or not-for-profit organization. Such equipment may include, but is not limited to, telephones or telephone systems, photocopiers, computers, motor vehicles, and construction equipment. Equipment shall not be considered to be shared under the following two circumstances: when, although the equipment is owned by another business or not-for-profit organization, the bidder has entered into a formal lease for the use of the equipment and exercises exclusive use of the equipment; or when the bidder owns equipment that it has formally leased to another business or not-for-profit organization, and for the duration of such lease the bidder has relinquished all right to the use of such leased equipment.

## 12. NON-COLLUSIVE BIDDING AND CODE OF ETHICS CERTIFICATION; CERTIFICATION OF NO SOLICITATION BASED ON COMMISSION, PERCENTAGE, BROKERAGE, CONTINGENT FEE OR OTHER FEE

By bidding on this Contract, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, that: (a) the prices in its bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor; (b) the prices quoted in its bid have not been and will not be knowingly disclosed, directly or indirectly, by the bidder prior to the official opening of such bid to any other bidder or to any competitor; (c) no attempt has been made and none will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition; (d) this organization has not made any offers or agreements, or given or agreed to give anything of value (see definition of "anything of value" appearing in the clause of the Form of Contract entitled "No Gifts, Gratuities, Offers of Employment, etc.") or taken any other action with respect to any Authority employee or former employee or immediate family member of either which would constitute a breach of ethical standards under the Code of Ethics and Financial Disclosure dated as of April 11, 1996 (a copy of which is available upon request to the individual named in the clause hereof entitled "Questions by Bidders"), nor does this organization have any knowledge of any act on the part of an Authority employee or former Authority employee relating either directly or indirectly to this organization which constitutes a breach of the ethical standards set forth in said Code; (e) no person or selling agency, other than a bona fide employee or bona fide established commercial or selling agency maintained by the bidder for the purpose of securing business, has been employed or retained by the bidder to solicit or secure this Contract on the understanding that a commission, percentage, brokerage, contingent or other fee would be paid to such person or selling agency; the bidder has not offered, promised or given, demanded or accepted, any undue advantage, directly or indirectly, to or from a public official or employee, political candidate, party or party official, or any private sector employee (including a person who directs or works for a private sector enterprise in any capacity), in order to obtain, retain, or direct business or to secure any other improper advantage in connection with this Contract.

The foregoing certification as to "(a)", "(b)", "(c)", "(d)" and "(e)" shall be deemed to have been made by the bidder as follows: if the bidder is a corporation, such certification shall be deemed to have been made not only with respect to the bidder itself, but also with respect to each parent, affiliate, director and officer of the bidder, as well as, to the best of the certifier's knowledge and belief, each stockholder of the bidder with an ownership interest in excess of 10%; if the bidder is a partnership, such certification shall be deemed to have been made not only with respect to the bidder itself, but also with respect to each partner. Moreover, the foregoing certification, if made by a corporate bidder, shall be deemed to have been authorized by the Board of Directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of such certification as the act and deed of the corporation.

In any case where the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the signed bid a signed statement which sets forth in detail the reasons therefor. If the bidder is uncertain as to whether it can make the foregoing certification, it shall so indicate in a signed statement furnished with its bid, setting forth in such statement the reasons for its uncertainty.

Notwithstanding that the bidder may be able to make the foregoing certification at the time the bid is submitted, the bidder shall immediately notify the Authority in writing during the period of irrevocability of bids on this Contract or any extension of such period, of any change of circumstances which might under this clause make it unable to make the foregoing certification or required disclosure. The foregoing certification or signed statement shall be deemed to have been made by the bidder with full knowledge that it would become a part of the records of the Authority and that the Authority will rely on its truth and accuracy in awarding this Contract. In the event that the Authority should determine at any time prior or subsequent to the award of this Contract that the bidder has falsely certified as to any material item in the foregoing certification or has willfully or fraudulently furnished a signed statement which is false in any material respect, or has not fully and accurately represented any circumstance with respect to any item in the foregoing certification required to be disclosed, the Authority may determine that the bidder is not a responsible bidder with respect to its bid on this Contract or with respect to future bids on Authority contracts and may, in addition to exercising any other rights or remedies it may have, exercise any of the rights or remedies set forth in the clause of the Form of Contract entitled "Rights and Remedies of the Authority".

In addition, bidders are advised that knowingly providing a false certification or statement pursuant hereto may be the basis for prosecution for offering a false instrument for filing (see e.g., New York Penal Law, Section 175.30 et seq.). Bidders are also advised that the inability to make such certification will not in and of itself disqualify a bidder, and that in each instance the Authority will evaluate the reasons therefor provided by the bidder.

Under certain circumstances the bidder may be required as a condition of this contract award to enter into a Monitoring Agreement under which it will be required to take certain specified actions, including compensating an independent Monitor to be selected by the Port Authority. Said Monitor shall be charged with, among other things, auditing the actions of the bidder to determine whether its business practices and relationships indicate a level of integrity sufficient to permit it to continue business with the Port Authority.

## 13. BIDDER ELIGIBILITY FOR AWARD OF CONTRACTS - DETERMINATIONS BY AN AGENCY OF THE STATE OF NEW YORK OR NEW JERSEY CONCERNING ELIGIBILITY TO RECEIVE PUBLIC CONTRACTS

Bidders are advised that the Authority has adopted a policy to the effect that in awarding its contracts it will honor any determination by an agency of the State of New York or New Jersey that a bidder is not eligible to bid on or be awarded public contracts because the bidder has been determined to have engaged in illegal or dishonest conduct or to have violated prevailing rate of wage legislation.

The policy permits a bidder whose ineligibility has been so determined by an agency of the State of New York or New Jersey to submit a bid on a Port Authority contract and then to establish that it is eligible to be awarded the contract on which it has bid because (i) the state agency determination relied upon does not apply to the bidder, or (ii) the state agency determination relied upon was made without affording the bidder the notice and hearing to which the bidder was entitled by the requirements of due process of law, or (iii) the state agency determination was clearly erroneous or (iv) the state agency determination relied upon was not based on a finding of conduct demonstrating a lack of integrity or a violation of a prevailing rate of wage law.

The full text of the resolution adopting the policy may be found in the Minutes of the Authority's Board of Commissioners meeting of September 9, 1993.

## 14. ON SITE SUPERVISION

This Contract is being set aside for bidding by Port Authority certified Minority and Womens' Business Enterprises or Small Business Enterprises. Given this bidding preference, the successful bidder shall, at a minimum, maintain a regular on site presence at the Construction Site and exercise day-to-day financial and operational management, control and oversight of the Work.

# PROPOSAL

To The Port Authority of New York and New Jersey:

The undersigned[2] J.H. Salas + Sons Inc "a Corporation organized under the laws of the State of new Jersey"

(hereinafter called "the Contractor") hereby offers to perform all the obligations and to assume all the duties and liabilities of the Contractor provided for in the annexed Contract, at the price inserted by the undersigned in the clause of the Form of Contract entitled "General Agreement".

This offer shall be irrevocable for 60 days after the date on which The Port Authority of New York and New Jersey opens this Proposal.

To induce the acceptance of this Proposal, the undersigned hereby makes each and every certification, statement, assurance, representation and warranty made by the Contractor in said Contract. Moreover as a condition to receipt and consideration by the Authority of the Proposal whether or not it is accepted, the undersigned agrees that all information of any nature whatsoever, regardless of the form of the communication, received from the undersigned (including its officers, agents, or employees) by the Authority, its Commissioners, officers, agents or employees, and notwithstanding any statement therein to the contrary, has not been given in confidence and may be used or disclosed by or on behalf of the Authority without liability of any kind except as may arise under letters patent of the undersigned, if any.

PROCUREMENT
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2 Insert bidder's name at the top of the page. After the bidder's name, insert one of the following phrases:

If a corporation, give state of incorporation, using the phrase, "a corporation organized under the laws of the State of ."

If a partnership, give full names of partners, using also the phrase, "co-partners doing business under the firm name of ."

If an individual using a trade name, give individual name, using also the phrase, "an individual doing business under the trade name of ."

If a joint venture, give the information required above for each participant in the joint venture.

Unless expressly stated otherwise, the Information for Bidders, all papers required by it and submitted in connection herewith at any time, said Form of Contract, and all papers made part of the Contract by the terms of the Form of Contract are made part of this Proposal.

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The undersigned hereby designates the following as the bidders office[3]:

601 UNION AVE
UNION BEACH N.J.

The telephone number of the bidder is: 732 739 6700

The fax number of the bidder is: 732 739 0006

The E-Mail address of the bidder is: JHSalas@Monmouth.Com

[3] Insert office address.

## SIGNATURE AND CERTIFICATE OF AUTHORITY[4]

PROCUREMENT 2006 AUG 30 PM 2:59

Dated, August 21, 20 06

(Signature of individual or name of corporation or partnership)

(Signature of agent, partner or corporate officer)

By[5 6] Gustavo Salas

(Acknowledgment of signature to be taken on proper form on following page(s))

## CERTIFICATE OF AUTHORITY, IF BIDDER IS A CORPORATION

I, the undersigned, as Secretary of the corporation submitting the foregoing Proposal, hereby certify that under and pursuant to the by-laws and resolutions of said corporation, each officer who has signed said Proposal on behalf of the corporation is fully and completely authorized so to do.

(Corporate Seal)

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4 If bidder is a joint venture, insert signatures as appropriate for one participant of the joint venture on this page and attach and complete an additional signature sheet in the same form as appears on this page for each other participant as required.

5 If Proposal is signed by an officer or agent, give title.

6 NOTE: The foregoing signature shall be deemed to have been provided with full knowledge that the foregoing Proposal, the accompanying Contract booklet, as well as any certification, statement, assurance, representation, warranty, schedule or other document submitted by the bidder with the Proposal will become a part of the records of the Authority and that the Authority will rely in awarding the Contract on the truth and accuracy of such Proposal and each such certification, statement, assurance, representation, warranty and schedule made therein by the Contractor. Knowingly submitting a false statement in connection with any of the foregoing may be the basis for prosecution for offering a false instrument for filing (see, e.g., N.Y. Penal Law, Section 175.30 et seq.).

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## ACKNOWLEDGMENT[7]

### ACKNOWLEDGMENT OF BIDDER, IF A CORPORATION

State of New Jersey

SS:

County of Monmouth

On this 21st day of Aug, 2006 before me personally came and appeared GUSTAVO SALAS, to me known, who, being by me duly sworn, did depose and say that he resides at [redacted], that he is the President of J & S Salas & Sons Inc, the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation; and that he signed his name thereto by like order.

Lucy Ortiz
Notary Public
State of New Jersey
My Commission Expires May 3, 2010

(Notary Seal)

(Notary Signature)

### ACKNOWLEDGMENT OF BIDDER, IF A PARTNERSHIP

State of _____

_____ SS:

County of _____

On this _____ day of _____, 20 , before me personally came and appeared _____, to me known and known to me to be one of the members of the firm of _____, described in and who executed the foregoing instrument and he acknowledged to me that he executed the same as and for the act and deed of said firm.

(Notary Seal)

_____

(Notary Signature)

### ACKNOWLEDGMENT OF BIDDER, IF AN INDIVIDUAL

State of _____

_____ SS:

County of _____

On this _____ day of _____, 20 , before me personally came and appeared _____ to me known and known to me to be the person described in and who executed the foregoing instrument and he acknowledged to me that he executed the same.

(Notary Seal)

_____

(Notary Signature)

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[7] If bidder is a joint venture, insert signature as appropriate for one participant of the joint venture on this page and attach and complete an additional Acknowledgment sheet in the same form as appears on this page for each other participant as required

CONTRACT AK-179

## STATEMENT ACCOMPANYING PROPOSAL[8]

Names and Residences of Officers, If Bidder is a Corporation

| Name | Title, | Residence[9] |
|---|---|---|
| Gustavo Salas | President | [redacted] |
| Juan A. Salas | V. Pres. | [redacted] |
| Felipe Salas | Secretary | [redacted] |
| Juan R. Salas | Treasurer | [redacted] |

Names and Residences of Partners, If Bidder is a Partnership

| Name | General or Limited Partner | Residence[10] |
|---|---|---|

Bidder's Residence, If an Individual[11]

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8 If bidder is a joint venture, insert signature as appropriate for one participant of the joint venture on this page and attach and complete an additional Statement Accompanying Proposal sheet in the same form as appears on this page for each other participant as required.

9 Give Street and Number of Residence. Do not give business address.

10 Give Street and Number of Residence. Do not give business address.

11 Give Street and Number of Residence. Do not give business address.

# FORM OF CONTRACT

# CHAPTER I

# GENERAL PROVISIONS

## 15. DEFINITIONS

To avoid undue repetition, the following terms whenever they occur in this Form of Contract or any of the other papers forming a part of the Contract shall be construed as follows:

"Contract" shall mean, in addition to this Form of Contract, the Information for Bidders, the Proposal, the Authority's acceptance, the Specifications and the Contract Drawings (including written addenda issued over the name of the Chief Engineer), all of which are made part hereof as though herein set forth in full. The Contract as so defined shall constitute the complete and exclusive statement of the terms of the agreement between the parties and the Contract may not be explained or supplemented by course of dealing, usage of trade or course of performance.

The term "days" or "calendar days" in reference to a period of time shall mean consecutive calendar days, Saturdays, Sundays and holidays, included.

The term "construction site" or words of similar import shall mean the three Staten Island Bridges (Bayonne Bridge, Goethals Bridge and Outerbridge Crossing) including their approaches located in New Jersey and New York.

"Work" shall mean all structures, equipment, plant, labor, materials (including materials and equipment, if any, furnished by the Authority) and other facilities and all other things necessary or proper for or incidental to repair of light poles, light pole supports, light systems, light pole foundations and related work incidental to the repairs, including but not limited to installation of duct banks, conduits, wiring, etc.; and "performance of Work" and words of similar import shall mean the furnishing of such facilities and the doing of such things.

"Work required by the Contract Drawings and Specifications in their present form" or words of similar import shall include all Work required by the Specifications in their present form (whether or not shown upon the Contract Drawings), all Work shown upon the Contract Drawings in their present form (whether or not mentioned in the Specifications), and all Work involved in or incidental to the accomplishment of the results intended by the Specifications and Contract Drawings in their present form (whether or not mentioned therein or shown thereon)."

"Equipment" and "plant" shall include construction equipment and plant rented as agent for the Authority.

"Extra Work" shall mean Work required by the Chief Engineer, Assistant Chief Engineer - Construction or Engineer of Construction pursuant to the clause hereof entitled "Extra Work Orders" which is in addition to that required by the Contract Drawings and Specifications in their present form.

"Contract Drawings" shall mean the Contract Drawings designated in the clause of the Specifications entitled "Contract Drawings" and, except as used in the phrase "Contract Drawings in their present form", shall include any future alterations and revisions of said drawings.

"Shop Drawings" shall mean all drawings, diagrams, illustrations, schedules, including supporting data, which are specifically prepared for this Contract and submitted by the Contractor pursuant to the requirements of the Specifications or the Engineer to illustrate some portion of the Work. The terms "shop drawings", "placing drawings" and "working drawings" are used interchangeably in this Contract.

"Catalog Cuts" shall mean all standard drawings, diagrams, illustrations, brochures, schedules, performance charts and instructions submitted by the Contractor pursuant to the requirements of the Specifications or the Engineer to illustrate some portion of the Work.

"Chief Engineer" shall mean the Chief Engineer of the Authority for the time being, or his successor in duties, acting personally.

"Engineer" shall mean the Chief Engineer, acting either personally or through his duly authorized representatives acting within the scope of the particular authority vested in them.

"Assistant Chief Engineer - Construction" shall mean the Assistant Chief Engineer - Construction of the Authority for the time being, or his successor in duties, acting personally.

"Engineer of Construction" shall mean the designated Engineer of Construction for the facility at which the Work is being performed or his successor in duties, acting personally.

"Inspector" shall mean any representative of the Engineer designated by him as Inspector and acting within the scope of the particular authority vested in him.

The term "permanent construction" shall include all construction, installation, structures, equipment and materials (including materials and equipment, if any, furnished by the Authority to be constructed, installed or left by the Contractor at or about the construction site (or elsewhere in the possession of the Authority after the completion of the Work (whether or not they are yet delivered or installed), even though they are subsequently to be removed by others. The terms, "permanent installation", "permanent structure", "permanent materials", and words of similar import shall have the same meaning as the term "permanent construction".

"Subcontractor" shall mean anyone who performs Work (other than or in addition to the furnishing of materials, plant or equipment) at or about the construction site, directly or indirectly for or in behalf of the Contractor (and whether or not in privity of contract with the Contractor), but shall not include any person who furnished merely his own personal labor or his own personal services or who performs Work which consists only of the operation of construction equipment of which he is the lessor.

"Materialman" shall mean anyone who furnishes materials, plant or equipment to the Contractor or any subcontractor for use at or about the construction site in the performance of Work.

"Materialman" or "subcontractor", however, shall exclude the Contractor or any subsidiary or parent of the Contractor or any person, firm or corporation which has a substantial interest in the Contractor or in which the Contractor or the parent or the subsidiary of the Contractor, or an officer or principal of the Contractor or of the parent or the subsidiary of the Contractor has a substantial interest, provided, however, that for the purpose of the clause hereof entitled "Assignments and Subcontracts" the exclusion in this paragraph shall not apply to anyone but the Contractor himself.

"Workingman" or "workman" shall mean any employee of the Contractor or of a subcontractor who performs personal labor or personal services at the construction site.

"Lump Sum" shall mean the amount stipulated in the clause hereof entitled "General Agreement".

"Notice" shall mean a written notice.

Whenever they refer to the Work or its performance, "directed", "required", "permitted", "ordered", "designated", "prescribed" and words of similar import shall mean directed, required permitted, ordered, designated or prescribed by the Engineer; and "approved", "acceptable", "satisfactory" and words of similar import shall mean approved by or acceptable or satisfactory to the Engineer; and "necessary", "reasonable", "proper", "correct" and words of similar import shall mean necessary, reasonable, proper or correct in the judgment of the Engineer.

Whenever "including", "such as" or words of similar import are used, the specific things thereafter enumerated shall not limit the generality of the things preceding such words.

## 16. GENERAL AGREEMENT[12]

The Contractor agrees to repair light poles, light pole supports, light systems, light pole foundations and related work incidental to the repairs, including but not limited to installation of duct banks, conduits, wiring, etc. and to furnish all structures, equipment, plant, labor, materials and other facilities and to do all other things necessary or proper therefor or incidental thereto, all in strict accordance with the Contract Drawings and Specifications and any future changes therein; and the Contractor further agrees to assume and perform all other duties and obligations imposed upon him by this Contract.

The Authority agrees to pay to the Contractor and the Contractor agrees to accept from the Authority, in full consideration for the performance by the Contractor of his duties and obligations under this Contract and the whole thereof, a compensation of:

TWO HUNDRED NINETY THREE THOUSAND SEVEN HUNDRED Dollars

— ZERO — Cents

($ 293,700.00 )

(throughout this Contract called the "Lump Sum"), and such compensation only, subject only to the express provisions of this Contract specifically setting forth actual, defined additions to or deductions from such compensation.

The enumeration in this Form of Contract and in the Specifications of particular things to be furnished or done at the Contractor's expense, or without cost or expense to the Authority, or without additional compensation to the Contractor shall not be deemed to imply that only things of a nature similar to those enumerated shall be so furnished and done; but the Contractor shall perform all Work as required without other compensation than that specifically provided, whatsoever changes may be made in the Contract Drawings and Specifications, whatsoever Work may be required in addition to that required by the Contract Drawings and Specifications in their present form, and whatsoever obstacles or unforeseen conditions may arise or be encountered.

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PROCUREMENT

[12] For sales tax exemptions, see clauses entitled "Exemptions from New Jersey State Sales Taxes" and "Exemptions from New York State and New York City Sales Taxes".

## 17. AUTHORITY ACCESS TO RECORDS

The Authority shall have access during normal business hours to all records and documents of the Contractor relating to any amounts for which the Contractor has been compensated, or claims he should be compensated, by the Authority by payment determined on any basis other than by payment of a lump sum or unit price amount agreed upon in writing by the Contractor and the Authority; provided, however, such access shall extend to certified payroll records as described in the clause of the Form of Contract entitled "Prevailing Rate of Wage" regardless of the method by which the Contractor is compensated under this Contract. The Contractor shall obtain for the Authority similar access to similar records and documents of subcontractors. Such access shall be given or obtained both before and within a period of three years after Final Payment to the Contractor; provided, however, that if within the aforesaid three year period the Authority has notified the Contractor in writing of a pending claim by the Authority under or in connection with this Contract to which any of the aforesaid records and documents of the Contractor or of his subcontractors relate either directly or indirectly, then the period of such right of access shall be extended to the expiration of 6 years from the date of Final Payment with respect to the records and documents involved.

No provision in this Contract giving the Authority a right of access to records and documents is intended to impair or affect any right of access to records and documents which the Authority would have in the absence of such provision.

## 18. AGENCY FOR RENTAL OF CONSTRUCTION EQUIPMENT

With respect to the performance of Work in the State of New York:

A. General Provisions

The Contractor further agrees to act as the agent of the Authority, subject to the provisions of this numbered clause relating to such agency for the rental of all construction equipment necessary or desirable for or incidental to the performance of the Contract (other than construction equipment owned and also used by the Contractor or owned and also used by any subcontractor) and, in the exercise of such agency, to assume all the obligations and duties imposed upon him by this Contract. The Contractor may authorize any subcontractor to act as his subagent for rental of such equipment for use by such subcontractor, subject to all the provisions of this Contract. "Construction equipment" as used in this numbered clause shall include plant.

The Authority will pay the rental charges for said equipment directly to the lessors thereof, but the charges so paid shall be deducted from the compensation payable to the Contractor under the Contract; provided, however, that the Authority will pay such charges, and the Contractor is authorized by the Authority to act as such agent, to the extent only that the charges payable for such rental do not exceed the compensation payable to the Contractor under the Contract; and provided further that the Contractor performs all the obligations relating to said agency imposed upon him by this Contract.

The Authority will provide the Contractor with a statement to be furnished by him and the subcontractors to such lessors which will identify this Contract as the one under which the Contractor is authorized to rent said equipment and which will identify the site to which delivery must be made. The Contractor shall arrange for delivery of said equipment directly to the construction site. Payment of the rental charges therefore shall be made by the Authority on the basis of invoices made out to the Authority in which is contained the place of delivery and on which the Contractor has certified by endorsement that such construction equipment is being or has been used in the performance of the Contract, said invoices to be submitted through the Contractor to the Authority at the time said equipment is put into use at the construction site. In the event said invoices are not submitted promptly, at the time stated above, but are submitted at a time when, by reason of prior advances and payments to the Contractor or for his account, the amounts still payable to the Contractor in connection with the Contract are insufficient to pay said invoices, then the Authority shall not be liable to the lessors for any amounts in excess of said amounts still payable to the Contractor which remain in the possession of the Authority.

Notwithstanding the above agency arrangement, the Authority shall not be liable to lessors of construction equipment for any amounts except rental charges based on time of use of such equipment, and the Contractor's agency is limited accordingly. All obligations incurred by the Contractor or subcontractors for any other expenses, including repairs and damages for breach of the rental agreement, shall be obligations incurred by the Contractor or subcontractors as principal not as agent of the Authority. Moreover, as between the Authority and the Contractor, the Contractor shall be responsible for all amounts due to lessors of construction equipment notwithstanding the above agency arrangement.

The Contractor shall indemnify the Authority against any claim of any kind whatsoever made against the Authority by a lessor of construction equipment and the Contractor assumes the risk of all claims against him by any lessor of construction equipment, including in both cases, claims in connection with a subcontractor.

The agency provided for under this numbered clause shall not relieve the Contractor of any of his duties and obligations elsewhere provided for under this Contract.

B. Option Not to Act as Agent

Notwithstanding the provisions of A above, the Contractor shall have the right to elect not to act as the agent of the Authority for the rental of any particular item or items of said construction equipment, in which event, with regard to any such rentals by the Contractor as principal and not agent, the provisions of A of this numbered clause shall be inapplicable as well as those provisions of the clause of the Form of Contract entitled "Exemption From New York State and New York City Sales Taxes", which relate to rental of construction equipment.

## 19. EXEMPTION FROM NEW JERSEY STATE SALES TAXES

With respect to the performance of Work in the State of New Jersey, the attention of the Contractor is directed to the following provision of the New Jersey State Sales and Use Tax Act:

Receipts from sales made to contractors or repairmen of materials, supplies or services for exclusive use in erecting structures or building on, or otherwise improving, altering or repairing real property of:

> (a) organizations described in subsections (a) and (b) of section 9 of the "Sales and Use Tax Act," P.L. 1966, c.30 (C. 54:32B-9);
>
> *** are exempt from the tax imposed under the "Sales and Use Tax Act," provided any person seeking to qualify for the exemption shall do so pursuant to such rules and regulations and upon forms as shall be prescribed by the director. N.J.S.A. 54:32B-8:22.

The Authority is an exempt organization of the type described in subsection (a) of section 9 of the act.

In view of the foregoing, the Contractor should not include in his price(s) any amounts for New Jersey State sales and use taxes on such materials, supplies and services. [13]

If (i) any claim is made against the Contractor by the State of New Jersey for such sales or compensating use taxes, or (ii) any claim is made against the Contractor by a materialman or a subcontractor on account of a claim against such materialman or subcontractor by the State of New Jersey for such sales or compensating use taxes, then the Authority will reimburse the Contractor in an amount equal to the amount of such tax required to be paid in accordance with the requirements of law, provided that:

A. the Contractor, or the Contractor and any such subcontractor, as the case may be, have complied with such rules and regulations as may have been promulgated relating to the claiming of the exemption from such taxes and have filed all the forms and certificates required by the applicable laws, rules and regulations in connection therewith; and

B. the Authority is afforded the opportunity before any payment of tax is made, to contest said claim in the manner and to the extent that the Authority may choose and to settle or satisfy said claim, and such attorney as the Authority may designate is authorized to act for the purpose of contesting, settling and satisfying said claim; and

C. the Contractor, or the Contractor and any such subcontractor, as the case may be, give immediate notice to the Authority of any such claim, cooperate with the Authority and its designated attorney in contesting said claim and furnish promptly to the Authority and said attorney all information and documents necessary or convenient for contesting said claim, said information and documents to be preserved for six years after the date of Final Payment or longer if such a claim is pending or threatened at the end of such six years.

If the Authority elects to contest any such claim, it will bear the expense of such contest.

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[13] Note regarding equipment rentals: The attention of the Contractor is directed to the fact that the New Jersey State Sales Tax Bureau has ruled that the "rental of equipment is taxable whether or not the job is performed for an exempt organization." Therefore in the case of equipment rentals, if any, the Contractor should include in his prices an amount for taxes thereon.

## 20. EXEMPTION FROM NEW YORK STATE AND NEW YORK CITY SALES TAXES

With respect to the performance of Work in the State of New York:

A. Materials Incorporated in Permanent Construction

The attention of the Contractor is directed to the following provision of the New York State and New York City Sales and Compensating Use Tax Act:

> "#1115. Exemptions from sales and use taxes. (a) Receipts from the following shall be exempt from the tax on retail sales imposed under subdivision (a) of section eleven hundred five and the compensating use tax imposed under section eleven hundred ten:
>
> (15) Tangible personal property sold to a contractor, subcontractor or repairman for use in erecting a structure or building of an organization described in subdivision (a) of section eleven hundred sixteen, or adding to, altering or improving real property, property or land of such an organization, as the terms real property, property or land are defined in the real property tax law; provided, however, no exemption shall exist under this paragraph unless such tangible personal property is to become an integral component part of such structure, building or real property."

The Authority is an exempt organization of the type described in subdivision (a) of section eleven hundred sixteen.

In view of the foregoing, the Contractor should not include in his price(s) any amounts for New York State and New York City sales and compensating use taxes on such tangible personal property.

If (i) any claim is made against the Contractor by the State of New York or City of New York for such sales or compensating use taxes, or (ii) any claim is made against the Contractor by a materialman or a subcontractor on account of a claim against such materialman or subcontractor by the State of New York or City of New York for such sales or compensating use taxes, then the Authority will reimburse the Contractor in an amount equal to the amount of such tax required to be paid in accordance with the requirements of law, provided that:

1.) the Contractor, or the Contractor and any such subcontractor, as the case may be, have complied with such rules and regulations as may have been promulgated relating to the claiming of the exemption from such taxes and have filed all the forms and certificates required by the applicable laws, rules and regulations in connection therewith;

2.) and the Authority is afforded the opportunity before any payment of tax is made, to contest said claim in the manner and to the extent that the Authority may choose and to settle or satisfy said claim and such attorney as the Authority may designate is authorized to act for the purpose of contesting, settling and satisfying said claim; and

3.) the Contractor, or the Contractor and any such subcontractor, as the case may be, give immediate notice to the Authority of any such claim, cooperate with the Authority and its designated attorney in contesting said claim and furnish promptly to the Authority and said attorney all information and documents necessary or convenient for contesting said claim, said information and documents to be preserved for six years after the date of Final Payment or longer if such a claim is pending or threatened at the end of such six years.

If the Authority elects to contest any such claim, it will bear the expense of such contest.

B. Rental of Construction Equipment

The rental by the Contractor or subcontractor of construction equipment not owned by the Contractor or subcontractors for use in the performance of the Contract will also not be subject to New York State or New York City sales or compensating use taxes, provided that:

1.) the Contractor's and any subcontractor's use of construction equipment rented from others, and any agreement for such rental, is based upon the agency arrangement provided for in the clause hereof entitled "Agency for Rental of Construction Equipment" and the Contractor and subcontractors have performed all their obligations under said clause;

2.) delivery of said equipment is to the construction site;

3.) the Contractor or subcontractor has furnished to the lessor the statement from the Authority identifying this Contract as the one under which the Contractor or subcontractor has been authorized to rent said equipment and identifying the construction site to which delivery must be made;

4.) the invoice for said equipment is made out to the Authority and prescribes the place of delivery; and

5.) the amounts payable for rental of said equipment do not exceed the amount of compensation payable in connection with the Work.

In view of the above, the Contractor should not include in his price(s) any amounts for New York State and New York City sales and compensating use taxes on such rentals of equipment.

If (i) any claim is made against the Contractor by the State or City of New York for sales or compensating use taxes on such rental of construction equipment or (ii) any claim is made against the Contractor by a materialman, lessor or a subcontractor on account of a claim against such materialman, lessor or subcontractor by the State or City of New York for sales or compensating use taxes on rental of said equipment, then the Authority will reimburse the Contractor in an amount equal to the amount of such tax required to be paid in accordance with the requirements of law, provided that the provisos listed above in this numbered clause as A.1 through A.3 and B.1 through B.5 are complied with.

If the Authority elects to contest any such claim, it will bear the expense of such contest.

# CHAPTER II

# ADJUSTMENTS AND PAYMENTS

## 21. ADJUSTMENTS OF LUMP SUM

If any Work required by the Contract Drawings and Specifications in their present form shall be countermanded or reduced, the Engineer shall have full authority on behalf of both parties to make such adjustment by way of reduction in the Lump Sum as he may in his sole discretion deem equitable and reasonable, and in making such adjustment, no allowance to the Contractor shall be made for anticipated profits.

The Chief Engineer shall have authority to agree in writing with the Contractor for adjustments by way of reduction in the Lump Sum in lieu of those for which provision is heretofore made in this numbered clause.

## 22. COMPENSATION FOR EXTRA WORK

The Chief Engineer shall have authority to agree in writing with the Contractor on behalf of the Authority upon lump sum or other compensation for Extra Work in lieu of the compensation for which provision is hereinafter made in this numbered clause.

If such agreement on compensation is not made, and Extra Work be performed, the Contractor's compensation shall be increased by the following amounts and such amounts only:

1.) In the case of Extra Work performed by the Contractor personally, an amount equal to the actual net cost in money of the labor and materials required for such Extra Work, plus twenty per cent (20%) of such net cost, plus such rental for equipment (other than small tools) required for such Extra Work as the Engineer deems reasonable.

2.) In the case of Extra Work performed by a subcontractor, an amount equal to the actual net cost in money of the labor and materials required for such Extra Work, plus twenty per cent (20%) of such net cost plus such rental for equipment (other than small tools) required for such Extra Work as the Engineer deems reasonable, plus seven per cent (7%) of the sum of the foregoing cost, percentage of cost, and rental.

As used in this numbered clause (and in this clause only):

"Labor" means foremen, surveyors, laborers, mechanics and other employees below the rank of superintendent, exclusive of timekeepers, directly employed at the construction site, whether employed by the Contractor or by the subcontractors, subject to the Engineer's authority to determine what employees of any category are "required for Extra Work" and as to the portion of their time allotted to Extra Work; and "cost of labor" means the wages actually paid to and received by such employees plus a proper proportion of (a) premiums, if any, actually paid by the employer for Workers' Compensation Insurance upon the basis of such wages, (b) vacation allowances and union dues and assessments which the employer actually pays pursuant to contractual obligation upon the basis of such wages, and (c) taxes actually paid by the employer pursuant to law upon the basis of such wages. "Employees" as used above means only the employees of one employer.

"Materials" means temporary and consumable materials as well as permanent materials; and "cost of materials" means the price (including taxes actually paid by the Contractor pursuant to law upon the basis of such materials) for which such materials are sold for cash by the manufacturers or producers thereof, or by regular dealers therein, whether or not such materials are purchased directly from the manufacturer, producer or dealer (or if the Contractor is the manufacturer or producer thereof, the reasonable cost to the Contractor of the manufacture and production), plus the reasonable cost of delivering such materials to the construction site in the event that the price paid to the manufacturer, producer or dealer does not include delivery and in case of temporary materials, less their salvage value, if any.

"Work day" in reference to an item of equipment means a day other than a Saturday, Sunday or legal holiday except that if the particular item of equipment is actually utilized at the construction site by the Contractor or subcontractors under this or any other Contract with the Authority on a Saturday, Sunday or legal holiday said day shall be deemed a work day.

The rental for equipment, whether owned by the Contractor or subcontractors or rented from others and notwithstanding the actual price of any rental or actual costs associated with such equipment, shall be computed by the Engineer on the basis of the following:

A.

1.) Hourly rental for those items of equipment listed in the "Rental Rate Blue Book" (published by Machinery Information Division, K-III Directory Corporation, 1735 Technology Drive, Suite 410, San Jose, California 95131-2398), (hereinafter called "the Blue Book") shall be 100% of the applicable rates as listed in said book, reduced to an hourly basis (see formula below) except that such applicable rates shall be reduced by 50% for all hours of rental payable hereunder in excess of 8 hours each day. The edition of this publication to be used shall be the one in effect on the date of the actual rental of the equipment. The "Estimated Operating Cost per Hour" as set forth for such item of equipment in the Blue Book shall be added to the hourly rental for each hour that such equipment is actually engaged in performing Extra Work. No amount for operating cost will be allowed during periods when such equipment is not actually engaged in performing Extra Work (i.e. standby rental time). None of the provisions of the Blue Book shall be deemed referred to or included in this Contract except as specifically set forth in this Section.

2.) If no listing of rental rate and/or hourly operating cost for the item of equipment is in the Blue Book, the Engineer shall determine the reasonable rate of rental and/or hourly operating cost of the particular item of equipment by such other means as he finds appropriate.

B. When utilizing the rental rates appearing in the Blue Book, the Engineer shall determine the applicable rate and the hourly rental determined therefrom by applying the following criteria:

1.) The rate to be applied for an item of equipment used on a particular Extra Work order shall be the daily, weekly or monthly rates from the foregoing publication based on the total number of work days or portions thereof that a particular item of equipment or substitute item of equipment is at the construction site for use by the Contractor or subcontractors whether under this Contract or any other contract with the Authority. Included within this period will be (i) work days of idleness of the equipment at the construction site whether such idleness results from acts or omissions of the Contractor, Authority or third persons, breakdowns in the equipment or any other cause, (ii) work days on which the equipment is removed from the construction site solely to enable the performance of repairs thereon, and (iii) work days intervening between the removal of equipment from the construction site for repairs and the delivery to the construction site of the same or substitute equipment. The number of work days in the period for each rate shall be as indicated below:

| | |
|---|---|
| Three work days or less. | Daily Rate |
| More than three work days but not more than fifteen work days. | Weekly Rate |
| More than fifteen work days. | Monthly Rate |

The pro rata portion which one hour bears to the applicable rate shall be determined in accordance with the following formula:

| | |
|---|---|
| Hourly rate based on daily rental. | 1/8 of daily rental from Blue Book |
| Hourly rate based on weekly rental. | 1/40 of weekly rental from Blue Book |
| Hourly rate based on monthly rental. | 1/176 of monthly rental from Blue Book |

2.) The rental rate shall be multiplied by the applicable regional adjustment factor shown for such item of equipment in the Blue Book. The adjustment factor shall not apply to the hourly operating cost.

3.) If the Engineer should determine that the nature or size of the equipment used by the Contractor in connection with Extra Work is larger or more elaborate, as the case may be, than the size or nature of the minimum equipment determined by the Engineer to be suitable for the Extra Work, the reasonable rental will not be based upon the equipment used by the Contractor but will be based on the smallest or least elaborate equipment determined by the Engineer to have been suitable for the performance of the Extra Work.

C. In the case of equipment utilized only for Extra Work: (a) in addition to amounts determined as provided in subparagraphs A and B above, there will be added to the rental as computed above the taxes on the rental actually paid by the Contractor or subcontractor and the reasonable cost of transporting such equipment to and from the construction site, and (b) notwithstanding the number of hours during which such equipment is utilized, the minimum rental therefor will be for a period of eight hours.

In computing the Contractor's compensation insofar as it is based upon Extra Work, and notwithstanding any provision to the contrary appearing in the Blue Book, no consideration shall be given to any items of cost or expense not expressly set forth above, it being expressly agreed that the costs and percentage additions hereinbefore provided cover items of cost and expense to the Contractor of any type whatsoever, including administration, overhead, taxes (other than those enumerated above), clean-up, consumables including gas and oil, drafting (including printing or other reproduction), coordination, field measurements, maintenance, repairs, insurance, profit to the Contractor and small tools.

Whenever any Extra Work is performed (whether by the Contractor directly or through a subcontractor), the Contractor shall, at the end of each day, submit to the Engineer (a) daily time slips showing the name and number of each workman employed on such Work, the number of hours which he is employed thereon, the character of his duties, and the wages to be paid to him, (b) a memorandum showing the rates and amounts of Workers' Compensation Insurance premiums, if any, and state and federal taxes based on such wages, and vacation allowances and union dues and assessments which the employer actually pays pursuant to contractual obligation upon the basis of such wages (c) a memorandum showing the amount and character of the materials furnished for such Work, from whom they were purchased and the amount to be paid therefor, and (d) a memorandum of equipment used in the performance of such Work, together with the rental claimed therefor. Such memoranda and time slips are for the purpose of enabling the Engineer to determine the amounts to be paid by the Authority under this numbered clause; and accordingly, they shall constitute a condition precedent to such payment and the failure of the Contractor to furnish them with respect to any Work shall constitute a conclusive and binding determination on his part that such Work is not Extra Work and shall constitute a waiver by the Contractor of claims for payment for such Work. In the event that the Chief Engineer and the Contractor shall agree in writing upon a lump sum or other compensation for Extra Work in lieu of compensation as provided in the second paragraph of this clause, the daily time slips and memoranda required by this paragraph shall not be required subsequent to the date on which such agreement has been reached.

## 23. COMPENSATION FOR EMERGENCY DELAYS

If the Contractor is specifically directed by the Engineer to suspend his operations as stipulated in the Specifications entitled "Conditions and Precautions" or if the Contractor is specifically directed not to start his operations at a time when operations are permitted to start as stipulated in such Section, and if solely because of such suspension or direction not to start any of the Contractor's or subcontractor's employees or equipment then engaged in or about to start such Work are necessarily kept idle at the construction site, during the hours when they would otherwise be engaged in the performance of the Work, then the Contractor's compensation shall be increased by an amount equal to the salaries and wages in amounts approved by the Engineer which the employer is required to pay and actually pays to such employees for the period or periods of such idleness, plus a proper proportion of (a) the premiums actually paid by the employer for Workers' Compensation Insurance, if any, upon the basis of such salaries and wages, (b) taxes actually paid by the employer pursuant to law upon the basis of such salaries and wages, and (c) vacation allowances and union dues and assessments which the employer actually pays pursuant to contractual obligations upon the basis of such salaries and wages, and in addition thereto such rental as the Engineer deems reasonable for such equipment during the period or periods of such idleness. The rental for idle equipment shall be computed by the Engineer in accordance with the provisions of the clause of the Form of Contract entitled "Idle Salaried Men and Equipment".

In the event that the Contractor deems that any payment should be made pursuant to this numbered clause, he shall give prompt written notice to the Engineer stating the reasons why he believes such payments should be made and shall moreover, furnish to the Engineer at the end of each day, a memorandum showing the name, payroll title, salary rate and employer of each of the workingmen, and description, owner and claimed rental rate for each item of equipment claimed to have been kept idle. Said notice and memorandum are for the purpose of enabling the Engineer to verify the Contractor's claim at the time. Accordingly, notwithstanding any other provisions hereof, the failure of the Contractor to furnish such notice and memorandum shall constitute a conclusive binding determination on his part that he is not entitled to compensation as provided herein and shall constitute a waiver by the Contractor of all claims for such payment, such notice and memorandum being conditions precedent to payment under this numbered clause.

## 24. SEMI- MONTHLY ADVANCES

On or about the first and fifteenth day of each month, the Engineer shall (upon receipt from the Contractor of such information as he may require, including a certification in writing, in such form as may be required pursuant to the clause hereunder entitled "Prevailing Rate of Wage", that he has paid and caused his subcontractors to pay at least the prevailing rate of wage and supplements required by such clause) estimate and certify to the Authority the approximate amount of Work performed and compensation earned by the Contractor up to that time showing separately:

A. The amount of Work (other than Extra Work) performed by the Contractor up to that time and a sum bearing the same proportion to the Lump Sum as the Work performed (other than Extra Work) bears to the Work performed and to be performed (other than Extra Work).

B. The increases, if any, in the Contractor's compensation for which provision is specifically made elsewhere in this Contract.

As an aid to the Contractor and to facilitate his performance, the Authority shall, within fifteen days after the receipt of each such semi-monthly certificate, advance to the Contractor by check the sums so certified, minus, however, either ten per cent (10%) of the amounts certified pursuant to subparagraph A of this numbered clause or $25,000.00, whichever is less, and minus all prior advances and payments to the Contractor or for his account and minus payments by the Authority to lessors of construction equipment.

Within seven days of receipt of any sum attributable to Work performed by a subcontractor or materialman or within such later period as is provided in the subcontract or purchase agreement, the Contractor shall advance to the subcontractor or materialman said sum, less such amount, if any, as the Contractor is authorized to retain under the subcontract or purchase agreement.

Notwithstanding the above, the Authority shall have the right, at its sole discretion, to directly pay the subcontractors and material suppliers who perform Work for or furnish materials to the Contractor in connection with the Work of this Contract.

Prior to certifying any amount for payment hereunder, the Engineer may require that the Contractor submit a certification accurately and fully setting forth the total amount due and payable to each subcontractor and supplier for Work performed or materials provided by such subcontractor or supplier in connection with the Work of this Contract. Any payment made by the Authority to a subcontractor or supplier pursuant to the provisions of this numbered clause shall be made in reliance upon such certification and all such payments shall be considered as advances to the Contractor of the compensation payable hereunder. No such payment shall relieve the Contractor of any of its obligations hereunder.

Furthermore, within fifteen (15) days of the Contractor's receipt of the Authority acceptance of the Contractor's Proposal, the Contractor shall submit to the Engineer a listing of all subcontract and material supply agreements entered into by the Contractor for the performance of Work required by this Contract. Such listing shall include the names and addresses of each such subcontractor and supplier and the amounts payable under each such agreement. As and when any modifications are made to such agreements or any additional subcontracts or supply agreements are entered into, the Contractor shall inform the Engineer of such and shall indicate the amounts payable thereunder.

Nothing contained herein shall be deemed to create any additional rights in such subcontractors or suppliers or to alter the rights of the Authority as such are set forth in the clause hereof entitled "Withholding of Payments"

## 25. FINAL PAYMENT

After the rendition of the Certificate of Final Completion and upon receipt from the Contractor of such information as may be required, the Engineer shall certify in writing to the Authority and to the Contractor the total compensation earned by the Contractor.

See the Form of Contract clause entitled "Certificate of Final Completion" which requires as a prerequisite for the issuance of such certificate the submission of a "Summary of Asbestos Removal and Disposal Costs".

If so required, the Contractor shall thereupon (i) certify to the Authority in writing, in such form as may be required pursuant to the clause hereunder entitled "Prevailing Rate of Wage", that he has paid and caused his subcontractors to pay at least the prevailing rate of wage and supplements required by such clause and (ii) furnish to the Authority a detailed sworn statement of all claims, just and unjust, of subcontractors, materialmen and other third persons then outstanding and which he has reason to believe may thereafter be made on account of the Work.

Within thirty days after issuance of such certificate of total compensation earned (or within thirty days after receipt of the documents provided for in the immediately preceding paragraph, if required), the Authority shall pay to the Contractor by check the amount stated in said certificate, less all other payments and advances whatsoever to or for the account of the Contractor. All prior estimates and payments shall be subject to correction in this payment, which is throughout this Contract called the Final Payment.

The acceptance by the Contractor, or by anyone claiming by or through him, of Final Payment shall be and shall operate as a release to the Authority of all claims and of all liability to the Contractor for all things done or furnished in connection with the Contract and for every act and neglect of the Authority and others relating to or arising out of the Contract, including claims arising out of breach of contract and claims based on claims of third persons, excepting only his claims for reimbursement for certain sales taxes as hereinbefore provided. No payment, however, final or otherwise, shall operate to release the Contractor from any obligations in connection with this Contract.

The Contractor's agreement as provided in the immediately preceding paragraph above shall be deemed to be based upon the consideration forming part of this Contract as a whole and not to be gratuitous; but in any event even if deemed gratuitous and without consideration, such agreement as provided in the immediately preceding paragraph above shall nevertheless be effective. Such release shall include all claims, whether or not in litigation and even though still under consideration by the Authority or the Engineer. Such release shall be effective notwithstanding any purported reservation of right by the Contractor to preserve such claim. The acceptance of any check designated as "Final Payment" or bearing any similar designation shall be conclusively presumed to demonstrate the intent of the Contractor that such payment was intended to be accepted as final, with the consequences provided in this numbered clause, notwithstanding any purported reservation of rights.

The Contractor agrees that he shall not be entitled to, and hereby waives any right he might otherwise have to, and shall not seek any judgment whether under this Contract or otherwise for any such Final Payment or for an amount equivalent thereto or based thereon, or for any part thereof, if such judgment would have the effect of varying, setting aside, disregarding or making inapplicable the terms of this numbered clause or have the effect in any way of entitling the Contractor to accept such Final Payment or an amount equivalent thereto or based thereon or any part thereof other than in the same fashion as a voluntary acceptance of a Final Payment subject to all the terms of this Contract including this numbered clause, unless and until the Contractor should obtain a judgment on any claim arising out of or in connection with this Contract (including a claim based on breach of contract) for an amount not included in said Final Payment. In any case in which interest is allowable on the amount of the Final Payment, such interest shall be at the rate of 6% per annum for the period, if any, in which such interest is due.

## 26. WITHHOLDING OF PAYMENTS

If (1) the Contractor fails to perform any of his obligations under this Contract or any other agreement between the Authority and the Contractor (including his obligation to the Authority to pay any claim lawfully made against him by any materialman, subcontractor or workman or other person which arises out of or in connection with the performance of this Contract or any other agreement with the Authority) or (2) any claim (just or unjust) which arises out of or in connection with this Contract or any other agreement between the Authority and the Contractor is made against the Authority or (3) any subcontractor under this Contract or any other agreement between the Authority and the Contractor fails to pay any claims lawfully made against him by any materialman, subcontractor, workman or other third person which arises out of or in connection with this Contract or any other agreement between the Authority and the Contractor or if in the opinion of the Chief Engineer any of the aforesaid contingencies is likely to arise, then the Authority shall have the right, in its discretion, to withhold out of any payment (final or otherwise and even though such payment has already been certified as due) such sums as the Chief Engineer may deem ample to protect it against delay or loss or to assure the payment of just claims of third persons, and to apply such sums in such manner as the Chief Engineer may deem proper to secure such protection or satisfy such claims. All sums so applied shall be deducted from the Contractor's compensation. Omission by the Authority to withhold out of any payment, final or otherwise, a sum for any of the above contingencies, even though such contingency has occurred at the time of such payment, shall not be deemed to indicate that the Authority does not intend to exercise its right with respect to such contingency. Neither the above provisions for rights of the Authority to withhold and apply monies nor any exercise or attempted exercise of, or omission to exercise, such rights by the Authority shall create any obligation of any kind to such materialmen, subcontractors, workmen or other third persons.

Until actual payment to the Contractor, the right to any amount to be paid under this Contract (even though such amount has already been certified as due) shall be subordinate to the rights of the Authority under this numbered clause.

In the event that wages and/or supplements have been paid in an amount less than as required by this Contract, the Authority shall also have the right to withhold from the Contractor out of any payment, final or otherwise, on this, or any other open contract that the Contractor has with the Authority, so much as may be necessary to pay to laborers, mechanics, architects, draftsmen, engineers and technical workers, and others employed on the Work, the difference between the sums such persons should have received as wages and/or supplements and the amounts they actually received, and to pay such sums over to such persons. All such payments shall be deemed to be payments for the Contractor's account. In addition, the Contractor shall be required to pay to the Authority an amount equal to the Authority's cost of any investigation conducted by or on behalf of the Authority, that discovers a failure to pay wages and/or supplements as required by this Contract by the Contractor or its subcontractors, the cost of such investigation to be determined by the Chief Engineer personally. If the Contractor fails or refuses to pay for the cost of any such investigation after demand by the Authority, the Authority may deduct from any amount payable to the Contractor by the Authority, under the Contract or under any other open contract between the Contractor and the Authority, an amount equal to the cost of such investigation.

If, however, the payment of any amount due to the Contractor shall be improperly delayed by the fault of the Authority, the Authority shall pay the Contractor interest thereon at the rate of six percent (6%) per annum for the period of delay, it being agreed that such interest shall be in lieu of and in liquidation of any damages to the Contractor because of such delay.

# CHAPTER III

# PROVISIONS RELATING TO TIME

## 27. TIME FOR COMPLETION AND DAMAGES FOR DELAY

The Contractor shall complete the performance of all Work under this Contract within 365 calendar days after receipt by him of the acceptance of his Proposal.

The Contractor shall not commence the performance of the Work until the date of receipt by him of notice from the Authority that the insurance procured by him in accordance with the clause hereof entitled "Insurance Procured by the Contractor", if any is required, is satisfactory, as evidenced by the certificate to be furnished in accordance with said clause.

The time for completion shall not be extended on account of the time required to furnish the documents referred to above, but the Authority shall give notice to the Contractor within ten days after receipt of the certificate of insurance as to whether or not such insurance is satisfactory.

The Contractor's obligations for the performance and completion of the Work within the time or times provided for in this Contract are of the essence of this Contract. The Contractor guarantees that he can and will complete the performance of the Work within the time hereinbefore stipulated or within the time as extended in accordance with the clause hereof entitled "Extensions of Time". Inasmuch as the damage and loss to the Authority which will result from delay in completing the performance of the Work within the time herein stipulated will include items of loss whose amount will be incapable or very difficult of accurate estimation, the damages to the Authority for each calendar day by which the Contractor does not complete performance of the Work within the time or times above stipulated or within such time or times as extended in accordance with the clause hereof entitled "Extensions of Time", shall be liquidated in the sum of Five Hundred Dollars ($500) per calendar day.

## 28. EXTENSIONS OF TIME

The time above provided for completion of any part of the Contract shall be extended (subject, however, to the provisions of this numbered clause) only if in the opinion of the Engineer the Contractor is necessarily delayed in completing such part by such time solely and directly by a cause which meets all the following conditions:

A. Such cause is beyond the Contractor's control and arises without his fault;

B. Such cause comes into existence after the opening of Proposals on this Contract and neither was nor could have been anticipated by investigation before such opening.

Variations in temperature and precipitation shall be conclusively deemed to have been anticipated before opening of such Proposals on this Contract except to the extent that the actual monthly average temperature varies from a temperature which is 10 per cent (10%) above or below the monthly normal temperature and except to the extent that the actual number of days of precipitation (of 0.1 inch or more) per month exceeds a number equal to two plus the normal number of days of precipitation per month.

In any case, the variations in temperature and precipitation described in the immediately preceding sentence will be cause for an extension of time only if occurring between the actual time of commencement of the Work at the construction site and the time for completion stipulated in the clause hereof entitled "Time for Completion and Damages for Delay" (or such time as extended as provided for herein). In the case of portions of months the number of days will be pro-rated by the Engineer. Temperature and precipitation shall be as recorded by the U. S. Weather Bureau in its publications, including that entitled "Local Climatological Data with Comparative Data", which is applicable to the area in which the Work is to be performed, and in the case of precipitation, the normal number of days of precipitation (of 0.1 inch or more) per month as abstracted from the aforementioned publications are as follows:

| **Month** | **Normal number of days per month on which precipitation exceeds 0.1 inch** |
|---|---|
| January | 7 |
| February | 7 |
| March | 8 |
| April | 7 |
| May | 6 |
| June | 6 |
| July | 5 |
| August | 7 |
| September | 6 |
| October | 6 |
| November | 7 |
| December | 7 |

In any event, even though a cause of delay meets all the above conditions, an extension shall be granted only to the extent that (i) the performance of the Work is actually and necessarily delayed and (ii) the effect of such cause cannot be anticipated and avoided or mitigated by the exercise of all reasonable precautions, efforts and measures (including planning, scheduling and rescheduling), whether before or after the occurrence of the cause of delay, and an extension shall not be granted for a cause of delay which would not have affected the performance of the Contract were it not for the fault of the Contractor or for other delay for which the Contractor is not entitled to an extension of time.

Any reference herein to the Contractor shall be deemed to include subcontractors and materialmen, whether or not in privity of contract with the Contractor, and employees and others performing any part of the Contract and all the foregoing shall be considered as agents of the Contractor.

The period of any extension of time shall be that necessary to make up the time actually lost, subject to the provisions of this numbered clause, and shall be only for the portion of the Contract actually delayed. The Engineer may defer all or part of his decision on an extension and any extension may be rescinded or shortened if it subsequently is found that the delays can be overcome or reduced by the exercise of reasonable precautions, efforts and measures.

As a condition precedent to an extension of time, the Contractor shall give written notice to the Engineer within 48 hours after the time when he knows or should know of any cause which might under any circumstances result in delay for which he claims or may claim an extension of time (including those causes which the Authority is responsible for or has knowledge of), specifically stating that an extension is or may be claimed, identifying such cause and describing, as fully as practicable at the time, the nature and expected duration of the delay and its effect on the various portions of the Contract. Since the possible necessity for an extension of time may materially alter the scheduling, plans and other actions of the Authority, and since, with sufficient opportunity, the Authority might if it so elects attempt to mitigate the effect of a delay for which an extension of time might be claimed, and since merely oral notice may cause disputes as to the existence or substance thereof, the giving of written notice as above required shall be of the essence of the Contractor's obligations and failure of the Contractor to give written notice as above required shall be a conclusive waiver of an extension of time.

It shall in all cases be presumed that no extension, or further extension, of time is due unless the Contractor shall affirmatively demonstrate to the satisfaction of the Engineer that it is. To this end the Contractor shall maintain adequate records supporting any claim for an extension of time, and in the absence of such records, the foregoing presumption shall be deemed conclusive.

## 29. IDLE SALARIED MEN AND EQUIPMENT

If any salaried men or equipment of the Contractor or any sub- contractor are necessarily kept continuously idle and wholly unoccupied at the construction site for a full day on each of two or more full days on which they would be engaged in the performance of the Work but for causes due solely to acts or omissions of the Authority or the Engineer occurring after the opening of Proposals on this Contract, and if such idleness is not due to any cause within the control of the Contractor or of any of his subcontractors or materialmen or his or their employees, then the Authority shall pay to the Contractor and the Contractor shall accept (in addition to any sums otherwise payable under this Contract, and in full satisfaction of and in liquidation of all claims for damages because of such act or omission of the Authority or the Engineer) an amount equal to that which the employer actually pays such salaried employees during such full days of idleness, plus a proper proportion of the premiums actually paid for Workers Compensation Insurance upon the basis of such salaries, if any, a proper proportion of vacation allowances and union dues and assessments actually paid by the employer pursuant to contractual obligations on the basis of such salaries, and a proper proportion of the taxes actually paid by the employer pursuant to law upon the basis of such salaries and plus such rental for such idle equipment as the Engineer deems reasonable. The rental for idle equipment shall be computed by the Engineer in accordance with the provisions of the clause of the Form of Contract entitled "Compensation for Extra Work"; provided, however, that the seven per cent (7%) of the rental to be paid in accordance with said clause in the case of equipment utilized by subcontractors shall not be payable in connection with such idle equipment; and provided further that the provisions of subparagraph C of said clause shall not be applicable to such idle equipment.

The Contractor shall give written notice to the Engineer before the end of the second of the above mentioned 2 or more full days (whether or not the Authority is aware of the existence of any circumstances which might constitute a basis for payment under this numbered clause), specifically stating that salaried men or equipment have been kept idle under circumstances which might result in payment under this numbered clause; and he shall furnish with such notice, for all the days that have occurred, and shall in addition furnish at the end of each additional day of the above mentioned 2 or more full days, (a) a memorandum showing the name, payroll title, salary rate and employer of each of the salaried men claimed to have been kept idle at the construction site, and the rates and amounts of Workers' Compensation Insurance premiums, if any, and taxes based upon their salaries and the holiday and vacation allowances and union dues and assessments which the employer must actually pay pursuant to contractual obligations based on their salaries, and (b) a memorandum of the equipment claimed to be kept idle, together with the amount claimed as rental therefor. Said notice and memoranda are for the purpose of enabling the Engineer to verify the Contractor's claim at the time, and of enabling him to take such steps as may be necessary to remedy the conditions upon which the claim is based. The furnishing of such notice and memoranda shall be a condition precedent to payment under this numbered clause, so that the day on which notice is given shall be counted as not later than the second of the above mentioned 2 or more full days and no subsequent day shall be counted for which the above memoranda are not furnished at the end of such day.

## 30. DELAYS TO CONTRACTOR

As between the Contractor and the Authority, the Contractor assumes the risk of all suspensions of or delays in performance of the Contract, regardless of the length thereof, arising from all causes whatsoever, whether or not relating to this Contract, including wrongful acts or omissions of the Authority, its officers, agents, employees and contractors, except only to the extent, if any, that compensation or an extension of time may be due as expressly provided for elsewhere in this Contract for such suspension or delays and except to the extent, if any, that compensation may be agreed to by the Chief Engineer in writing pursuant to the clause hereof entitled "Compensation for Extra Work" for impact costs incurred by the Contractor in connection with the performance of Extra Work. Subject only to such exceptions, the Contractor shall bear the burden of all costs, expenses and liabilities which he may incur in connection with such suspensions or delays, and all such suspensions, delays, costs, expenses and liabilities of any nature whatsoever, whether or not provided for in this Contract, shall conclusively be deemed to have been within the contemplation of the parties.

Notwithstanding any provisions of this Contract, whether relating to time of performance or otherwise, the Authority makes no representation or guaranty as to when the construction site or any part thereof will be available for the performance of the Contract or as to whether conditions at the construction site will be such as to permit the Contract to be performed thereon without interruption or by any particular sequence or method or as to whether the performance of the Contract can be completed by the time required under this Contract or by any other time.

Wherever in connection with this Contract it is required, expressly or otherwise, that the Authority shall perform any act relating to the Contract, including making available or furnishing any real property, materials, or other things, no guaranty is made by the Authority as to the time of such performance and the delay of the Authority in fulfilling such requirement shall not result in liability of any kind on the part of the Authority except only to the extent, if any, that an extension of time or compensation may be due as expressly provided for elsewhere in this Contract.

## 31. CANCELLATION FOR DELAY

If the performance of the Contract or any portion of it shall, in the opinion of the Chief Engineer, be materially delayed, whether or not through the fault of the Contractor, by any cause which affects the Contractor's ability to perform the Contract without affecting to the same degree the Authority's own ability to perform it, either directly or through others, the Authority shall have the right at any time during the existence of such delay to cancel this Contract as to any portion not yet performed, without prejudice to the rights, liabilities and obligations of the parties under this Contract arising out of portions already performed, provided, however, that such right of cancellation shall not exist if the delay be due to any wrongful act or omission of the Authority. In the event of such cancellation, no allowance shall be made for anticipated profits.

# CHAPTER IV

# CONDUCT OF CONTRACT

## 32. AUTHORITY OF CHIEF ENGINEER

Inasmuch as the public interest requires that the project to which this Contract relates shall be performed in the manner which the Authority, acting through the Chief Engineer, deems best, the Chief Engineer shall have absolute authority to determine what is or is not necessary or proper for or incidental to the portion thereof specified in the clause hereof entitled "General Agreement" and the Contract Drawings and Specifications shall be deemed merely his present determination on this point. In the exercise of this authority, he shall have power to alter the Contract Drawings and Specifications; to require the performance of Work not required by them in their present form, even though of a totally different character from that now required; and to vary, increase and diminish the character, quantity and quality of, or to countermand, any Work now or hereafter required. Such variation, increase, diminution or countermanding need not be based on necessity but may be based on convenience.

If at any time it shall be, from the viewpoint of the Authority, impracticable or undesirable in the judgment of the Chief Engineer to proceed with or continue the performance of the Contract or any part thereof, whether or not for reasons beyond the control of the Authority, he shall have authority to suspend performance of any part or all of the Contract until such time as he may deem it practicable or desirable to proceed. Moreover, if at any time it shall be, from the viewpoint of the Authority impracticable or undesirable in the judgment of the Chief Engineer to proceed with or continue the performance of the Contract or any part thereof whether or not for reasons beyond the control of the Authority, he shall have authority to cancel this Contract as to any or all portions not yet performed and as to any materials not yet installed even though delivered. Such cancellation shall be without prejudice to the rights and obligations of the parties arising out of portions already performed, but no allowance shall be made for anticipated profits.

To resolve all disputes and to prevent litigation the parties to this Contract authorize the Chief Engineer to decide all questions of any nature whatsoever arising out of, under, or in connection with, or in any way related to or on account of, this Contract (including claims in the nature of breach of Contract or fraud or misrepresentation before or subsequent to acceptance of the Contractor's Proposal and claims of a type which are barred by the provisions of this Contract) and his decision shall be conclusive, final and binding on the parties. His decision may be based on such assistance as he may find desirable. The effect of his decision shall not be impaired or waived by any negotiations or settlement offers in connection with the question decided, whether or not he participated therein himself, or by any prior decision of the Engineer or others, which prior decisions shall be deemed subject to review, or by any termination or cancellation of this Contract provided, however, that notwithstanding the decision reached by the Chief Engineer in a review of determinations by the Assistant Chief Engineer for Construction or Engineer of Construction that a particular item of Work is not Extra Work the Contractor shall be compensated therefor as provided in written orders of the Assistant Chief Engineer for Construction or Engineer of Construction expressly and unmistakably indicating his intention to treat Work described therein as Extra Work issued in accordance with the provisions of the clause hereof entitled "Extra Work Orders" for amounts not in excess of $25,000 and subject to the aggregate limit specified in said clause.

All such questions shall be submitted in writing by the Contractor to the Chief Engineer for his decision, together with all evidence and other pertinent information in regard to such questions, in order that a fair and impartial decision may be made. In any action against the Authority relating to any such question the Contractor must allege in his complaint and prove such submission, which shall be a condition precedent to any such action. No evidence or information shall be introduced or relied upon in such an action that has not been so presented to the Chief Engineer.

This numbered clause shall be governed by and construed in accordance with the law of the State of New York, without giving effect to its choice of law provisions.

## 33. AUTHORITY AND DUTIES OF ENGINEER

In the performance of the Contract, the Contractor shall conform to all orders, directions and requirements of the Engineer and shall perform the Contract to the satisfaction of the Engineer at such times and places, by such methods and in such manner and sequence as he may require, and the Contract shall at all stages be subject to his inspection. The Engineer shall determine the amount, quality, acceptability and fitness of all parts of the Work and shall interpret the Contract Drawings, Specifications and any orders for Extra Work. The Contractor shall employ no equipment, materials, methods or men to which the Engineer objects, and shall remove no materials, equipment or other facilities from the construction site without permission. Upon request, the Engineer shall confirm in writing any oral order, direction, requirements or determination.

The Contractor is requested to orally advise the Engineer of questions as they arise. Although such advice will not substitute for the written notice and information for which requirements are set forth elsewhere herein, it is anticipated that it will facilitate prompt decisions on the part of the Engineer and others.

The enumeration herein or in the Specifications of particular instances in which the opinion, judgment, discretion or determination of the Engineer shall control or in which the Contract shall be performed to his satisfaction or subject to his inspection, shall not imply that only the matters of a nature similar to those enumerated shall be so governed and performed, but without exception the entire Contract shall be so governed and so performed.

## 34. NOTICE REQUIREMENTS

No claim against the Authority shall be made or asserted in any action or proceeding at law or in equity, and the Contractor shall not be entitled to allowance of such claim. unless the Contractor shall have complied with all requirements relating to the giving of written notice of the information with respect to such claim as provided in this numbered clause. The failure of the Contractor to give such written notice and information as to any claim shall be conclusively deemed to be a waiver by the Contractor of such claim, such written notice and information being conditions precedent to such claim. As used herein "claim" shall include any claim arising out of, under, or in connection with, or in any way related to or on account of, this Contract (including claims in the nature of breach of Contract or fraud or misrepresentation before or subsequent to acceptance of the Contractor's Proposal and claims of a type which are barred by the provisions of this Contract) for damages, payment or compensation of any nature or for extension of any time for performance of any part of this Contract.

The requirements as to the giving of written notice and information with respect to claims shall be as follows:

A. In the case of any claims for Extra Work, extension of time for completion, idle salaried men and equipment, or any other matter for which requirements are set forth elsewhere in this Contract as to notice and information, such requirements shall apply.

B. In the case of all other types of claim, notice shall have been given to the Engineer, personally, as soon as practicable, and in any case, within 48 hours, after occurrence of the act, omission, or other circumstance upon which the claim is or will be based, stating as fully as practicable at the time all information relating thereto. Such information shall be supplemented with any further information as soon as practicable after it becomes or should become known to the Contractor, including daily records showing all costs which the Contractor may be incurring or all other circumstances which will affect any claim to be made, which records shall be submitted to the Engineer, personally.

The above requirements for notices and information are for the purpose of enabling the Authority to avoid waste of public funds by affording it promptly the opportunity to cancel or revise any order, change its plans, mitigate or remedy the effects of circumstances giving rise to a claim or take such other action as may seem desirable and to verify any claimed expense or circumstances as they occur, and the requirements herein for such notice and information are essential to this Contract and are in addition to any notice required by statute with respect to suits against the Authority.

The above referred to notices and information are required whether or not the Authority is aware of the existence of any circumstances which might constitute a basis for a claim and whether or not the Authority has indicated it will consider a claim.

No act, omission, or statement of any kind shall be regarded as a waiver of any of the provisions of this numbered clause or may be relied upon as such waiver except only either a written statement signed by the Executive Director of the Authority or a resolution of the Commissioners of the Authority expressly stating that a waiver is intended as to any particular provision of this numbered clause, and more particularly no discussion, negotiations, consideration, correspondence, or requests for information with respect to a claim by any Commissioner, officer, employee or agent of the Authority shall be construed as a waiver of any provision of this numbered clause or as authority or apparent authority to effect such a waiver.

Since merely oral notice or information may cause disputes as to the existence or substance thereof, and since notice, even if written, to other than the Authority representative above designated to receive it may not be sufficient to come to the attention of the representative of the Authority with the knowledge and responsibility of dealing with the situation only notice and information complying with the express provisions of this numbered clause shall be deemed to fulfill the Contractor's obligation under this Contract.

## 35. EQUAL EMPLOYMENT OPPORTUNITY - NEW YORK

During the performance of this Contract, within the State of New York the Contractor agrees as follows:

A. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, sex, color or national origin, and will take affirmative action to insure that they are afforded equal employment opportunities without discrimination because of race, creed, sex, color or national origin. Such action shall be taken with reference, but not be limited to: recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training.

B. The Contractor shall send to each labor union or representative of workers with which he has or is bound by a collective bargaining or other agreement or understanding, a notice, to be provided by the State Commission for Human Rights, advising such labor union or representative of the Contractor's agreement under clauses A through H (hereinafter called "non-discrimination clauses"). If the Contractor was directed to do so by the Authority as part of the bid or negotiation of this Contract, the Contractor shall request such labor union or representative to furnish him with a written statement that such labor union or representative will not discriminate because of race, creed, sex, color or national origin and that such labor union or representative either will affirmatively cooperate, within the limits of its legal and contractual authority, in the implementation of the policy and provisions of these non-discrimination clauses or that it consents and agrees that recruitment, employment, and the terms and conditions of employment under this Contract, shall be in accordance with the purposes and provisions of these non-discrimination clauses. If such labor union or representative fails or refuses to comply with such a request that it furnish such a statement, the Contractor shall promptly notify the State Commission for Human Rights of such failure or refusal.

C. The Contractor shall post and keep posted in conspicuous places, available to employees and applicants for employment, notices to be provided by the State Commission for Human Rights setting forth the substance of the provisions of clauses A and B and such provisions of the State's laws against discrimination as the State Commission for Human Rights shall determine.

D. The Contractor shall state, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, sex, color or national origin.

E. The Contractor shall comply with the provisions of Sections 291-299 of the Executive Law and the Civil Rights Law, shall furnish all information and reports deemed necessary by the State Commission for Human Rights under these non-discrimination clauses and such sections of the Executive Law, and shall permit access to his books, records and accounts by the State Commission for Human Rights, the Attorney General and the Industrial Commissioner for the purposes of investigation to ascertain compliance with these non-discrimination clauses and such sections of the Executive Law and Civil Rights Law.

F. This Contract may be forthwith canceled, terminated or suspended, in whole or in part, by the Authority upon the basis of a finding made by the State Commission for Human Rights that the Contractor has not complied with these non-discrimination clauses, and the Contractor may be declared ineligible for future contracts made by or on behalf of the State, the Authority or other public authority or agency of the State, until he has satisfied the State Commission for Human Rights that he has established and is carrying out a program in conformity with the provisions of these non-discrimination clauses. Such finding shall be made by the State Commission for Human Rights after conciliation efforts by the Commission have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the Commission, notice thereof has been given to the Contractor by the Commission and an opportunity has been afforded him to be heard publicly before the State Commissioner of Human Rights or his designee. Such sanctions may be imposed and remedies invoked independently of or in addition to sanctions and remedies otherwise provided by law.

G. The Contractor shall include the provisions of clauses A through F in every subcontract or purchase order in such a manner that such provisions will be binding upon each subcontractor or vendor as to operations to be performed within the State of New York. The Contractor shall take such action in enforcing such provisions of such subcontract or purchase order as the Authority may direct, including sanctions or remedies for non-compliance. If the Contractor becomes involved in or is threatened with litigation with a subcontractor or vendor as a result of such direction by the Authority, the Contractor shall promptly so notify the General Counsel to the Authority, requesting him to intervene and protect the interests of the Authority.

H. The provisions of this numbered clause which refer to the State Commission for Human Rights, the Attorney General and the Industrial Commissioner are inserted in this Contract for the benefit of such parties, as well as for the benefit of the Authority, and said Commission, Commissioner and the Attorney General shall have a direct right of action against the Contractor to effectuate the intent of this clause.

## 36. EQUAL EMPLOYMENT OPPORTUNITY - NEW JERSEY

With respect to the performance of Work in the State of New Jersey and in order to conform with the policy of the Authority the Contractor agrees that the provisions of N.J.S.A. 10:2-1 through 10:2-4, dealing with discrimination in employment on public contracts, and the Rules and Regulations promulgated pursuant thereto, are hereby made a part of this Contract and are binding upon him and that it shall not be a defense to the Contractor in any action arising directly or indirectly out of such legislation and Rules and Regulations that the Authority may not be subject thereto.

The provisions of this numbered clause are for the benefit of the Attorney General of the State of New Jersey, Division on Civil Rights in the Department of Law and Public Safety of the State of New Jersey, and the Director thereof, as well as for the benefit of the Authority, and said Division and Director shall have a right of action against the Contractor to effectuate the intent of this clause.

## 37. NO DISCRIMINATION IN EMPLOYMENT

During the performance of this Contract within the State of New Jersey, the Contractor agrees as follows:

A. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, religion, national origin, ancestry, age, sex or liability for military service. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, creed, color, religion, national origin, ancestry, age, liability for military service, or sex. Such action shall include but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and the selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

B. The Contractor will, in all solicitations or advertisements for employee's placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, religion, national origin, ancestry, sex or liability for military service.

C. The Contractor will send to each labor union or representative of workers with which the Contractor has a collective bargaining agreement or other contract or understanding a notice advising the said labor union or workers' representative of the Contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. The Contractor will submit to the Authority every two weeks a report indicating the number of men employed at the construction site as of the lst and 15th days of each month and the projected number of men to be so employed during the following month. This report shall also indicate the trade in which such men are employed and, with respect to current employment (but not projected employment), shall indicate the number of such men who are members of the following groups:

1.) Black

2.) Oriental

3.) American Indian

4.) Puerto Rican, Mexican-American or Cuban

With respect to the number of men in the four categories mentioned in 1 through 4 in the immediately preceding sentence, the report shall also list the name and address and the trade of each such man.

E. The Contractor will include the provisions of Par. A through D of this Section in every contract, and will require the inclusion of these provisions in every subcontract entered into by any of its subcontractors, so that such provisions will be binding upon each such subcontractor, as the case may be. For the purpose of including such provisions in any construction contract or subcontract, as required hereby, the term "Contractor" and the term "Subcontractor" may be changed to reflect appropriately the name or designation of the parties of such contract or subcontract.

F. The Contractor agrees that he will fully cooperate with the office of the Attorney General of the State of New Jersey and with the Authority which seeks to deal with the problem of unlawful or invidious discrimination and with all other State efforts to guarantee fair employment practices under this contract, and said Contractor will comply promptly with all requests and directions from the Attorney General of the State of New Jersey and the Authority in this connection, both before and during construction.

G. Full cooperation as expressed in clause F foregoing shall include, but not be limited to, being a witness or complainant in any proceeding involving questions of unlawful or invidious discrimination if such is deemed necessary by the Attorney General of the State of New Jersey, permitting employees of said Contractor to be witnesses or complainants in any proceeding involving questions of unlawful or invidious discrimination, if such is deemed necessary by the Attorney General of the State of New Jersey, signing any and all documents involved in any proceeding involving questions of unlawful or invidious discrimination, the execution of which are deemed necessary by the Attorney General of the State of New Jersey, participating in meetings, submitting periodic reports on the racial aspects of present and future employment, assisting in inspection at the construction site, and promptly complying with all State directives deemed essential by the Attorney General of the State of New Jersey to insure compliance with all Federal and State laws, regulations and policies against racial or other unlawful or invidious discrimination.

H. Upon the basis of a finding by the Attorney General of the State of New Jersey that the Contractor has not complied with these nondiscrimination clauses and that by reason thereof there has been a material breach of this contract, the Executive Director of the Authority shall have the sole discretion and power to declare this contract null and void upon 10 days' notice to the Contractor. In such event the Contractor shall become liable for any and all damages which shall accrue to the Authority including, but not limited to, the difference between the total cost of completion and the contract price under this agreement.

I. The provisions of this numbered clause which refer to the Attorney General are inserted in this contract for the benefit of the Attorney General of the State of New Jersey as well as for the benefit of the Authority, and said Attorney General shall have a direct right of action against the Contractor to effectuate the intent of this clause.

## 38. AFFIRMATIVE ACTION REQUIREMENTS - EQUAL EMPLOYMENT OPPORTUNITY

The Contractor shall comply with the provisions set forth hereinafter. These provisions are modeled on the conditions for bidding on federal government contracts adopted by the Office of Federal Contract Compliance in 1978.

Each bidder, contractor or subcontractor (hereinafter called the Contractor) must fully comply with the clauses entitled 'Equal Employment Opportunity - New York' and 'Equal Employment Opportunity - New Jersey' and these bid conditions. The Contractor commits itself to the goals for minority and female utilization set forth below and all other requirements, terms and conditions of these bid conditions by submitting a properly signed bid.

The Contractor shall appoint a company executive to assume the responsibility for the implementation of the requirements, terms and conditions of these bid conditions.

A. The goals for minority and female participation, expressed in percentage terms, for the Contractor's workforce at the construction site under this Contract are as follows:

| | |
|---|---|
| Minority, except laborers | 30% |
| Minority, laborers | 40% |
| Female, except laborers | 6.9% |
| Female, laborers | 6.9% |

These goals are applicable to all construction Work performed at the construction site under the Contract.

The Contractor's compliance with this Section shall be based on its implementation of the clauses entitled 'Equal Employment Opportunity - New York' and 'Equal Employment Opportunity - New Jersey', and specific affirmative action obligations required herein of minority and female employment and training must be substantially uniform throughout the length of the Contract and in each trade. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the Contract. Compliance with the goals will be measured against the total work hours performed.

B.

1.) The Contractor shall provide written notification to the General Manager, Business and Job Opportunity, Office of Regional and Economic Development of the Port Authority of New York and New Jersey, within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under this Contract. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

2.) The Contractor shall submit a Workforce Projection Schedule, which shall be correlated to the progress schedule, within thirty days after acceptance of the proposal, for the approval of the Engineer. The Contractor shall maintain and periodically update it at intervals as required by the Engineer. The Workforce Projection Schedule shall include the time period in which each trade shall be utilized, the average number of workers required per trade on a weekly basis, the peak period for each trade, and the number of workers required per trade for the peak period on a weekly basis.

C.

1.) As used in these specifications:

a. Omitted

b. "Manager" means General Manager, Business and Job Opportunity, Office of Regional and Economic Development of the Authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U. S. Treasury Department Form 941;

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic persons of Puerto Rican, Mexican, Dominican, Cuban, Central or South American culture or origin, regardless of race;

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2.) Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the Work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 such provisions as are necessary for the Contractor to achieve the aggregate goals set forth above.

3.) Omitted.

4.) The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p hereof. The goals set forth above are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in the total workforce at the construction site under the Contract including employees of the Contractor and the subcontractors. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified. These goals may be achieved through utilization of journeyworkers and apprentices. In the event they are not achieved through the utilization of journeyworkers, the maximum number of apprentices provided for in the applicable collective bargaining agreement may be utilized to achieve said goals.

5.) Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations hereunder.

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

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

a. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

b. Develop maximum job opportunities for apprentices appropriate to the conditions of the Work and subject to the applicable collective bargaining agreement, in conjunction with training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7a above.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Manager when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations hereunder with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth.

k. Tests and other selection requirements shall comply with 41 CFR Part 60-3.

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

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

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

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

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

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

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

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

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

12.) The Contractor shall carry out such sanctions and penalties for violation of this clause and of the clause entitled "Equal Employment Opportunity", including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered by the Authority. Any Contractor who fails to carry out such sanctions and penalties shall be in violation hereof.

13.) The Contractor, in fulfilling its obligations hereunder shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 hereof so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of these provisions, the Authority shall proceed accordingly.

14.) The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports, including the Monthly Employment Utilization Report, relating to the provisions hereof as may be required and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g. mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

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

## 39. PREVAILING RATE OF WAGE

The Contractor shall pay or provide (and shall cause all subcontractors to pay or provide) to his or their workmen, laborers and mechanics (who are employed by him or them to work on an hourly or daily basis at any trade or occupation at or about the construction site) at least the prevailing rate of wage and supplements for others engaged in the same trade or occupation in the locality in which the Work is being performed as determined by the Engineer.

For purposes of this Contract, the Engineer has determined that the prevailing rates of wage and supplements are those established by the Secretary of Labor of the United States pursuant to the Davis-Bacon Act (40 U.S.C.A. 276a) for the locality in which the Work is to be performed. The schedule of wages and supplemental benefits which are currently in effect is attached hereto. However, the applicable rates shall be those which are in effect on the date of opening of Proposals.

The provisions of this numbered clause are inserted in this Contract for the benefit of such workmen, laborers and mechanics as well as for the benefit of the Authority; and if the Contractor or any subcontractor shall pay or provide any such workman, laborer or mechanic less than the rates of wages and supplements above described, such workman. laborer or mechanic shall have a direct right of action against the Contractor or such subcontractor for the difference between the wages and supplements actually paid or provided and those to which he is entitled under this clause. If such workman, laborer or mechanic is employed by any subcontractor whose subcontract does not contain a provision substantially similar to the provisions of this clause (requiring the payment or provision of at least the above minimum, and providing for a cause of action in the event of the subcontractor's failure to pay or provide such wages and supplements) such workman, laborer or mechanic shall have a direct right of action against the Contractor. The Authority shall not be a necessary party to any action brought by any workman, laborer or mechanic to obtain a money judgment against the Contractor or any subcontractor pursuant to this numbered clause.

Nothing herein contained shall be construed to prevent the Contractor or any subcontractor from paying higher rates of wages or providing higher supplements than the minimum hereinbefore prescribed; and nothing herein contained shall be construed to constitute a representation or guarantee that the Contractor or any subcontractor can obtain workmen, laborers and mechanics for the minimum herein before prescribed.

The Contractor shall post at the Work site, in a place that is prominent, accessible and visible to all employees of the Contractor and its subcontractors during the daily time period that the Contractor and/or subcontractor performs Work at the site, the appropriate prevailing wage and supplement schedules. The Contractor must inform all employees, including those of its subcontractors, that they may obtain a copy of the prevailing wage and supplement schedule from the Contractor.

The Contractor and every subcontractor shall make and maintain weekly payroll records during the course of the Work and for the period set forth in the clause hereof entitled "Authority Access to Records" for all employees employed in the Work. Such records shall contain the name, address and social security number of each such employee, the employee's correct payroll classification, rate of pay and supplements, daily and weekly number of hours worked, deductions made and actual wages and supplements paid. The Contractor shall submit these weekly payroll records to the Authority (on forms furnished by the Authority) of all his payroll records and those of each of his subcontractors as the Authority may require with the Contractor's monthly Payment Application, together with an affidavit by the Contractor and by each subcontractor to the effect that such payroll records are correct and complete, the wage and supplement rates contained therein are not less than those required by the provisions of this Contract, and the classifications set forth for each employee conform with the work performed. Such copies and summaries and the original payroll records shall be available for inspection by the Authority (including its Inspector General), and the Contractor and its subcontractors shall permit such representatives to interview employees during working hours on the job site.

The Engineer may at any time request the Contractor to prepare a daily report on the the Authority form entitled *Contractor Daily Sign-In Sheet*, copies of which can be obtained from the Engineer, The *Contractor Daily Sign-In Sheet* shall be completed as follows:

1.) At the beginning of each workday the Contractor shall:

   a. fill in the top of the *Contractor Daily Sign-In Sheet*, including the location, date, contractor/subcontractor name and contract number;

   b. ensure that each employee, including those of subcontractors, has printed and signed his or her name and indicated his or her work classifications, the last four digits of his or her social security number, and his or her starting time;

2.) At the end of each workday, the Contractor shall:

   a. ensure that each employee, including those of subcontractors, has signed out and indicated his or her ending time;

   b. sign the Certification Statement at the bottom of the form to indicate that the information contained in the *Contractor Daily Sign-In Sheet* is true and accurate; and

   c. submit the original completed form to the Engineer's representative.

In an area of his office at the Site of the Work which is accessible to his employees, the Contractor shall display such printed material as may be provided by the Engineer setting forth information for the employees of the Contractor and his subcontractors concerning the wage and supplemental benefit requirements set forth in this numbered clause. The Contractor shall also cause each of his subcontractors to display such material in a similarly accessible place in any office which the subcontractor maintains at the Site of the Work.

The Contractor's failure to comply with any provision of this numbered clause shall be deemed a substantial breach of this Contract.

## 40. EXTRA WORK ORDERS

No Extra Work of a cost in excess of $25,000 shall be performed except pursuant to written orders of the Chief Engineer expressly and unmistakably indicating his intention to treat the Work described therein as Extra Work; and, no Extra Work of a cost of $25,000 or less shall be performed except pursuant to written orders of the Chief Engineer, Assistant Chief Engineer - Construction or the Engineer of Construction expressly and unmistakably indicating his intention to treat the Work described therein as Extra Work; and, exclusive of Extra Work expressly authorized by or pursuant to a resolution of the Commissioners of the Authority or its Committee on Construction, the Chief Engineer and, subject to the foregoing limitation, the Assistant Chief Engineer - Construction and the Engineer of Construction, shall have authority to order any item of Extra Work, if the cost thereof to the Authority together with the cost of all other Extra Work previously ordered and not expressly authorized as aforesaid will not in the aggregate be in excess of the sum specified in the letter of acceptance of the Contractor's Proposal as the limit on such authority to order Extra Work; provided, however, that Extra Work in excess of such aggregate amount may be ordered as above provided to the extent expressly authorized in a writing signed by the Executive Director of the Authority delegating authority vested in him pursuant to the By-Laws or a resolution of the Commissioners of the Authority or its Committee on Construction and in the case of Extra Work ordered by the Assistant Chief Engineer - Construction or Engineer of Construction to the extent expressly authorized in a writing signed by the Chief Engineer delegating authority vested in the Executive Director as aforesaid, which in turn was vested in him by the Executive Director.

In the absence of such an order signed by the Chief Engineer in the case of Extra Work of a cost in excess of $25,000 and by the Chief Engineer or Assistant Chief Engineer - Construction or Engineer of Construction in the case of Extra Work of a cost of $25,000 or less, if the Engineer shall direct, order or require any Work, whether orally or in writing, which the Contractor deems to be Extra Work, the Contractor shall nevertheless comply therewith, but shall within twenty-four hours give written notice thereof to the Chief Engineer and the Engineer, stating why he deems it to be Extra Work, and shall moreover furnish to the Engineer time slips and memoranda as required by the clause hereof entitled "Compensation for Extra Work". Said notice, time slips and memoranda are for the purpose of affording to the Chief Engineer an opportunity to verify the Contractor's claim at the time and (if he desires so to do) to cancel promptly such order, direction or requirement of the Engineer, of affording to the Engineer an opportunity of keeping an accurate record of the materials, labor and other items involved, and generally of affording to the Authority an opportunity to take such action as it may deem desirable in light of the Contractor's claims. Accordingly, the failure of the Contractor to serve such notice or to furnish such time slips and memoranda shall be deemed to be a conclusive and binding determination on his part that the direction, order or requirement of the Engineer does not involve the performance of Extra Work, and shall be deemed to be a waiver by the Contractor of all claims for additional compensation or damages by reason thereof, such written notice, time slips and memoranda being a condition precedent to such claims.

## 41. PERFORMANCE OF EXTRA WORK

The provisions of this Form of Contract relating generally to Work and its performance shall apply without exception to any Extra Work required and to the performance thereof. Moreover, the provisions of the Specifications relating generally to the Work and its performance shall also apply to any Extra Work required and to the performance thereof, except to the extent that a written order in connection with any particular item of Extra Work may expressly provide otherwise.

## 42. TITLE TO MATERIALS

All materials to become part of the permanent construction shall be and become the property of the Authority upon delivery at the construction site or upon being especially adapted for use in or as a part of the permanent construction, whichever may first occur, subject however to the Contractor's assumption of risk under the clause hereof entitled "Risks Assumed by the Contractor", subparagraph A.

The Contractor shall promptly furnish to the Authority such bills of sale and other instruments as may be required by it, properly executed, acknowledged and delivered, assuring to it title to such materials, free of encumbrances and shall mark or otherwise identify all such materials as the property of the Authority.

## 43. ASSIGNMENTS AND SUBCONTRACTS

Any assignment or other transfer by the Contractor of this Contract or any part hereof or of any of his rights hereunder or of any monies due or to become due hereunder and any delegation of any of his duties hereunder without the express consent in writing of the Authority shall be void and of no effect as to the Authority, provided, however, that the Contractor may subcontract portions of the Work to such persons as the Engineer may, from time to time, expressly approve in writing. For each individual, partnership or corporation proposed by the Contractor as a subcontractor, the Contractor shall submit to the Authority a certification or, if a certification cannot be made, a statement by such person, partnership or corporation to the same effect as the certification or statement required from the Contractor pursuant to the clauses of the "Information For Bidders" entitled "Certification of No Investigation (Criminal or Civil Anti-Trust), Indictment, Conviction, Suspension, Debarment, Disqualification, Prequalification Denial or Termination, Etc; Disclosure of Other Required Information" and "Non-Collusive Bidding and Code of Ethics Certification; Certification of No Solicitation Based on Commission, Percentage, Brokerage, Contingent Fee or Other Fee". All further subcontracting by any subcontractor shall also be subject to such approval of the Engineer. Approval of a subcontractor may be conditioned on (among other things) the furnishing, without expense to the Authority, of a surety bond guaranteeing payment by the subcontractor of claims of materialmen, subcontractors, workmen and other third persons arising out of the subcontractor's performance of any part of the Work. Approval of a subcontractor may be rescinded for, among other things, failure of the Contractor to furnish the subcontractor's certificate of insurance, if any is required by the clause "Insurance Procured by the Contractor" within the time set forth in said clause.

No consent to any assignment or other transfer, and no approval of any subcontractor, shall under any circumstances operate to relieve the Contractor of any of his obligations; no subcontract, no approval of any subcontractor and no act or omission of the Authority or the Engineer shall create any rights in favor of such subcontractor and against the Authority; and as between the Authority and the Contractor, all assignees, subcontractors, and other transferees shall for all purposes be deemed to be agents of the Contractor. Moreover, all subcontracts and all approvals of subcontractors shall be and, regardless of their form, shall be deemed to be conditioned upon performance by the subcontractor in accordance with this Contract; and if any subcontractor shall fail to perform the Contract to the satisfaction of the Engineer, the Engineer shall have the absolute right to rescind his approval forthwith and to require the performance of the Contract by the Contractor personally or through other approved subcontractors.

## 44. CLAIMS OF THIRD PERSONS

The Contractor undertakes to pay all claims lawfully made against him by subcontractors, materialmen and workmen, and all claims lawfully made against him by other third persons arising out of or in connection with or because of the performance of this Contract and to cause all subcontractors to pay all such claims lawfully made against them.

## 45. CERTIFICATES OF PARTIAL COMPLETION

If at any time prior to the rendition of the Certificate of Final Completion, any portion of the permanent construction has been satisfactorily completed, and if in the judgment of the Engineer such portion of the permanent construction is not necessary for the operations of the Contractor but will be immediately useful to and is needed by the Authority for other purposes, the Engineer may render to the Authority and to the Contractor a certificate in writing to that effect (herein called a Certificate of Partial Completion), and thereupon or at any time thereafter the Authority may take over and use the portion of the permanent construction described in such Certificate and exclude the Contractor therefrom.

The rendition of a Certificate of Partial Completion shall not be construed to constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates in the event that he has failed to complete the same in accordance with the terms of this Contract. Moreover, the acceptance of a Certificate of Partial Completion by the Authority shall not operate to release the Contractor from any obligations under or upon this Contract.

## 46. CERTIFICATE OF FINAL COMPLETION

After the satisfactory completion of all Work whatsoever required and the making of such tests and inspections as may be necessary or desirable, the Engineer shall render to the Authority and to the Contractor a certificate in writing (herein called the Certificate of Final Completion) certifying that in his opinion all Work under this Contract, including Extra Work, has been completed in accordance with the Contract Drawings and Specifications and the requirements of the Engineer, and certifying the date as of which it was so completed.

The rendition of the Certificate of Final Completion shall not be construed to constitute an extension of the Contractor's time for performance in the event that he has failed to complete the Work in accordance with the terms of this Contract. Moreover, the acceptance of the Certificate of Final Completion by the Authority shall not operate to release the Contractor from any obligations under or upon this Contract.

As a condition precedent to rendition of the Certificate of Final Completion, the Contractor shall submit the "Summary of Asbestos Removal and Disposal Costs" in accordance with the Section of Division 1 - GENERAL PROVISIONS entitled "Asbestos Cost Summary Submittal".

## 47. NO GIFTS, GRATUITIES, OFFERS OF EMPLOYMENT, ETC.

During the term of this Contract, the Contractor shall not offer, give or agree to give anything of value either to an Authority employee, agent, job shopper, consultant, construction manager or other person or firm representing the Authority, or to a member of the immediate family (i.e, a spouse, child, parent, brother or sister) of any of the foregoing, in connection with the performance by such employee, agent, job shopper, consultant, construction manager or other person or firm representing the Authority of duties involving transactions with the Contractor on behalf of the Authority, whether or not such duties are related to this Contract or any other Authority contract or matter. Any such conduct shall be deemed a material breach of this Contract.

As used herein "anything of value" shall include but not be limited to any (a) favors, such as meals, entertainment, transportation (other than that contemplated by the Contract or any other Authority contract), etc., which might tend to obligate the Authority employee to the Contractor, and (b) gift, gratuity, money, goods, equipment, services, lodging, discounts not available to the general public, offers or promises of employment, loans or the cancellation thereof, preferential treatment or business opportunity. Such term shall not include compensation contemplated by this Contract or any other Authority contract.

Where used in this clause, the term "Authority" shall be deemed to include all subsidiaries of the Authority. Currently, those subsidiaries are the Port Authority Trans-Hudson Corporation (PATH), the Newark Legal and Communications Center and the New York and New Jersey Railroad Corporation.

In addition, during the term of this Contract, the Contractor shall not make an offer of employment or use confidential information in a manner proscribed by the Code of Ethics and Financial Disclosure dated as of April 11, 1996 (a copy of which is available upon request to the Office of the Secretary of the Authority).

The Contractor shall include the provisions of this clause in each subcontract entered into under this Contract.

# CHAPTER V

# WARRANTIES MADE AND LIABILITY

# ASSUMED BY THE CONTRACTOR

## 48. CONTRACTOR'S WARRANTIES

The Contractor represents and warrants:

A. That he is financially solvent, that he is experienced in and competent to perform the type of services contemplated by this Contract, that the facts stated or shown in any papers submitted or referred to in connection with his Proposal are true, and, if the Contractor be a corporation, that it is authorized to perform this Contract;

B. That he has carefully examined and analyzed the provisions and requirements of this Contract and inspected the construction site, that from his own investigations he has satisfied himself as to the nature of all things needed for the performance of this Contract, the general and local conditions and all other matters which in any way affect this Contract or its performance, and that the time available to him for such examination, analysis, inspection and investigations was adequate;

C. That the Contract is feasible of performance in accordance with all its provisions and requirements and that he can and will perform it in strict accordance with such provisions and requirements;

D. That no Commissioner, officer, agent or employee of the Authority is personally interested directly or indirectly in this Contract or the compensation to be paid hereunder; and

E. That, except only for those representations, statements or promises expressly contained in this Contract, no representation, statement or promise, oral or in writing, of any kind whatsoever by the Authority, its Commissioners, officers, agents, employees or consultants has induced the Contractor to enter into this Contract or has been relied upon by the Contractor, including any with reference to: (1) the meaning, correctness, suitability, or completeness of any provisions or requirements of this Contract; (2) the nature, existence or location of materials, structures, obstructions, utilities or conditions, surface or subsurface, which may be encountered at the construction site; (3) the nature, quantity, quality or size of the materials, equipment, labor and other facilities needed for the performance of this Contract; (4) the general or local conditions which may in any way affect this Contract or its performance; (5) the price of the Contract; or (6) any other matters, whether similar to or different from those referred to in (1) through (5) immediately above, affecting or having any connection with this Contract, the bidding thereon, any discussions thereof, the performance thereof or those employed therein or connected or concerned therewith.

Moreover, the Contractor accepts the conditions at the construction site as they may eventually be found to exist and warrants and represents that he can and will perform the Contract under such conditions and that all materials, equipment, labor and other facilities required because of any unforeseen conditions (physical or otherwise) shall be wholly at his own cost and expense, anything in this Contract to the contrary notwithstanding.

Nothing in the Contract Drawings or Specifications or any other part of the Contract is intended as or shall constitute a representation by the Authority as to the feasibility of performance of this Contract or any part thereof. Moreover, the Authority does not warrant or represent either by issuance of the Contract Drawings and Specifications or by any provision of this Contract as to time for performance or completion or otherwise that the Contract may be performed or completed by the times required herein or by any other times.

The Contractor further represents and warrants that he was given ample opportunity and time and by means of this paragraph was requested by the Authority to review thoroughly all documents forming this Contract prior to opening of Proposals on this Contract in order that he might request inclusion in this Contract of any statement, representation, promise or provision which he desired or on which he wished to place reliance; that he did so review said documents, that either every such statement, representation, promise or provision has been included in this Contract or else, if omitted, that he expressly relinquishes the benefit of any such omitted statement, representation, promise or provision and is willing to perform this Contract without claiming reliance thereon or making any other claim on account of such omission.

The Contractor further recognizes that the provisions of this numbered clause (though not only such provisions) are essential to the Authority's consent to enter into this Contract and that without such provisions, the Authority would not have entered into this Contract.

## 49. RISKS ASSUMED BY THE CONTRACTOR

The Contractor assumes the following distinct and several risks, whether they arise from acts or omissions (whether negligent or not) of the Contractor, of the Authority, or of third persons, or from any other cause, and whether such risks are within or beyond the control of the Contractor, excepting only risks which arise solely from affirmative acts done by the Authority subsequent to the opening of Proposals on this Contract with actual and wilful intent to cause the loss, damage and injuries described in subparagraphs A through C below:

A. The risk of loss or damage to the permanent construction prior to the rendition of the Certificate of Final Completion (other than loss or damage to the portions of the permanent construction with respect to which Certificates of Partial Completion have been issued), and the Contractor shall forthwith repair, replace and make good any such loss or damage to the permanent construction without cost to the Authority;

B. The risk of claims, fines or penalties, just or unjust, made by third persons or assessed by courts or governmental agencies or entities against the Contractor or the Authority on account of injuries (including wrongful death), loss, damage or liability of any kind whatsoever arising or alleged to arise out of or in connection with the performance of the Work (whether or not actually caused by or resulting from the performance of the Work) or out of or in connection with the Contractor's operations or presence at or in the vicinity of the construction site or Authority premises, including claims against the Contractor or the Authority for the payment of workers' compensation, whether such claims, fines or penalties are made or assessed and whether such injuries, damage, loss and liability are sustained at any time both before and after the rendition of the Certificate of Final Completion;

C. The risk of loss or damage to any property of the Contractor, and of claims made against the Contractor or the Authority for loss or damage to any property of subcontractors, materialmen, workmen and others performing the Work, occurring at any time prior to completion of removal of such property from the construction site or Authority premises or the vicinity thereof.

The Contractor shall indemnify the Authority against all claims described in subparagraphs B and C above and for all expense incurred by it in the defense, settlement or satisfaction thereof, including expenses of attorneys, except where indemnity would be precluded by New York State General Obligations Law, Section 5-322.1 or by other applicable law. If so directed, the Contractor shall defend against any claim described in subparagraphs B and C above, in which event he shall not without obtaining express advance permission from the General Counsel of the Authority raise any defense involving in any way jurisdiction of the tribunal, immunity of the Authority, governmental nature of the Authority or the provisions of any statutes respecting suits against the Authority . Unless a claim is one which the Contractor is not required to indemnify the Authority against as described in the first sentence of this paragraph, such defense shall be at the Contractor's cost.

The provisions of this numbered clause shall also be for the benefit of the Commissioners, officers, agents and employees of the Authority, so that they shall have all the rights which they would have under this numbered clause if they were named at each place above at which the Authority is named, including a direct right of action against the Contractor to enforce the foregoing indemnity, except, however, that the Authority by action of its Board of Commissioners may at any time in its sole discretion and without liability on its part cancel the benefit conferred on any of them by this numbered clause, whether or not the occasion for invoking such benefit has already arisen at the time of such cancellation.

Neither the issuance of a Certificate of Completion nor the making of Final Payment shall release the Contractor from his obligations under this numbered clause. Moreover, neither the enumeration in this numbered clause nor the enumeration elsewhere in this Contract of particular risks assumed by the Contractor or of particular claims for which he is responsible shall be deemed (a) to limit the effect of the provisions of this numbered clause or of any other clause of this Contract relating to such risks or claims, (b) to imply that he assumes or is responsible for risks or claims only of the type enumerated in this numbered clause or in any other clause of this Contract, or (c) to limit the risks which he would assume or the claims for which he would be responsible in the absence of such enumerations.

## 50. NO THIRD PARTY RIGHTS

Nothing contained in this Contract is intended for the benefit of third persons, except to the extent that the Contract specifically provides otherwise by use of the words "benefit" or "direct right of action".

## 51. INSURANCE PROCURED BY THE AUTHORITY

In order to reduce the cost of this Contract, the Authority will procure and will maintain in force and pay the premiums on:

A. A policy of primary public liability (Comprehensive - Commercial General Liability, including Contractual) insurance on which the Contractor and the subcontractors will be insureds issued by an insurance company satisfactory to the Authority, with current coverage limits of $2 million per occurrence combined single limit for bodily injury and property damage liability.

B. Policies of excess public liability insurance from various insurers, with combined coverage limits of $23 million per occurrence, excess of the primary $2 million insurance coverage.

C. A policy of workers' compensation and employer's liability insurance fulfilling the Contractor's and the subcontractor's obligations under the applicable State Workers' Compensation Law for those employees of the Contractor and the subcontractors employed pursuant to this Contract in operations conducted at the site of the Work hereunder. Coverage under this policy may, as appropriate, include one or more of the following endorsements:

1.) Longshore and Harbor Workers' Compensation Act Coverage Endorsement. (Applies when performing work on or around navigable waters).

2.) Maritime Coverage Endorsement (Applies to masters or members of the crews of vessels, if vessels are used).

3.) Federal Employer's Liability Act Coverage Endorsement. (May apply to railroad related Work).

Determination in any instance as to the appropriateness of the included coverage described in C.1, 2 and 3 above will be made based upon information to be provided by the Contractor relating to the mode of performance of work to be done under the Contract.

The policy described in C above will not provide coverage for any workers' compensation for the Contractor and/or subcontractors who perform any asbestos Work. In such cases, the Contractor or subcontractors shall procure and maintain, at their own expense, the workers' compensation insurance in accordance with the requirements of law in the state(s) where the work will take place, along with employer's liablility insurance (in limits of not less than $1 million per occurrence).

Should the Contractor and/or subcontractors be required to procure the workers' compensation insurance, within ten days after the acceptance of its Proposal the Contractor shall deliver to the General Manager, Risk Management, The Port Authority of NY & NJ, Treasury Department, 225 Park Avenue South, 12th Floor, New York, N.Y. 10003 (Attn: Contract Insurance Review), an original certificate, stating the Contract number, from the insurer. A duplicate certificate evidencing the above insurance shall also be delivered to the Engineer. With regard to insurance required to be procured by a subcontractor, the Contractor shall deliver the certificate described above at least ten days before the subcontractor commences Work.

The requirements for insurance procured by the Contractor or subcontractors shall not in any way be construed as a limitation on the nature or extent of the obligations of the Contractor or subcontractors.

D. A policy of builder's risk insurance, covering the improvements or other Work to be effectuated by the Contractor and the subcontractors, with coverage limits of $50 million per occurrence for all locations combined (subject to a $50 million annual aggregate for flood and earthquake damage and a limit of $10 million per occurrence for damage to off-site storage and property in-transit). The deductible is $10,000 per occurrence for all losses except those caused by flood and earthquake, where a $50,000 deductible per occurrence with respect to flood, and a $25,000 deductible per occurrence with respect to earthquake are in effect. The policy form contains various exclusions, including but not limited to the following property exclusions: automobiles; aircraft; and Contractors' and subcontractors' machinery, tools, and equipment and property of a similar nature, including forms, shoring, scaffolding, temporary structures, rental property/equipment and similar property, not intended to become a permanent part of a building or structure. The Contractor and the subcontractors must refer to the policy form to determine all properties and perils included and excluded and to determine their rights and responsibilities as insureds under the policy form. The Contractor and the subcontractors are responsible for payment for all losses within the deductibles and losses not covered by the builder's risk policies.

The current policies described in A through D of this numbered clause are on file and available for examination by appointment in the office of the General Manager, Risk Management, The Port Authority of NY & NJ, Treasury Department, 225 Park Avenue South, 12th Floor, New York, N.Y. 10003. The policies under A and B above are subject to certain liability coverage exclusions, which include, but are not limited to, exclusions from liability from claims arising from pollution and exposure to asbestos.

The Contractor and subcontractors shall comply with all obligations of the insured under or in connection with all of the policies described in A through D above.

The Authority shall have the right at any time and from time to time at its option to procure insurance substituting in whole or in part for any or all of the policies described in A through D above or to require that the Contractor and the subcontractors themselves obtain insurance substituting in whole or part for that above referred to, provided always, however, that the Contractor and the subcontractors shall be afforded coverage as stipulated by the Authority and the Authority shall either pay the premiums on such substitute insurance or reimburse the Contractor and the subcontractors therefor.

Neither the procurement of the above insurance or any substitute insurance nor the extent of the coverage or the limits of liability thereunder shall be construed to be a limitation on the nature or extent of the Contractor's obligations, or to relieve the Contractor of any such obligations, and the procurement of the above insurance is only for the purpose of reducing the cost of the Contract without constituting any representation by the Authority as to the adequacy of the insurance to protect the Contractor against the obligations imposed on the Contractor by law (except the applicable State Workers' Compensation Law) or by this or any other Contract.

Notwithstanding any provision of this clause, however, no subcontractor shall be or have the right to be covered under the policies of insurance above referred to until the subcontractor has been expressly approved in writing by the Engineer, as required under this Contract, and such approval may be withheld, among other reasons, until execution by the subcontractor of agreements affirming its obligations provided in this clause with respect to the above insurance.

The provisions of this numbered clause are not intended to create any rights for the Contractor other than rights which may be available to the Contractor under said policies themselves, whatever such rights may be. Moreover, the Authority makes no representation or guaranty, either by the provisions of this numbered clause or otherwise, as to the effect of or the coverage under said policies, and no employee or agent of the Authority is authorized to make any such representation or guaranty, either by the provisions of this numbered clause or otherwise, as to the effect of or the coverage under said policies, and no employee or agent of the Authority is authorized to make any such representation or guaranty or to offer any interpretation of or information on said policies. The Contractor warrants and represents that it has examined and is familiar with the above stated coverages and that in submitting its Proposal it has relied solely on its own interpretation thereof and not on any representations or statements, oral or written, of the Authority, its Commissioners, officers, agents, employees, consultants or contractors.

All negotiations and adjustments with any insurer concerning payment for any loss, the risk of which is borne by the Contractor under this Contract, shall be the responsibility of and shall be conducted by the Contractor unless the applicable policy provides otherwise. The Contractor shall, however, inform the Engineer of the progress of all such negotiations and notify the Engineer sufficiently in advance of all meetings thereon so that the Engineer or designated representatives may attend said negotiations if they so desire.

The Authority shall be entitled to all returned premiums, dividends and credits which may become payable at any time for any reason whatsoever in connection with the aforementioned insurance. The Contractor hereby assigns to the Authority all such returned premiums, dividends and credits and the subcontractors shall be deemed to have assigned to the Authority all such returned premiums, dividends and credits by becoming subcontractors under this Contract. The Contractor shall execute and cause the subcontractors to execute any instrument necessary or convenient to evidence the Authority's right to such returned premiums, dividends and credits.

Notwithstanding any payment by the Authority of any insurance premiums, the Authority shall not be deemed the employer of any employees hired by the Contractor or any subcontractor covered by such insurance nor shall it be liable for any of the obligations of such employer.

The Contractor and the subcontractors shall cooperate to the fullest extent with the Authority in all matters relating to the aforementioned insurance and shall comply with all requirements of all insurance policies procured by the Authority. They shall also at their own expense furnish the Engineer or a duly authorized representative with copies of all payrolls, correspondence, papers, records and other things necessary or convenient for dealing with or defending against any claims and for procuring or administering the aforementioned insurance including furnishing the name of any of their employees, officers, or agents whose presence or testimony is necessary or convenient in any negotiations or proceedings involving such insurance.

## 52. INSURANCE PROCURED BY CONTRACTOR

The Contractor, in its own name as insured, shall maintain and pay the premiums on the policy or policies of insurance for coverage(s) as hereinafter described, which shall cover its operations hereunder, shall be effective throughout the effective period of this contract, and shall afford coverage(s) in not less than the amounts set forth below:

A. Commercial Automobile Liability Insurance covering "any" vehicles on the broadest commercially available form:

1.) Combined single limit for bodily injury and property damage liability – $2 Million each accident.

The Authority shall be named as an additional insured in the liability policy or policies and evidenced by the certificate(s) of insurance set forth above. The liability policy(ies) and the certificate(s) of insurance shall show coverage for cross-liability/severability of interests as provided under the standard ISO "separation of insureds" condition.

The Contractor shall deliver certified copies of the policy(ies) described above or certificate(s) of insurance evidencing the existence thereof to the Engineer at the location where the work will be performed, within ten (10) days after the acceptance of its Proposal. Such policy(ies) or certificate(s) shall state the contract number and shall contain a valid provision or endorsement that the policy(ies) may not be canceled, terminated, changed or modified without giving thirty (30) days written advance notice thereof to the Authority. Such policy(ies) and certificate(s) of insurance shall contain an additional endorsement providing that "the insurance carrier shall not, without obtaining express advance permission from the General Counsel of the Authority, raise any defense involving in any way the jurisdiction of the tribunal over the person of the Authority, raise any defense involving in any way the jurisdiction of the Authority, its Commissioners, officers, agents or employees, the governmental nature of the Authority or the provisions of any statute respecting suits against the Authority". Certified copies of all renewal policies or certificates evidencing their existence shall be delivered to the Engineer at the location where the work will be performed at least ten (10) days prior to the expiration date of each expiring policy. If at any time any of the certificates or policies shall be or become unsatisfactory to the Authority as to form or substance, or if the carrier issuing any such certificate or policy shall be or become unsatisfactory to the Authority, the Contractor shall promptly obtain a new and satisfactory certificate and policy. Upon request of the General Manager, Risk Management, the Contractor shall furnish the Authority with a certified copy of each policy stated above.

The requirements for insurance procured by the Contractor shall not in any way be construed as a limitation on the nature or extent of the contractual obligations assumed by the Contractor under this contract. The insurance requirements are not a representation by the Authority as to the adequacy of the insurance to protect the Contractor against the obligations imposed on them by law or by this or any other Contract.

# CHAPTER VI

# RIGHTS AND REMEDIES

## 53. RIGHTS AND REMEDIES OF AUTHORITY

The Authority shall have the following rights in the event the Chief Engineer shall deem the Contractor guilty of a breach of any term whatsoever of this Contract:

A. The right to take over and complete the Work or any part thereof as agent for and at the expense of the Contractor, either directly or through other contractors.

B. The right to cancel this Contract as to any or all of the Work yet to be performed.

C. The right to specific performance, an injunction or any other appropriate equitable remedy.

D. The right to money damages.

For the purpose of this Contract, breach shall include but not be limited to the Contractor's failure to procure insurance satisfactory to the Authority within the time limit specified in the Clause hereof entitled "Insurance Procured By The Contractor" and the following, whether or not the time has yet arrived for performance of an obligation under this Contract: a statement by the Contractor to any representative of the Authority indicating that he cannot or will not perform any one or more of his obligations under this Contract; any act or omission of the Contractor or any other occurrence which makes it improbable at the time that he will be able to perform any one or more of his obligations under this Contract; any suspension of or failure to proceed with any part of the Work by the Contractor which makes it improbable at the time that he will be able to perform any one or more of his obligations under this Contract; any false certification at any time by the Contractor as to any material item certified pursuant to the clauses of the Information For Bidders entitled "Certification of No Investigation (Criminal or Civil Anti-Trust), Indictment, Conviction, Suspension, Debarment, Disqualification, Prequalification Denial or Termination, Etc; Disclosure of Other Required Information" and "Non-Collusive Bidding and Code of Ethics Certification; Certification of No Solicitation Based on Commission, Percentage, Brokerage, Contingent Fee or Other Fee", , any false certification at any time by the Contractor or a subcontractor pursuant to the clause "Prevailing Rate of Wage Certification" set forth in the Information for Bidders, or the willful or fraudulent submission of any signed statement pursuant to such clauses which is false in any material respect; or the Contractor's incomplete or inaccurate representation of its status with respect to the circumstances provided for in such clauses.

The enumeration in this numbered clause or elsewhere in this Contract of specific rights and remedies of the Authority shall not be deemed to limit any other rights or remedies which the Authority would have in the absence of such enumeration; and no exercise by the Authority of any right or remedy shall operate as a waiver of any other of its rights or remedies not inconsistent therewith or to estop it from exercising such other rights or remedies.

## 54. RIGHTS AND REMEDIES OF CONTRACTOR

Inasmuch as the Contractor can be adequately compensated by money damages for any breach of this Contract which may be committed by the Authority, the Contractor expressly agrees that no default, act or omission of the Authority shall constitute a material breach of this Contract, entitling him to cancel or rescind it or (unless the Engineer shall so direct) to suspend or abandon performance.

## 55. PERFORMANCE OF WORK AS AGENT FOR CONTRACTOR

In the exercise of its right to take over and complete Work as agent for the Contractor, for which provision is made in the clause hereof entitled "Rights and Remedies of Authority", the Authority shall have the right to take possession of and use or permit the use of any and all plant, materials, equipment and other facilities provided by the Contractor for the purpose of the Work and the Contractor shall not remove any of the same from the site of the Work without express permission. Unless expressly directed to discontinue the performance of all Work, the Contractor shall continue to perform the remainder thereof in such manner as in no way will hinder or interfere with the portions taken over by the Authority.

In the certificate of total compensation earned, for which provision is made in the clause hereof entitled "Final Payment", the Engineer will separately state the amount of Work performed by the Authority as agent for the Contractor, credit to the Authority the cost thereof, and credit to the Contractor the compensation earned thereby; and the difference between them shall be payable by the Contractor to the Authority, or vice versa as the case may be. If such difference is in its favor, the Authority may deduct it from any moneys due the Contractor, and if such moneys be insufficient, the balance thereof shall be payable to it on demand; if in the Contractor's favor, it shall constitute part of the Final Payment.

The exercise by the Authority of its right to take over the Work shall not release the Contractor from any of its obligations or liabilities under this Contract.

## 56. NO ESTOPPEL OR WAIVER

The Authority shall not be precluded or estopped by any acceptance, certificate or payment, final or otherwise, issued or made under this Contract or otherwise issued or made by it, the Engineer, or any officer, agent or employee of the Authority, from showing at any time the true amount and character of Work performed, or from showing that any such acceptance, certificate or payment is incorrect or was improperly issued or made; and the Authority shall not be precluded or estopped, notwithstanding any such acceptance, certificate or payment, from recovering from the Contractor any damages which it may sustain by reason of any failure on his part to comply strictly with this Contract, and any moneys which may be paid to him or for his account in excess of those to which he is lawfully entitled.

Neither the acceptance of the Work or any part thereof, nor any payment therefor, nor any order or certificate issued under this Contract or otherwise issued by the Authority, the Engineer, or any officer, agent or employee of the Authority, nor any permission or direction to continue with the performance of Work, nor any performance by the Authority of any of the Contractor's duties or obligations, nor any aid lent to the Contractor by the Authority in his performance of such duties or obligations, nor any other thing done or omitted to be done by the Authority, its Commissioners , officers, agents or employees shall be deemed to be a waiver of any provision of this Contract or of any rights or remedies to which the Authority may be entitled because of any breach thereof, excepting only a resolution of its Commissioners, providing expressly for such waiver. No cancellation, rescission or annulment hereof, in whole or as to any part of the Work, because of any breach hereof, shall be deemed a waiver of any money damages to which the Authority may be entitled because of such breach. Moreover, no waiver by the Authority of any breach of this Contract shall be deemed to be a waiver of any other or any subsequent breach.

# CHAPTER VII

# MISCELLANEOUS

## 57. SUBMISSION TO JURISDICTION

The Contractor hereby irrevocably submits himself to the jurisdiction of the Courts of the State of New York 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 the Proposal or this Contract. The Contractor agrees that service of process on the Contractor in relation to such jurisdiction may be made, at the option of the Authority, either by registered or certified mail addressed to the applicable office as provided for in the clause hereof entitled "Service of Notices on the Contractor", by registered or certified mail addressed to any office actually maintained by the Contractor or by actual personal delivery to the Contractor if the Contractor be an individual, to any partner if the Contractor be a partnership or to an officer, director or managing or general agent if the Contractor be a corporation.

Such service shall be deemed to be sufficient when jurisdiction would not lie because of the lack of basis to serve process in the manner otherwise provided by law. In any case, however, process may be served as stated above whether or not it might otherwise have been served in a different manner.

## 58. PROVISIONS OF LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included therein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

## 59. INVALID CLAUSES

If any provision of this Contract shall be such as to destroy its mutuality or to render it invalid or illegal, then, if it shall not appear to have been so material that without it the Contract would not have been made by the parties, it shall not be deemed to form part thereof but the balance of the Contract shall remain in full force and effect.

## 60. NON-LIABILITY OF THE AUTHORITY REPRESENTATIVES

Neither the Commissioners of the Authority nor any officer, agent, or employee thereof shall be charged personally by the Contractor with any liability or held liable to him under any term or provision of this Contract, or because of its execution or attempted execution, or because of any breach hereof.

## 61. SERVICE OF NOTICES ON THE CONTRACTOR

Whenever provision is made in this Contract for the giving of any notice to the Contractor, its deposit in any post office or post office box, enclosed in a postpaid wrapper addressed to the Contractor at his office, or its delivery to his office, shall be sufficient service thereof as of the date of such deposit or delivery, except to the extent, if any, otherwise provided in the clause entitled "Submission to Jurisdiction". Until further notice to the Authority the Contractor's office will be that stated in his Proposal. Notices may also be served personally upon the Contractor; or if a corporation, upon any officer, director, or managing or general agent; or if a partnership upon any partner.

## 62. MODIFICATION OF CONTRACT

No change in or modification, termination or discharge of this Contract, in any form whatsoever, shall be valid or enforceable unless it is in writing and signed by the party to be charged therewith or his duly authorized representative, provided, however, that any change in or modification, termination or discharge of this Contract expressly provided for in this Contract shall be effective as so provided.

The authority of any person to order Extra Work or to alter the Contract Drawings and Specifications does not include the power to cancel, modify or waive any provision of the Form of Contract, and no officer or other representative of the Authority shall have the power so to do unless and until hereafter so authorized by or pursuant to a resolution of the Commissioners of the Authority or by or pursuant to a resolution of their appropriate Committee.

## 63. PUBLIC RELEASE OF INFORMATION

The Contractor and all his subcontractors shall not issue or permit to be issued any press release, advertisement, or literature of any kind, which refers to the Authority or the services performed in connection with this Contract, without first obtaining the written approval of the Chief Engineer. Such approval may be withheld if for any reason the Chief Engineer believes that the publication of such information would be harmful to the public interest or is in any way undesirable. This provision shall survive termination or expiration of this Contract.

# SPECIFICATIONS

# DIVISION 1

# GENERAL PROVISIONS

## 64. CONSTRUCTION REQUIRED BY THE SPECIFICATIONS

These Specifications relate generally to repair of light poles, light pole supports, light systems, light pole foundations and related work incidental to the repairs, including but not limited to installation of duct banks, conduits, wiring, etc. at the three Staten Island Bridges including their approaches located in New Jersey and New York.

These Specifications require the doing of all things necessary or proper for or incidental to the matter referred to in the immediately preceding paragraph, as shown on the Contract Drawings in their present form. In addition, all things shown on the Contract Drawings even though not expressly mentioned in these Specifications, all things mentioned in these Specifications even though not shown on the Contract Drawings, and all things not specified either on the Contract Drawings, or in the Specifications but involved in carrying out their intent and in the complete and proper execution of the matter referred to in the immediately preceding paragraph are required by these Specifications; and the Contractor shall perform the same as though they were specifically delineated, described and mentioned.

In case of a conflict between a requirement of the Contract Drawings and a requirement in Division 1 of the Specifications, the requirement of Division 1 shall control. In case of a conflict between a requirement contained in other Divisions of the Specifications and a requirement of the Contract Drawings, the requirement of the Contract Drawings shall control.

Some Sections of the Specifications make cross references to construction specified in other Sections of the Specifications, including cross references intended to avoid duplication by the bidders in quoting prices and to point out some of the necessity for coordination. Such cross references are not intended to be complete or all inclusive, and the Contractor shall ascertain for himself both the nature and the extent of all construction which may be related to that under each Section of the Specifications whether or not expressly referred to.

Some Sections of the Specifications contain a general description of the construction under such Sections. Such description is merely a very general one and is not intended to outline the construction required by the Specifications and Contract Drawings. Accordingly, such description shall be construed as in aid of and supplemental to, but in no case limiting, impairing or decreasing, the requirements elsewhere set forth with respect to the construction to be performed.

The Contractor's compensation for all construction whatsoever referred to in the Specifications and Contract Drawings in their present form, even though the need for certain items of such construction may be contingent upon future occurrences or determinations or upon other circumstances, shall be deemed to be included in the price(s) quoted by the Contractor in the Form of Contract unless the Specifications or Contract Drawings expressly state that compensation in addition to such price shall be payable for such items of construction. The express statement in some cases to the effect that certain construction shall be without additional cost to the Authority shall not impair the application of this paragraph in other cases.

The distribution of various parts of the construction among the Divisions and Sections of the Specifications or among the Contract Drawings is not intended as a representation of the most effective or logical method of organizing, scheduling, or subcontracting the construction, and the Contractor shall ascertain for himself how to do so unless otherwise expressly prescribed in this Contract.

In all cases the provisions of the second paragraph of this numbered Section shall control.

## 65. AVAILABLE PROPERTY

Subject to the conditions elsewhere stated herein, those areas to be occupied by the permanent construction will be made available to the Contractor upon the commencement of his first operations at the construction site, together with an area shown cross-hatched on Contract Drawing No. G3 and designated "Area Available For Contractor's Use".

Any additional property which the Contractor desires for his operations shall be obtained by him at his own expense.

The Contractor will be permitted to use only so much of the aforesaid areas as is necessary for the performance of the Contract, and he must at all times so conduct his operations as not to encroach upon or block the portions used by others. The Engineer may at any time make joint or exclusive assignments of particular portions thereof, either to the Contractor or to others, and may take over and use for other purposes any portions which, in the opinion of Engineer, are not required for the performance of the Contract.

The Contractor shall daily clean up the areas made available to him so that they are free at all times of refuse, rubbish, scrap material or debris.

## 66. OPERATIONS OF OTHERS

During the time that the Contractor is performing the Contract, other persons will be engaged in other operations on or about the construction site including during the time that the Contractor is performing the Contract, other persons will be engaged in other operations on or about the construction sites including persons performing the work of Contracts AKG-274.094 (Goethals Bridge Deck Rehabilitation),AKO-284.037 (Outerbridge Crossing Repainting), AKB-158A (Bayonne Bridge Steel Repairs), AK-155 (Staten Island Bridges Lighting Rehabilitation), AK-159 (SIB Access Control System) and AK-174 (Staten Island Bridges Upgrade Emergency Egress Signage andLighting) and normal facility operations and maintenance all of which shall remain uninterrupted.

The Contractor shall so plan and conduct his operations as to work in harmony with others engaged at the construction site and not to delay, endanger or interfere with the operations of others (whether or not specifically mentioned above), all to the best interests of the Authority and the public and as may be directed by the Engineer.

## 67. LABOR ACTIONS

Whenever any labor strike, slowdown, work stoppage, picketing or other labor action which might interfere with the performance of the Contract, or of other Authority or PATH contracts or the operation of any Authority or PATH facility occurs at the construction site or at any other Authority or PATH facility as a result of the Contractor's (or its subcontractor's) utilization of particular means, methods or manpower to perform the Work required by the Contract, the Contractor shall pursue all remedies which are appropriate and available to him to avoid such interference.

## 68. CONTRACTOR'S MEETINGS

The Contractor shall conduct job progress and coordination meetings with subcontractors in his field office every two weeks, or as frequently as job conditions require or the Engineer may request. The Engineer shall be notified and, at his option, may attend these meetings. The Contractor shall prepare and distribute minutes to the Engineer and the subcontractors within forty-eight (48) hours of the day following the meetings.

The Contractor shall attend separate job progress and coordination meetings with the Engineer every two weeks, or at times otherwise requested by the Engineer.

## 69. CONTRACT DRAWINGS

The Contract Drawings which accompany and form a part of these Specifications bear the general title "The Port Authority of NY & NJ - Staten Island Bridges - Light Pole and Light Pole Support Repairs - Contract AK-179" and are separately numbered and entitled as follows:

| Dwg. No. | Title |
|---|---|
| G1 | TITLE SHEET |
| G2 | INDEX OF DRAWINGS |
| G3 | SITE PLANS |
| E1 | LEGEND, ABBREVIATIONS, GENERAL NOTES, AND LIST OF APPROVED MANUFACTURERS |
| E2 | BAYONNE BRIDGE LIGHTING PLANS |
| E3 | GOETHALS BRIDGE LIGHTING PLANS SHEET 1 |
| E4 | GOETHALS BRIDGE LIGHTING PLANS SHEET 2 |
| E5 | OUTERBRIDGE CROSSING LIGHTING PLANS SHEET 1 |
| E6 | OUTERBRIDGE CROSSING LIGHTING PLANS SHEET 2 |
| E7 | OUTERBRIDGE CROSSING LIGHTING PLANS SHEET 3 |
| E8 | DETAILS SHEET 1 |
| E9 | DETAILS SHEET 2 |
| E10 | DETAILS SHEET 3 |
| E11 | DETAILS SHEET 4 |
| E12 | LIGHT POLE AND LIGHT FIXTURE SCHEDULE |
| S1 | GOETHALS BRIDGE LIGHT POLE SUPPORTS, STRUCTURAL NOTES, ABBREVIATIONS, ELEVATIONS, SECTIONS AND DETAILS |
| S2 | LIGHT POLE SUPPORTS ON PARAPETS, LIGHT POLE/HIGH MAST TOWER FOUNDATIONS, PLANS, SECTIONS, AND NOTES |
| MT1 | NOTES, LEGEND, ABBREVIATIONS, AND SIGN DATA TABLE |
| MT2 | KEY PLANS |
| MT3 | BAYONNE BRIDGE PLAN -1- |
| MT4 | BAYONNE BRIDGE PLAN -2- |

| | |
|---|---|
| MT5 | OUTERBRIDGE CROSSING PLAN -1- |
| MT6 | OUTERBRIDGE CROSSING PLAN -2- |
| MT7 | OUTERBRIDGE CROSSING PLAN -3- |
| MT8 | OUTERBRIDGE CROSSING PLAN -4- |
| MT9 | GOETHALS BRIDGE PLAN -1- |
| MT10 | GOETHALS BRIDGE PLAN -2- |
| MT11 | GOETHALS BRIDGE PLAN -3- |
| MT12 | GOETHALS BRIDGE PLAN -4- |
| MT13 | GOETHALS BRIDGE PLAN -5- |
| MT14 | GOETHALS BRIDGE PLAN -6- |
| MT15 | DETAILS -1- |
| MT16 | DETAILS -2- |

The Contract Drawings do not show all of the details of the Work and are intended only to illustrate the character and extent of the Work to be performed. Accordingly, they may be supplemented during the performance of the Work by the Engineer or by the Contractor subject to the approval of the Engineer, to the extent necessary to further illustrate the Work.

An indication on the Contract Drawings of the existence, nature or location of any utilities, structures, obstructions, conditions or materials does not constitute a representation as to the conclusions to be drawn therefrom nor a representation that no others exist in addition to those shown, even in the same location; nor does the absence of any indication on said drawings of the existence, nature or location of any utilities, structures, obstructions, conditions or materials constitute a representation that none exist.

After the Contract has been executed, the Contractor will be furnished six (6) copies of the Specifications and Contract Drawings without charge.

## 70. SHOP DRAWINGS, CATALOG CUTS AND SAMPLES

The Contractor shall specifically prepare for this Contract all Shop Drawings which may be required in addition to the Contract Drawings or in addition to any other drawings which the Engineer may issue in supplementing the Contract Drawings.

The specific requirements elsewhere set forth in the Specifications for furnishing Shop Drawings, Catalog Cuts and samples for any particular portion of the Contract shall not limit the obligation of the Contractor to furnish Shop Drawings, Catalog Cuts and samples for any other portion when so required by the Engineer.

The Contractor shall submit a general "Submittal Schedule" for the Engineer's review and approval listing the planned transmittal date and estimated number in each specification section category of Shop Drawings, Catalog Cuts, pages of calculations and samples within 30 days after receipt by the Contractor of the acceptance of the Proposal. A more detailed schedule shall be submitted no less than 30 calendar days prior to the actual date of any submittal.

After checking and verifying all field measurements and after complying with applicable procedures specified hereunder, the Contractor shall submit to the Engineer for review and approval, in accordance with the approved schedule of Shop Drawing submissions, or for other action if so indicated by the Engineer, four copies and two reproducibles, unless otherwise requested, of all Shop Drawings which will bear a specific written indication that the Contractor has reviewed the submission for conformance to the requirements of the Contract Drawings and Specifications.

All submissions shall be identified as the Engineer may require. The data shown on the Shop Drawings shall be complete with respect to quantities, dimensions, conformance to the specified performance and design criteria, materials, test results and similar information to enable the Engineer to review the submittal as required.

The Contractor shall also submit nine copies to the Engineer for review and approval pursuant to the approved submittal schedule, of all Catalog Cuts and samples for conformance to the requirements of the Contract Drawings and Specifications. All Catalog Cuts and samples shall have been reviewed by the Contractor and shall be accompanied by a specific written indication that the Contractor has reviewed the submittal for conformance with the Contract Drawings and Specifications and shall be identified clearly as to material, supplier, manufacturer's procedures and pertinent data such as catalog numbers and the use for which intended.

Before submission of each Shop Drawing, Catalog Cut and sample, the Contractor shall have determined and verified all quantities, dimensions, conformance to the specified performance and design criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed and coordinated each Shop Drawing or Catalog Cut with other Shop Drawings and Catalog Cuts and with other requirements of the Work.

At the time of each submission, the Contractor shall give the Engineer specific written notice of each variation in any Shop Drawing, Catalog Cut and sample from the requirements of the Contract Drawings or Specifications and, in addition, shall cause a specific notation of each such variation to be made on each submittal to the Engineer, for review and approval of each such variation.

The Engineer's review and approval of Shop Drawings, Catalog Cuts or samples shall not relieve the Contractor from responsibility for any variation from the requirements of the Contract Drawings or Specifications unless the Contractor has in writing called the Engineer's attention to each such variation at the time of submission as required hereunder and the Chief Engineer has given written approval of each by an express specific written notation thereof incorporated in or accompanying the Shop Drawing, Catalog Cut or sample approval. Approval of Shop Drawings, Catalog Cuts and samples which are inconsistent with the requirements of the Contract Drawings and Specifications shall not be deemed to waive or change such requirements or to relieve the Contractor of his obligations to perform such requirements unless the Chief Engineer shall expressly and specifically state that he is waiving or changing such requirements, as stated above.

Where a Shop Drawing, Catalog Cut or sample is required no related Work shall be performed prior to the Engineer's review and approval of the submission.

In preparing the Shop Drawings, the Contractor may adopt a sheet of any reasonable size which best suits his needs, but having adopted such size, all sheets thereafter of a similar nature shall be of the same size as that adopted. Each drawing shall have a margin on the top, bottom and right-hand side of one-half inch and on the left hand side a margin of one and one-half inches.

Upon receipt of the submittal, the Engineer will review the Shop Drawing, Catalog Cut or sample for conformance to the design information and materials shown on the Contract Drawings and contained in the Specifications. Approval by the Engineer shall not constitute a complete review or approval of the means, methods, techniques, sequences or procedures of construction, except where a specific means, method, technique, sequence or procedure of construction is specifically delineated in or required by the Contract Drawings or Specifications, and the approval shall not constitute a review and approval in regard to safety precautions or programs incident thereto. The review and approval of a separate item will not in itself indicate approval of the assembly in which the item functions. Any design shown on the Shop Drawings and prepared by the Contractor, his subcontractors, their detailers, or their professional engineers is the complete responsibility of the Contractor.

Within the number of working days hereinafter specified after receipt of the Shop Drawing prints, the Engineer shall approve or not approve the same or require corrections or additions to be made thereon. When a shop drawing is not approved or if additions or corrections are required, the Engineer shall return within this period one of the four copies submitted and the Contractor shall make the revisions, corrections or additions shown thereon to be made. He shall resubmit four prints and one brownline (reproducible) showing the drawing corrected as required. The Contractor shall direct specific attention in writing to revisions other than the corrections called for by the Engineer on the previous submittal. Each drawing shall be corrected as required until the approval of the Engineer is obtained. After each resubmission, the Engineer shall have the number of working days hereinafter specified in which to approve revisions or corrections.

The number of working days within which the Engineer shall advise the Contractor as to whether the Shop Drawings are approved, not approved, or require corrections or additions to be made thereto shall be as follows, except that 20 working days shall be required for the Engineer to review shop drawings submitted with design calculations.

| No. of Dwgs. Submitted Within 5 Consecutive Working Days for Each Discipline(*) | No. of Working Days for Engineer To Review Shop Drawings |
|---|---|
| Up to 50 | 10 |
| 51 to 75 | 15 |
| More than 75 | 20 |
| * Disciplines shall be defined as follows: Structural, Architectural, Civil, Geotechnical, Mechanical, Electrical, Traffic and Environmental. | |

Failure of the Contractor to provide 30 calendar days advance notice to the Engineer of any submittal shall result in a five (5) working day extension of the number of working days stated in the chart above. In no event shall an extension of the Engineer's review time provided for in this section relieve the Contractor from its duty to meet all contractual Milestone dates.

As soon as approval has been given to any Shop Drawing or Catalog Cut, the Contractor shall within five days send to the Engineer six prints, except that when the Engineer specifically so directs, nine prints shall be sent. After approval thereof, no change will be permitted thereon unless approved in writing by the Engineer.

Before final payment for the Work is made, the Contractor shall furnish to the Engineer one set of Shop Drawings, which have previously been prepared by the Contractor in accordance with requirements elsewhere specified in these Specifications, all clearly revised, completed and brought up to date showing the permanent construction as actually made. These drawings shall be in the form of Mylar reproducibles, from which clear prints can be made.

All drawings, data, calculations and other papers of any type whatsoever, whether in the form of writing, figures or delineations, which are prepared in connection with this Contract and submitted to the Authority shall become the property of the Authority. The Authority shall have the non-exclusive right to use or permit the use of all such drawings, data and other papers and any ideas or methods represented thereby for any purpose and at any time without additional compensation. No such papers shall be deemed to have been given in confidence. Any statement or legend to the contrary in connection with such drawings, data or other papers and in conflict with the provisions of this paragraph shall be void and of no effect.

## 71. SUBSTITUTION

Where a proprietary item or make is specified or mentioned herein or called for or mentioned on the Contract Drawings and the phrases "similar and equal to" or "approved equal" are used in connection therewith, the utilization of any other item or make will be deemed a substitution. Substitution for the proprietary item or make specifically named may be made only in accordance with the Section hereof entitled "Workmanship and Materials" and in accordance with the following.

Whenever materials or equipment are specified or described in the Contract Drawings or Specifications by using the name of a proprietary item or the name of a particular supplier, the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of another supplier or manufacturer may be accepted by the Engineer if sufficient information and proof is submitted by the Contractor to permit the Engineer to determine that the material or equipment proposed is equivalent or equal to that named and the Engineer approves the substitution. The procedure for review by the Engineer will include the following. Requests for review of substitute items of material and equipment will not be accepted by the Engineer from anyone other than the Contractor. If the Contractor wishes to furnish or use a substitute item of material or equipment, the Contractor shall make a timely written application to the Engineer for approval thereof, certifying that the proposed substitution will perform at least the identical functions and achieve at least the identical results called for by the specified product and otherwise be equal to the specified product with regard to, but not limited to, durability, maintenance, strength, energy costs and record of proven performance. The application shall state that the evaluation and approval of the proposed substitution shall not delay the Contractor's completion of the Work as required by the Contract, whether or not approval of the substitution will require a change in the construction and, in no event will the Contractor be granted an extension of time for completion of any portion of the Work for reasons related directly or indirectly to the evaluation of the proposed substitution or to the proposed substitution itself. Any variations of the proposed substitution from that specified shall be identified in the application, and maintenance, repair and replacement services for the substitution shall be indicated. The Engineer may require the Contractor to furnish at the Contractor's expense additional laboratory test data concerning the proposed substitution.

Such submission to the Engineer shall be made only by including the requested substitution in the list of materials required to be submitted to the Engineer in accordance with the Section hereof entitled "Inspections and Rejections" within forty-five calendar days after the receipt of the acceptance of the Contractor's Proposal. After the approval of said list, no substitutions will be permitted, except that a brand or make named in the Specifications may be submitted for approval in lieu of a brand or make on said list. Any such submission shall not imply, or impose on the Engineer, any obligation whatsoever to discuss, disclose or justify the reasons for his opinion, approval, acceptance or rejection.

The Engineer shall be the sole judge of as to whether a proposed substitution will be approved, and no substitution shall be ordered or utilized without the Engineer's prior written approval. The Engineer may require Contractor to furnish at Contractor's expense a special performance guarantee or other assurance with respect to any approved substitution. Furthermore, the approval of any substitute proprietary item or make shall not in any way entitle the Contractor to additional compensation therefor.

Notwithstanding such approval, however, the Contractor assumes the risk that such approved substitute item or make is not equal to that shown or specified and if at any time the substitution shall appear not to be so equal he shall replace the substitution with that originally shown on the Contract Drawings or called for in the Specifications at his own cost and reimburse the Authority for any loss occurring on account of the substitution failing to be equal, notwithstanding that it had been previously approved for use by the Engineer.

The construction called for by the Contract Drawings and Specifications may be adapted for a particular proprietary item or make of material or equipment. Therefore, if any construction not required by the Contract Drawings or Specifications in their present form is necessary or desirable because of the use of substitute item or make of material or equipment (even though such other item or make is approved by the Engineer), such construction shall be furnished or performed by the Contractor at his expense and subject to the approval of the Engineer.

## 72. WORKMANSHIP AND MATERIALS

Workmanship and materials shall in every respect be free from defects of any kind and shall be in accordance with the best modern practice and whenever the Contract Drawings, Specifications or directions of the Engineer admit of a doubt as to what is permissible or fail to note the quality of any construction the interpretation which calls for the best quality is to be followed. Workmanship shall conform to applicable Specifications, manufacturer's instructions and recommendations for installation of products for the applications shown on the Contract Drawings, all of which shall be subject to the provisions of the Section of Division 1 GENERAL PROVISIONS entitled "Inspections and Rejections".

All items provided in this contract that use dates in the recording, storing or processing of information shall use such dates correctly at all times including using such dates correctly in the recording, storing or processing of information after January 1, 2000 (Year 2000 Compliant).

Materials and Equipment incorporated into the Work shall be new except as may be otherwise herein specifically required, and shall comply with make, size, type and quality specified, or as specifically approved in writing by the Chief Engineer in accordance with the Section of Division 1 GENERAL PROVISIONS entitled "Substitution".

Reference to standards of any society, institution, association, or governmental authority in the Specifications or on the Contract Drawings, whether specific or by implication, shall mean for such standards which are part of the building code in effect for Work of this Contract the edition date published in such code; and such references which are not part of the building code, shall mean the latest edition date in effect at the time of opening of Proposals upon the present Contract unless specifically stated otherwise.

If required by the Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment to be employed by the Contractor in performing the Work. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the approved instructions of the applicable supplier except as otherwise provided in the Contract Drawings or Specifications.

In case of a discrepancy between a description or requirement in the Contract Drawings and Specifications for any material or equipment and a catalog number or other designation for the same material or equipment (even though stated to be acceptable), the description or requirements shall control.

In various paragraphs of these Specifications, references may be made to certain standard or tentative specifications or requirements of various organizations. Unless otherwise stated, these references are to be construed as referring to the specifications and requirements in effect on the date set for opening bids upon the present Contract.

All inventions, ideas, designs and methods contained in the Specifications and Contract Drawings in which the Authority has or may acquire patent, copyright or other property rights are hereby expressly reserved for the exclusive use of the Authority. The Specifications and Contract Drawings contain confidential information which is disclosed only to enable this Contract to be performed. Said Specifications and Drawings must not be used for any purpose detrimental to the interest of the Authority and must not be produced or copied in whole or in part or used for furnishing information to others without the written consent of the Authority, provided, however, that the Contractor may, when the performance of the Contract so requires, furnish said information to others for the purpose of engaging or informing subcontractors and materialmen.

If, in accordance with this Contract, the Contractor furnishes research, development or consultative services in connection with the performance of the Contract and if in the course of such research, development or consultation patentable subject matter is produced by the Contractor, its officers, agents, employees, subcontractors or materialmen, the Authority shall have, without cost or expense to it, an irrevocable, non-exclusive, royalty-free license to make, have made, and use, either itself or by anyone on its behalf, such subject matter in connection with any activity now or hereafter engaged in or permitted by the Authority. Promptly upon request by the Authority, the Contractor shall furnish or obtain from the appropriate person a form of license satisfactory to the Authority, but as between the Contractor and the Authority the license herein provided for shall nevertheless arise for the benefit of the Authority immediately upon the production of said subject matter and shall not await formal exemplification in a written license agreement as provided for above. Such license may be transferred by the Authority to its successors, immediate or otherwise, in the operation or ownership of any real or personal property now or hereafter owned or operated by the Authority, but such license shall not be otherwise transferable.

The right to use all material, software, firmware, compositions of matter, manufactures, apparatus, appliances, processes of manufacture or types of construction required in connection with this Contract and to which a patent, copyright or other intellectual property right applies or may apply shall be obtained by the Contractor without separate or additional compensation whether the same is patented, copyrighted or otherwise protected as an intellectual property right before, during or after the performance of the Contract.

The Contractor shall indemnify the Authority against and save it harmless from all loss and expense incurred in the defense, settlement or satisfaction of any claims in the nature of patent, copyright or other intellectual property right infringement arising out of or in connection with the Authority use, in accordance with the preceding two paragraphs of this numbered clause, of such subject matter or material, software, firmware, compositions of matter, manufactures, apparatus, appliances, processes of manufacture or types of construction to which a patent, copyright or other intellectual property right applies or may apply. If requested by the Authority and if notified promptly in writing of any such claim, the Contractor shall conduct all negotiations with respect to and defend such claim without expense to the Authority. If the Authority be enjoined from using any of the facilities which form the subject matter of this Contract and as to which the Contractor is to indemnify the Authority against patent, copyright or other intellectual property right claims, the Authority may, at its option and without thereby limiting any other right it may have hereunder or at law or in equity, require the Contractor to supply, temporarily or permanently, facilities not subject to such injunction and not infringing any patent, copyright or other intellectual property right or to remove all such facilities and refund the cost thereof to the Authority or to take such steps as may be necessary to ensure compliance by the Authority with such injunction, all to the satisfaction of the Authority and all without cost or expense to the Authority.

## 73. INSPECTIONS AND REJECTIONS

All Work and all construction, processes of manufacture and methods of construction involved in or related to the performance of the Work shall be at all times and places subject to the inspection of the Engineer, acting personally or through his Inspectors, and the enumeration in these Specifications of particular portions of such Work, construction, processes of manufacture or methods of construction which will or may be inspected by the Engineer or such Inspectors shall not be deemed to imply that only such Work, construction, processes of manufacture and methods of construction will or may be so inspected. The Engineer shall be the judge of the quality and suitability of the Work, construction, processes of manufacture and methods of construction for the purposes for which they are used or to be used. Should they fail to meet his approval they shall be forthwith reconstructed, made good, replaced or corrected, as the case may be, by the Contractor at his own expense. Rejected material shall be removed immediately from the site. The fact that the Inspectors have approved the materials and workmanship shall not relieve the Contractor from his obligation to supply other material and workmanship when so ordered by the Engineer.

The Contractor , at his own expense, shall furnish such facilities and give such assistance for inspection as the Engineer may direct. In the case of materials required by the Specifications to be inspected in the factory or plant, and in the case of any other items which the Engineer may designate, the Contractor shall secure for the Engineer and his Inspectors free access to all parts of such factories or plants and shall furnish to the Engineer three copies of purchase orders, two copies of mill shipping statements and four copies of shipping statements. Moreover, in the case of such materials to be factory or plant inspected, the Contractor shall give at least ten days' notice to the Engineer of his intention to commence the manufacture or preparation of such materials.

Other than the materials and equipment specifically required to be inspected at the manufacturer's factory or plant, all materials will be inspected at the construction site and any portions thereof which are rejected by the Engineer shall be immediately removed from the construction site by the Contractor and shall be replaced with new materials by the Contractor at his own expense.

In the case of materials to be inspected at the construction site, the Contractor shall submit a list of all such materials in triplicate to the Engineer for his approval prior to ordering same. The list shall be submitted within forty-five calendar days after receipt of the notice of acceptance and shall contain the following information:

A. Classification of submittal in accordance with the following:

Class I - A submittal for record of an expressly specified item.

Class II - A submittal of an item which conforms to an express generic specification or a submittal which is deemed by the Contractor to be identical to an expressly specified item.

Class III - A submittal which is deemed by the Contractor to be functionally equivalent but not identical to a specified item.

B. In the case of Class II and Class III, the Contractor shall supply adequate information to the Engineer to enable the Engineer to compare the specified item and the proposed substitution. Information shall include, but need not be limited to, technical specifications, Catalog Cuts, drawings, references to existing installations and test data, or any other data required by the Engineer.

C. In the case of fabricated materials for which Shop Drawings are to be prepared, a brief description of the material and the statement "see Shop Drawings".

D. In the case of materials or equipment listed in manufacturer's catalogs, the list shall contain the vendor's name, the manufacturer's name, brand name, style designation, catalog number and, where the Specifications require catalog cuts, the statement "see catalog cut".

E. In the case of materials or equipment for which Shop Drawings are not to be prepared, and which are not listed in any catalog, the list shall contain a complete description of the material or equipment, which shall be in sufficient detail to describe completely the materials or equipment and quality therefor.

The Engineer shall advise the Contractor whether said list is approved or requires corrections or additions within the number of working days indicated in the chart below:

| Type of Submittal | No. of Working Days for Engineer to Approve/Disapprove Items |
|---|---|
| Class I Material submittals | 10 |
| Portland Cement mix designs that require confirmation of the 28-day properties | 35 |
| Changes in asphalt mix designs that need to be confirmed with a batch mix at the plant | 35 |
| Class II Material submittals | 20 |
| Class III Material submittals | 30 |

Failure of the Contractor to provide 30 calendar days advance notice to the Engineer of any submittal shall result in a five (5) working day extension of the number of days stated in the chart above. In no event shall an extension of the Engineer's review time provided for in this section relieve the Contractor from its duty to meet all contractual Milestone dates.

Within ten working days after receipt of said list, the Engineer shall notify the Contractor of which items are approved and which disapproved. Within two working days thereafter, the Contractor shall resubmit a new list covering those items which were disapproved. After each such re-submission the Engineer shall have a similar period of ten days in which to approve or disapprove.

Should materials or equipment be delivered to the construction site without having been placed on the aforementioned list and approved, it shall be immediately removed from the construction site by the Contractor at his own expense.

## 74. MANUFACTURERS' CERTIFICATION

Where materials and equipment are required by these Specifications to conform to certain standard or tentative specifications or requirements of any organizations, including American Society for Testing and Materials, American National Standards Institute, Association Rules for Grading Lumber, Federal Specifications, National Electrical Manufacturers Association, American Association of State Highway and Transportation Officials, American Water Works Association and the International Municipal Signal Association, the Contractor shall furnish to the Engineer the manufacturer's written certification that each of the materials or equipment conforms to the foregoing standard or tentative specifications. The certification shall be delivered to the Engineer prior to installation of the materials to which it refers. Such certifications shall not be binding or conclusive on the Authority and may be rejected at any time by the Engineer if incorrect, improper or otherwise unsatisfactory in his opinion.

## 75. NO RELEASE OF CONTRACTOR

Any provision of this Contract for testing, inspection or approval, and any actual testing, inspection or approval, of any materials, workmanship, plant, equipment, drawings, program, methods of procedure, or of any other thing done or furnished or proposed by the Contractor to be done or furnished in connection with the Contract is for the benefit of the Authority not the Contractor. Any approval of such things shall be construed merely to mean that at that time the Engineer knows of no good reason for objecting thereto. No such provision for testing or inspection, no omission of testing or inspection, and no such approval shall release the Contractor from his full responsibility for the accurate and complete performance of the Contract in accordance with the Contract Drawings and Specifications or from any duty, obligation or liability imposed upon him by the Contract or from responsibility for injuries to persons or damage to property.

## 76. ERRORS AND DISCREPANCIES

If, in the performance of the Contract, the Contractor discovers any errors or omissions in the Contract Drawings or Specifications, or in the marks, lines and elevations furnished by the Authority in the construction undertaken and executed by him, he shall immediately notify the Engineer and the Engineer shall promptly verify the same.

If with the knowledge of such error or omission and prior to the correction thereof, the Contractor proceeds with any construction affected thereby, he shall do so at his own risk and the construction so done shall not be considered as construction done under and in performance of this Contract unless and until approved and accepted.

## 77. ACCIDENTS AND FIRST AID PROVISIONS

The Contractor shall promptly report in writing to the Engineer and to the Authority Manager, Claims Administration all accidents whatsoever arising out of or in connection with the performance of the Contract, whether on or adjacent to the construction site, which result in death, injuries or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damage is caused, the accident shall be reported immediately by telephone to both of the said representatives of the Authority.

The Contractor shall provide at the construction site such equipment and medical facilities as are necessary to supply first aid service, in case of accident, to any who may be injured in the progress of the Contract. He shall have standing arrangements for the removal and hospital treatment of any person who may be injured while engaged in the performance of the Contract.

If any claim is made by any third person against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the fact in writing to the aforementioned representatives of the Authority, giving full details of the claim.

## 78. SAFETY PROVISIONS

In the performance of the Contract, the Contractor shall exercise every precaution to prevent injury to workers and the public or damage to property.

He shall, at his own expense, provide temporary structures, place such watchmen, design and erect such barricades, fences and railings, give such warnings, display such lights, signals and signs, exercise such precaution against fire, adopt and enforce such rules and regulations, and take such other precautions as may be necessary, desirable or proper, or as may be directed.

The Contractor shall employ for Work of the Contract a competent person conforming to the requirements of the Code of Federal Regulations 29 CFR 1926.32(f) who shall be designated by the Contractor as authorized to perform the duties required by 29 CFR 1926 et seq. as applicable for Work of this Contract.

Obtain and submit to the Engineer one copy of material safety data sheet (MSDS) conforming to the requirements of 29 CFR 1910.1200(g) for each hazardous chemical utilized for permanent and consumable materials employed for Work of this Contract.

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss, including but not limited to:

A. All employees on the Work, the public, and other persons and entities who may be affected thereby;

B. All the Work, materials and equipment to be incorporated therein, whether in storage on or off the site; and

C. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of construction.

The Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and the Contractor has removed all workers, material and equipment from the construction site, or the issuance of the Certificate of Final Completion, whichever shall occur last.

Until fire protection needs are supplied by permanent facilities under this Contract, install and maintain temporary fire protection facilities. Comply with requirements of National Fire Protection Association NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alteration and Demolition Operations".

The Contractor shall employ only such men as are physically fit and are free from contagious or communicable diseases.

He shall use only machinery and equipment adapted to operate with the least possible noise, and shall so conduct his operations that annoyance to occupants of nearby property and the general public will be reduced to a minimum.

The bringing of intoxicating substances onto the construction site and the use or consumption of intoxicating substances at the construction site are prohibited. It shall be the responsibility of the Contractor to insure that all employees of the Contractor and of all subcontractors, materialmen and any other persons under contract to or under the control of the Contractor shall comply with the provisions of this paragraph.

The Contractor shall daily clean up all refuse, rubbish, scrap materials and debris caused by his operations, to the end that at all times the construction site shall present a neat, orderly and workmanlike appearance. Before the Certificate of Final Completion of Work will be issued, the Contractor shall remove all surplus materials, falsework, temporary fences and other temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from his operations and shall put the construction site in a neat, orderly condition.

In the event the Contractor encounters at the construction site, material reasonably believed to be asbestos, polychlorinated biphenyl (PCB) or any other hazardous material, the Contractor shall immediately stop Work in the area affected and report the condition in writing to the Engineer. Work in the affected area shall not thereafter be resumed by the Contractor except upon the issuance of a written order to that effect from the Engineer.

Within 15 days of the acceptance of his Proposal, the Contractor shall submit to the Engineer, for his review and approval, the Contractor's Safety Program which shall comply with all applicable federal, state, municipal and local and departmental laws and shall include, among other things, the designation by the Contractor of a qualified individual to administer such Safety Program.

## 79. DAILY PROGRESS, EQUIPMENT AND LABOR REPORTS

The Contractor shall furnish to the Engineer at the end of each day Work is performed at the construction site, a memorandum showing for that day (a) the construction performed, (b) the type of equipment used identifying each piece of equipment as owned by the Contractor or rented from others; (c) a statement of any unusual happening that occurred, and (d) the names and number of workers in each trade classification that were employed. Such memorandum shall not be deemed to be a substitute for the notices, time slips, memoranda or other data required under the clauses of the Form of Contract relating to compensation for Extra Work, nor shall such memorandum be deemed to be a substitute for the daily log required by the Section(s) of the Specifications pertaining to asbestos removal .

## 80. LAWS AND ORDINANCES

In order to effectuate the policy of the Authority, the Contractor shall comply with all provisions of federal, state, municipal, local and departmental laws, ordinances, rules, regulations and orders which would affect the Contract and the performance thereof and those engaged therein if said Contract were being performed for a private corporation, except where stricter requirements are contained in the Specifications or Contract Drawings, in which event the latter requirements shall apply. However, the Contractor shall not apply for any permits, licenses or variances in the name of or on behalf of the Authority, but shall do so in his own name where required by law, regulation or order or by the immediately preceding sentence. Nor shall the Contractor apply for permits, licenses, or any variance in his own name without first obtaining the approval of the Authority.

The Port Authority has applied/will apply for the following permit(s) in connection with this Contract in its own name:

A. Coast Guard permit: A copy is included herewith as Appendix A.
B. New York City Department of Transportation: A copy is included herewith as Appendix B.
C. New Jersey Department of Transportation: A copy is included herewith as Appendix C.

The Contractor shall comply with all provisions of the said permit(s).

## 81. U.S. COAST GUARD SECURITY REQUIREMENTS

The Contractor is advised that in conjunction with Port Security Provisions for the Port of New York and New Jersey a 25 yard security or exclusionary area has been established by the United States Coast Guard around all bridges, piers and other facilities on the waterfront in the Greater New York/New Jersey area. No person or vessel may enter these security areas without the approval of the Coast Guard Captain of the Port and Vessel Traffic Service Activities New York as well as the Commander, First Coast Guard District Bridge Branch.

All requests to enter into these security zones shall be made in writing to Captain of the Port of New York not less than 30 days prior to the intended date of entry into the zone. Requests must be submitted to the U.S. Coast Guard Waterways Oversight Branch at Commanding Officer, U.S. Coast Guard Activities New York (WOB), 212 Coast Guard Drive, Staten Island, NY 10305; (718) 354-4193 or 4355 and must contain a complete list of all personnel that will enter into the security zones, complete vessel information and, if appropriate, a copy of Coast Guard Bridge Branch construction approval.

The following information is required:

A. Employee's name, social security number and date of birth.

B. Contractor's supervisor name and telephone number.

C. Name, type, size of barge/vessel/boat.

D. Project start and end dates, working hours and days.

After background checks of all personnel have been completed, Coast Guard Captain of the Port will issue a letter specifying personnel and vessels authorized to enter the security zone.

After initial written approval for entry has been received, the Contractor shall notify the Coast Guard (Vessel Traffic Service 718-354-4088) daily prior to entering and upon securing for the day or leaving the site.

If additional, or changes in existing personnel, are required said information identified above shall be transmitted as above, as early as possible, but not less than 96 hours in advance of the expected change.

Failure to comply with the above Security Zone Requirements and Conditions is punishable under Federal Law by arrest, prosecution, and or civil penalties.

## 82. IDENTIFICATION

No person will be permitted on or about the construction site without a pass, permit or identification badge approved by the Engineer. The Contractor shall provide such passes, permits or identification badges for his employees, subcontractors and materialmen whenever necessary. Identification badges shall be worn in a conspicuous and clearly visible position by all employees of the Contractor whenever they are working at the construction site.

All persons entering the "Work Area" of asbestos removal shall, in addition to the above, conform to the requirements concerning entry into the "Work Area" contained in the Section(s) of the Specifications pertaining to asbestos removal.

## 83. SIGNS

No advertisement or sign, other than the name and address of the Contractor, will be permitted on any fences, temporary structures or elsewhere on the construction site and such advertisement will be permitted only upon the condition that it is first approved by the Engineer. In any event, the advertisement shall not exceed six feet by eight feet in overall dimensions.

## 84. CONTRACTOR'S FIELD OFFICE AND REPRESENTATIVE

At a readily accessible point on or near the construction site, the Contractor shall maintain a field office provided with a telephone.

During the performance of any Work at the construction site, the Contractor shall have a representative thereat who shall be authorized by the Contractor to receive and put into effect promptly all orders, directions and instructions from the Engineer. The Contractor's representative shall be provided, at all times, with a conformed copy of this Contract and a set of the Contract Drawings.

Orders and directions may be given orally by the Engineer and shall be received and promptly obeyed by the Contractor or his representative or any superintendent, foreman or other employee of the Contractor who may have charge of the particular part of the Work in relation to which the orders or directions are given. A confirmation in writing of such orders or directions will be given by the Engineer when so requested by the Contractor.

## 85. SURVEYS

The Engineer will establish a bench mark and a base line at or adjacent to the location of the Contractor's operations. The Contractor shall perform all surveys which may be required for the performance of the Contract. He shall carefully preserve any base line and bench mark which may be established by the Engineer.

The Contractor shall, in addition, furnish to the Engineer, without additional compensation therefor, any or all information and data regarding points, lines, grades, elevations and other survey information established by the Contractor during the performance of the Contract.

Surveys and measurements of quantities for purposes of computing Contractor's compensation shall be made by the Contractor as directed by and in the presence of, or jointly with, the Engineer, at the Engineer's option. Computations of quantities for payment shall be made by the Contractor and shall be subject to the approval of the Engineer.

## 86. TEMPORARY STRUCTURES

Unless otherwise provided in this Contract, the Contractor shall determine the need for and shall design, furnish and construct all barricades, fences, staging, falsework, formwork, shoring, scaffolding and other temporary structures required in the performance of the Contract, whether or not of the type enumerated in the Specifications or on the Contract Drawings, including those which would be required by law or regulation if this Contract were being performed for a private corporation. All such temporary structures shall be of adequate strength for the purposes for which they are constructed and shall be provided with graphics, warning signs and warning lights as required to inform personnel and the public of the hazards being protected against, and the Contractor shall maintain them in satisfactory condition. The design and drawings for such structures are to be prepared by the Contractor, and when requested by the Engineer they shall be submitted for his review before being used. Neither such approval, however, nor any requirements of the Engineer, the Specifications or the Contract Drawings shall relieve the Contractor of his responsibility for the design, construction and use of the temporary structures or from any obligations and risks imposed on him under this Contract, and any such approval or requirements shall be deemed merely to relate to minimum standards and not to indicate that the temporary structures are adequate or that they meet the Contractor's obligations under this Contract.

Temporary structures shall be painted with an approved dark color paint and shall be repainted whenever necessary during the period that the Contract is being performed. Upon completion of all Work under this Contract, the temporary structures shall be removed from the construction site.

## 87. PERMIT AND REQUIREMENTS FOR WELDING

Prior to the commencement of any cutting or welding operations at the construction site, the Contractor shall notify the Engineer and obtain an Authority cutting and welding permit. The Authority will issue this permit without payment of a fee, and application forms may be obtained from any Resident Engineer of the Authority, at his office at the facility. Unless otherwise approved by the Engineer, all cutting and welding operations shall be performed in accordance with the conditions which form a part of said permit. The permit application must be filled out and submitted in duplicate to the Engineer at least forty-eight hours prior to commencing welding or cutting operations at the construction site.

## 88. FINAL INSPECTION

When, in the opinion of the Contractor, the construction is completed and ready for final inspection, he shall so notify the Engineer in writing and the Engineer will give said construction (including any portions with respect to which Certificates of Partial Completion have been issued) a minute and thorough inspection. Before any Certificate of Final Completion will be issued, any defects or omissions noted on this inspection must be corrected by the Contractor.

## 89. WARRANTIES

The Specifications may provide for certain warranties of portions of the permanent construction. These warranties are intended for the greater assurance of the Authority and not as a substitute for rights which the Authority might otherwise have. Although such warranties shall be enforceable as provided, neither any requirement of this Contract with respect to warranties by the Contractor nor any guarantee or warranty given to the Contractor or the Authority by any manufacturer shall be deemed to be a limitation upon any rights which the Authority would have, either expressed or implied, in the absence of such guarantees or warranties.

## 90. UTILITY RECORD DRAWINGS

Prepare, on mylar sheets 22" x 34" or other size approved by the Engineer, drawings showing the exact locations and elevations of underground utility construction including manholes, catch basins, inlets, pipe lines and structures for carrying gases (including air) and fluids including water, storm drainage, sewage, oil, chemicals, electrical duct runs, cables and conduits, for new construction or extension of existing utilities installed underground under this Contract.

Submit to the Engineer, for verification and approval, tabulation of the data to be used in the preparation of the utility record drawings. Do not build-in, backfill or fill over or around or in any way cover underground structures, piping, conduit, cable or duct banks until such submitted data has been verified and approved by the Engineer.

Indicate the exact locations, including changes of direction and curves, by the use of offset distances from nearby permanent structures and, in addition, by the use of coordinates which shall be based on the system of coordinates used at the construction site, the origin of which is shown on the Contract Drawings. Base elevations on the datum used at the construction site as is shown on the Contract Drawings.

Submit prints of these drawings to the Engineer for verification, check of the accuracy, and for approval. Make indicated corrections and additions to the drawings, until the approval of the Engineer has been obtained. After these drawings have been approved by the Engineer, the original corrected mylar sheets shall be turned over to the Engineer before issuance of the Certificate of Final Completion, and such original drawings shall become the property of the Authority.

## 91. TEMPORARY UTILITY SERVICES

Operate and maintain temporary services and facilities in a safe and efficient manner. Modify as required throughout progress of the Contract, and remove from Authority property when no longer required, or replaced by the use of completed permanent facilities as approved by the Engineer.

Make arrangements for securing, and pay all costs for heat, light, power, water, and other services which may be required for the performance of the Contract.

## 92. TEMPORARY SANITARY FACILITIES

Make arrangements for securing and pay all costs for temporary toilets, wash facilities and drinking water including toilet tissue, paper towels, paper cups and similar disposable materials for use by the Contractor, subcontractors, materialmen or other persons over whom the Contractor has control. Comply with regulations and health codes, which would be applicable if the Authority were a private corporation, for the type, number, location, operation and maintenance of fixtures and facilities. Install facilities where directed by the Engineer, and remove from Authority property when no longer required.

## 93. ASBESTOS COST SUMMARY SUBMITTAL

Upon satisfactory completion of asbestos removal Work under this Contract, submit a Summary of Asbestos Removal and Disposal Costs on the form bound herewith, with all spaces filled in without exception. Such summary shall include costs associated with the Work computed in accordance with the stipulations of the clauses contained in CHAPTER II of the Form of Contract.

**THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY**
**SUMMARY OF ASBESTOS REMOVAL AND DISPOSAL COSTS**

CONTRACTOR _____ CONTRACT NO. AK-179
DATE _____
FACILITY TITLE STATEN ISLAND BRIDGES
SPECIFIC LOCATION OF REMOVAL _____

| | ASBESTOS CONTAINING MATERIALS[14] | | |
|---|---|---|---|
| ITEM DESCRIPTION | Sprayed on[15] | Pipe and Boiler Insulation[16] | Miscellaneous[17] |
| Removal[18] | | | |
| Encapsulation[19] | | | |
| Enclosures [20] | | | |
| Insurance[21] | | | |
| Replacement of Removed ACM[22] | | | |
| Clean up[23] | | | |
| On-site Monitoring of Abatement[24] | | | |
| * | | | |
| Purchase of Capital Equipment[25] | | | |
| Purchase of Protective Equipment[26] | | | |
| TOTALS: | | | |

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14 Where a particular type of asbestos containing material (ACM)is not present in the specific removal location described above, cross out ACM description and fill in NA (Not Applicable) for the associated description items.

15 Sprayed-on and trowelled-on fireproofing, acoustical plasters, simulated acoustical plasters, textures and other ACM such as those found on ceiling systems, fireproofing systems and structural steel.

16 Insulation or treatment on pipes, fittings, elbows, boilers, breachings, ducts, tanks or other mechanical equipment.

17 Specify as to type of material, i.e.; surface treatments such as floor and ceiling tiles, roofing materials, refractory insulation and structural insulation, electrical cable, asbestos cloth, "Transite" board, exterior siding/shingles, tape, roll board, brake shoes, or other asbestos containing items.

18 Include actual labor costs for removal of asbestos containing material.

19 Include actual labor costs for encapsulation of asbestos containing material.

20 Include actual labor costs for enclosure of asbestos containing material.

21 Include all premiums directly related to Work of this Contract only.

22 Include actual labor costs for re-insulating, re-wrapping with substitute material and actual material cost.

23 Include actual labor costs for, e.g., hepa vacuuming, assembly of discarded materials and abated asbestos at Work site and preparation of materials for disposal.

24 Include actual costs of air monitoring and analysis.

* Include actual costs for hauling and disposal in accordance with applicable Specification Sections.

25 Include actual costs for purchase of capital equipment, e.g., negative air pumps and tools, if directly related to this Contract.

26 Include actual costs for purchase of protective equipment, e.g., "Tyvek" suits, masks, hepa filters, amended water, and plastic sheeting if directly related to this Contract.

## 94. PROGRESS SCHEDULE

A. Within fifteen calendar days after acceptance of the Contractor's Proposal, the Contractor shall prepare and submit a progress schedule for the approval of the Engineer. The progress schedule shall show the dates for the commencement and completion of the items of work of the Contract and all Contract Milestones. The Contractor shall revise and resubmit the progress schedule until approved by the Engineer.

B. After the approval of such progress schedule, at least once a month or more frequently as directed by the Engineer, the Contractor shall update the progress schedule showing for each such item of work of the Contract the actual start dates, physical percent complete, expected completion dates (for activities in progress), a brief narrative explaining how the planned completion will be achieved, and the actual completion dates. No logic or duration changes shall be made therein without the written approval of the Engineer.

C. Approval of any progress schedule shall not relieve the Contractor of his obligation to complete the work by the time(s) required in the Contract and in accordance with all other Contract provisions, even though the schedule approved may be inconsistent with such completion.

D. The Engineer shall have the right at any time, when in his judgment the Work is not proceeding in accordance with the approved progress schedule, or anytime it is likely that the Work may not be completed by the time(s) required in the Contract even though the Contractor is proceeding in accordance with the approved progress schedule, to order the Contractor, without additional compensation, to employ additional shifts, to increase the number of men employed, to use additional plant or equipment, or to take such other steps as may be required to ensure the completion of the various operations within the time(s) allotted therefore in the approved schedule or by the Contract completion time(s).

E. In addition to the Authority's other rights, should the Contractor fail to comply with any provision of this Section, the Engineer shall have the right in its discretion to withhold out of any payment (final or otherwise and even though such payment has already been certified as due) such sums as it deems necessary or desirable, all as more fully provided in the clause of the Form of Contract entitled "Withholding of Payments".

## 95. ANALYSIS OF BID

Within fifteen calendar days after acceptance of the Proposal, the Contractor shall prepare a detailed analysis of bid on forms furnished by the Authority with all of the spaces filled in without exception, and containing such information as the Engineer may require for each of the items enumerated in such form.

## 96. CONDITIONS AND PRECAUTIONS

A. Construction Site Conditions:

1.) Notwithstanding lane availability specified in "Hours of Work" during the time the Contractor is performing the Work, it may at times be necessary, because of emergency or abnormal traffic conditions, to suspend the Contractor's operations or to postpone performance of Work. Should the Contractor be specifically directed to suspend operations in a lane or lanes specified herein to be available for operations of the Contractor, or should such lane or lanes not be available by the times specified elsewhere in the Contract, and if solely because of such suspension of operations or late availability of lane or lanes, the Contractor is necessarily kept idle at the construction site, the Contractor will be compensated as stipulated in the provisions of the Contract concerning compensation for emergency delays.

2.) At least 7 days but not more than 10 days prior to performing excavation, call 1-800-272-4480 and provide the information required for excavation(s) in New York and call 1-800-272-1000 and provide the information required for excavation(s) in New Jersey.

3.) Vehicles of the Contractor, employees of the Contractor, subcontractors, material-men or others over whom the Contractor has control shall be subject to the following:

a. Vehicles shall not be permitted to park in or on Authority property, except for construction vehicles necessary for the Work, which will be permitted to park at the area of Work during the times when the Work is being performed, subject to the conditions stated below and elsewhere herein.

b. All vehicles entering the construction site shall be registered commercial vehicles with commercial license plates and shall have permanently affixed company identification on the exterior of the vehicle.

c. There shall be no parking of personal vehicles anywhere on Authority property. The Contractor shall arrange for any necessary transportation for all personnel to the construction site. Vehicles used for transportation shall not be parked on Authority property.

d. All vehicles shall be required to pay the appropriate tolls for each passage or crossing of Authority facilities, or parking at Authority lots.

4.) Employees of the Contractor, subcontractors, material-men, visitors, or others over whom the Contractor has control shall be subject to the following:

a. All personnel working on the bridge shall obtain US Coast Guard (USCG) approval and shall comply with the section of the Contract entitled "U.S. Coast Guard Requirements". Allow 10 working days from the time of application to the USCG to obtain such approval.

b. Following USCG approval, all personnel shall obtain a photograph ID issued by the Authority. Allow 5 working days from the time of application to obtain such ID. This ID shall be displayed at all times while at the construction site. Two forms of valid ID are required, one being a photograph ID, when applying for the Authority-issued ID. Authority-issued ID's will be valid for a period of 4 months and must be renewed as required.

c. Certain areas of work may be accessible only with Authority-issued Access Control cards. At the Engineer's discretion, Contractor's necessary supervisory personnel will be furnished Access Control cards for specific work areas and hours of work. Return all Access Control cards when work is completed. Supervisory personnel shall comply with all rules for proper use of the Access Control Cards and shall be responsible for all personnel under their direct supervision. Access Control Cards are not transferable. Only the individual issued the Access Control Card may use it.

d. Provide a daily roster of all personnel working at the site to the Engineer. This roster shall be turned in prior to the start of each work shift and shall include employee name, ID badge number, and employers name. The Contractor's personnel shall notify the Engineer when they arrive at the construction site and when they leave the construction site.

e. All personnel shall log in and log out with the security guards, posted at the entry/exit points of the construction site, every time they enter or exit the construction site.

5.) For all Work under this Contract the Contractor shall.

a. Comply with all Authority bridge safety regulations stipulated in the publication entitled "Hazardous Material – Transportation Regulations at Tunnel and Bridge Facilities" which is on file at the Goethals Bridge Administration Building.

b. Not bring any equipment onto the bridge or approach spans that would induce gross single or tandem axle load in excess of those contained in Traffic Rules and Regulations on file in the Goethals Bridge Administration Building.

c. Exercise care and caution while loading or unloading equipment or materials on the bridge, or while performing operations so that excessive static or impact loads are not introduced on the bridge.

d. Take positive means to prevent any hot work, debris, or construction material from entering the waterway, traffic lanes or pedestrian walkway.

6.) Take all precautions necessary for protection of persons, traffic and property during dust or fragment generating operations, concrete mixing or placing, or other operations which may stain, soil or damage property or injure persons. Provide and erect waterproof, fire-resistant, UL labeled tarpaulins with flame- spread rating of 15 or less, or other protective enclosures as approved by the Engineer.

a. Protect roadways, sidewalks and waterways as required to prevent debris or materials from falling on persons and vehicles at such areas.

7.) Securely fasten material or construction which must be left in place between working periods in a manner approved by the Engineer so as not to be a hazard.

8.) Ensure that all access doors, gates, and other means of egress are secured during all times of work.

9.) Restrict smoking to areas designated by the Engineer for this purpose.

10.) Do not burn or bury debris of any type on Authority property, or wash waste materials down sewers or into waterways.

11.) Provide sound suppression devices on gasoline and diesel powered construction equipment and pneumatic tools as required to maintain noise exposures below the limits specified in the Code of Federal Regulations (CFR) 29 CFR 1926 Occupational Safety and Health Regulations for Construction (OSHA). Maintain such sound suppression devices in proper operating condition throughout the time of their use, and adjust and repair as required to maintain noise within exposure levels stipulated in 29 CFR 1926.52, Table D-2.

12.) All traffic lanes shall be reopened to traffic at the end of each Work Period, and all roadway surfaces shall be left clean, free of obstructions, and suitable for the safe unimpeded movement of traffic.

13.) Throughout the Contractor's hours of Work (Work Period), roadway surfaces that are not closed by the Contractor shall be clean, free of obstructions, protected as stipulated in the Section of Division 1 entitled "Maintaintence of Traffic and Work Area Protection" and suitable for the safe unimpeded movement of traffic.

14.) In addition to the Section of Division 1 entitled "Progress Schedule – Preparation, Updating & Reporting (Precedence Diagram Method)" submit to the Engineer, at least fourteen (14) calendar days in advance, the scheduled hours of Work Periods for each week; and indicate on such schedule Work which:

a. Will require lane closures (with identification of the bridge(s) and lane(s) to be closed).

B. No requirement of or omission to require any precautions under this Contract shall be deemed to limit or impair any responsibility or obligation assumed by the Contractor under or in connection with this Contract and the Contractor shall at all times maintain adequate protection to safeguard the public and all persons engaged in the Work and shall take such precautions as will accomplish such end, without undue interference with the public or the operations of the Authority.

## 97. HOURS OF WORK

A. Hours of Work:

1.) BAYONNE BRIDGE:

a. Work requiring closing of a single lane in either the northbound or southbound direction of the Bayonne Bridge, or any ramp or portion thereof shall be performed only during the following times:

| | | |
|---|---|---|
| Monday | 6:00 AM to 3:30 PM | 8:00 PM to 5:00 AM Tuesday |
| Tuesday | 6:00 AM to 3:30 PM | 8:00 PM to 5:00 AM Wednesday |
| Wednesday | 6:00 AM to 3:30 PM | 8:00 PM to 5:00 AM Thursday |
| Thursday | 6:00 AM to 3:30 PM | 8:00 PM to 5:00 AM Friday |
| Friday | 6:00 AM to 3:30 PM | 8:00 PM to 5:00 AM Saturday |
| | | |

b. Daytime southbound lane closures shall be in place by 6:15 AM. The Contractor will not be permitted to start closing any lane after 6:15 AM.

2.) GOETHALS BRIDGE:

a. WESTBOUND: Work requiring closing of a single Westbound traffic lane of the Goethals Bridge shall be performed only during the following times:

| WESTBOUND | |
|---|---|
| Monday | 10:00 PM to 5:00 AM Tuesday |
| Tuesday | 10:00 PM to 5:00 AM Wednesday |
| Wednesday | 10:00 PM to 5:00 AM Thursday |
| Thursday | 10:00 PM to 5:00 AM Friday |
| Friday | 11:59 PM to 8:00 AM Saturday |
| Saturday | 11:59 PM to 8:00 AM Sunday |

b. EASTBOUND – from date of contract award until November 17, 2006: The eastbound direction of the Goethals Bridge is closed each night from Monday night through Friday night. Work in the Goethals Bridge eastbound roadway is permitted during the closure of the eastbound direction, during the following times:

| EASTBOUND | |
|---|---|
| Monday | 9:30 PM to 5:00 AM Tuesday |
| Tuesday | 9:30 PM to 5:00 AM Wednesday |
| Wednesday | 9:30 PM to 5:00 AM Thursday |
| Thursday | 9:30 PM to 5:00 AM Friday |
| Friday | 11:59 PM to 8:00 AM Saturday |

Work on requiring closing of a single Eastbound traffic lane of the Goethals Bridge is permitted on Saturday during the following times:

| EASTBOUND | |
|---|---|
| Saturday | 11:59 PM to 8:00 AM Sunday |

c. EASTBOUND – after November 17, 2006: Work requiring closing of a single Eastbound traffic lane of the Goethals Bridge shall be performed only during the following times:

| EASTBOUND | |
|---|---|
| Monday | 10:00 PM to 5:00 AM Tuesday |
| Tuesday | 10:00 PM to 5:00 AM Wednesday |
| Wednesday | 10:00 PM to 5:00 AM Thursday |
| Thursday | 10:00 PM to 5:00 AM Friday |
| Friday | 11:59 PM to 8:00 AM Saturday |
| Saturday | 11:59 PM to 8:00 AM Sunday |

3.) OUTERBRIDGE CROSSING:

a. WESTBOUND: Work requiring closing of a single Westbound traffic lane of the Outerbridge Crossing shall be performed only during the following times:

| WESTBOUND | |
|---|---|
| Monday | 10:00 PM to 5:00 AM Tuesday |
| Tuesday | 10:00 PM to 5:00 AM Wednesday |
| Wednesday | 10:00 PM to 5:00 AM Thursday |

| | |
|---|---|
| Thursday | 10:00 PM to 5:00 AM Friday |
| Friday | 11:59 PM to 8:00 AM Saturday |
| Saturday | 11:59 PM to 8:00 AM Sunday |

b. EASTBOUND – from March 10 to November 17: Work requiring closing of a single Eastbound traffic lane of the Outerbridge Crossing shall be performed only during the following times:

| EASTBOUND | |
|---|---|
| Saturday | 11:59 PM to 8:00 AM Sunday |

c. EASTBOUND – from November 18 until March 9: Work requiring closing of a single Eastbound traffic lane on shall be performed only during the following times:

| EASTBOUND | |
|---|---|
| Monday | 10:00 PM to 5:00 AM Tuesday |
| Tuesday | 10:00 PM to 5:00 AM Wednesday |
| Wednesday | 10:00 PM to 5:00 AM Thursday |
| Thursday | 10:00 PM to 5:00 AM Friday |
| Friday | 11:59 PM to 8:00 AM Saturday |
| Saturday | 11:59 PM to 8:00 AM Sunday |

4.) Do not perform work on a legal federal holiday or a holiday of the States of New York or New Jersey unless approved by the Engineer.

5.) Work Not Requiring Closing of Traffic Lanes may be performed without restrictions as to Hours of Work, except that during such hours the Contractor shall conform to A.6 and A.7 herein.

6.) Jackhammering and other noise generating work shall only be performed between the hours of 7:00 AM and 7:00 PM daily from Monday through Friday, except as otherwise provided by A.4 herein.

7.) Notwithstanding anything to the contrary hereinabove, for the duration of the Contract, no closure of any traffic lanes is permitted during the following periods:

a. Memorial Day weekend (6:00 AM Friday through 6:00 AM Tuesday)

b. Independence Day weekend (6:00 AM Friday through 6:00 AM Tuesday if the holiday falls on a Monday; 6:00 AM Thursday through 6:00 AM Monday if the holiday falls on a Friday; and 6:00 AM the day before to 6:00 AM the day after if the holiday falls in the middle of the week)

c. Labor Day weekend (6:00 AM Friday through 6:00 AM Tuesday)

d. Mother's Day and Father's Day weekends (8:00 AM Saturday through 6:00 AM Monday)

e. Thanksgiving weekend (6:00 AM Wednesday through 6:00 AM Monday)

f. Easter weekend (6:00 AM Friday through 6:00 AM Monday)

g. From 6:00 AM the day before to 6:00 AM the day after the start of Rosh Hashanah, Yom Kippur, Passover and Hanukkah.

h. Columbus Day weekend (6:00 AM Friday through 6:00 AM Tuesday)

i. From 6:00 AM the day before to 6:00 AM the day after Veteran's Day.

j. From 6:00 AM December 18 to 6:00 AM January 3.

k. From 6:00 AM the day before to 6:00 AM the day after Martin Luther King's Birthday.

l. President's Day weekend (6:00 AM Friday through 6:00 AM Tuesday)

## 98. MAINTENANCE OF TRAFFIC AND WORK AREA PROTECTION

A. DEFINITIONS

As used in this numbered Section, and this Section only, the terms used herein shall have the following meaning:

1.) The terms "Traffic Lane", "Lane", "Active Roadway", "Street", and "Roadway" shall mean, in addition to the normally traveled pavement areas, other areas including but not limited to ramp terminal gore areas, roadway shoulders, and all other areas that may foreseeably be occupied by moving vehicles.

2.) "Flashing Arrow Sign Unit" (FASU) shall mean an engine/generator-, solar-, or battery-powered flashing light sign with lights displayed in the shape of an arrow.

3.) "Nighttime Hours" shall mean the local time period between 1/2 hour after sunset to 1/2 hour before sunrise.

4.) "Slow-Moving Vehicles" shall mean vehicles or equipment that travel at or under a speed corresponding to 15 mph less than the posted speed limit.

5.) "Work Area" shall mean the area immediately surrounding the Work in progress, typically where workers are afoot, and/or the space within a Roadway where Work on the Roadway is being done by the Contractor.

B. GENERAL REQUIREMENTS

Conform to requirements of this numbered Section, the Contract Drawings and the following:

1.) Portions of the latest editions, including all amendments thereto, of the Federal Highway Administration (FHWA): "Manual on Uniform Traffic Control Devices" (MUTCD) Part VI as hereinafter specified and applicable portions of the companion "Traffic Control Devices Handbook" (TCDH); "Standard Highway Signs"; "Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects"; and, the "Standard Color Tolerance Charts".

2.) American Association of State Highway and Transportation Officials (AASHTO): "Roadside Design Guide", Chapter 9: Safety Appurtenances for Work Zones; and "Standard Specifications for Highway Bridges", as hereinafter specified.

3.) The requirements of the Americans with Disabilities Act (ADA) laws in all respects as specified in the "ADA Accessibility Guidelines for Buildings and Facilities" (ADAAG).

4.) American Traffic Safety Service Associations (ATSSA): "Guidelines for the Use of Portable Changeable Message Signs".

5.) Maintenance of traffic and Work area protection features included herein and as shown on Contract Drawings.

6.) In the event of a technical conflict between a requirement in the publications referenced herein and the Contract documents, the requirements of the Contract documents shall control, unless otherwise directed by the Engineer.

7.) There may be more than one Work Area within the confines of a closed Roadway or Traffic lane. Each Work Area shall be individually protected as specified herein.

C. CONTRACTOR-FURNISHED MATERIALS AND EQUIPMENT

1.) Provide and maintain in good working order all materials, equipment, temporary construction signs and facilities required for proper maintenance of traffic and Work Area protection, as specified herein and/or shown on the Contract Drawings. All said equipment/devices shall remain the property of the Contractor unless otherwise shown on the Contract Drawings.

2.) All items provided under paragraph C.1 shall be new or undamaged previously used materials in serviceable condition conforming to requirements specified herein.

3.) Provide and maintain in serviceable condition the following as shown on the Contract Drawings:

a. Portable changeable message signs: Trailer mounted flashing arrow sign unit (FASU) or variable message sign unit (VMSU), as specified on the Contract Drawings;

b. Traffic Cones: as specified on the Contract Drawings;

c. Plastic Delineator Drums: as specified on the Contract Drawings;

d. Type III Barricades: as specified on the Contract Drawings;

e. Temporary Signs: Conform to requirements of Specification Section 02850 "Plywood Sign Panels and Wood Sign Posts" and/or Specification Section 02851 "Aluminum Sign Panels" hereof. Plywood signs shall be Type 1 unless otherwise shown on the Contract Drawings.

(i) Temporary sign supports: Wood conforming to requirements of Specification Section 02850.

(ii) Portable sign supports: "Windmaster" as manufactured by Marketing Displays, Inc., Farmington Hills, MI.; or approved equal;

f. Back-Up Trucks: Nominal actual weight of 15,000 lbs. with nominal 24,000 lbs. gross vehicle weight registration and rear-most wheels situated close to rear of truck body. Standard "ICC" type rear bumpers are not an acceptable substitute for the required rear wheel location. Actual vehicle weight may vary depending on the recommendations of the manufacturer of the vehicle-mounted impact attenuator selected. In addition, equip truck(s) with:

(i) Standard 4 lamp flashing hazard signal lights (parking and tail lights);

(ii) 4 lamp sealed beam rotating yellow warning light providing 35,000 candle power per lamp with an apparent flash rate of 120 flashes per minute. Truck mount such lights 7 to 10 feet above the Roadway and located so as to be visually unobstructed by any part of truck body, load, or equipment.

(iii) Vehicle-mounted impact attenuator: "TMA" units as manufactured by Energy Absorption Systems, Inc., Chicago, IL; or approved equal;

g. Temporary Roadway Plates: Steel Plates, sized to cover roadway excavations with thickness and edge support adequate to accommodate HS-20-44 loading per Figure 3.7.6B and 3.7.7A in the AASHTO "Standard Specifications for Highway Bridges".

4.) Submit the following to the Engineer in accordance with Division 1 - GENERAL PROVISIONS entitled "Shop Drawings, Catalog Cuts and Samples":

a. Catalog Cuts and Data Sheets: Complete manufacturer's data for all equipment and materials.

D. SPARE MATERIALS AND EQUIPMENT

1.) Initially furnish and subsequently maintain the quantities of spare materials and equipment, as scheduled on the Contract Drawings, at the construction site or at another nearby location approved by the Engineer.

2.) Totally relamp Flashing Arrow Sign Unit after each single bulb failure.

E. GENERAL WORK AREA PROTECTION

1.) Contractor shall establish a Traffic Maintenance Crew, properly trained, supplied, staffed and equipped to deploy and remove the Maintenance of Traffic and Work Area Protection elements required for each of the Contractor's construction activities, as described on the Contract Drawings, and/or paragraph E.3 herein. The Contractor shall identify and maintain one individual, per work shift, as the central or key contact for the Traffic Maintenance Crew and their associated activities.

2.) Contractor's Traffic Maintenance training shall be specifically developed from this section. The contents of Contractor's Training programs shall specifically include the Contract Drawings Traffic Standard Details and all other requirements included on the Contract Drawings.

3.) Prior to commencement of each day's Work, furnish and install, and periodically inspect, maintain, relocate, replace, cover, remove, or reconstruct, the traffic control delineations, guiding devices, signals, signs, and pedestrian protection, Roadway plates, barricades, and barriers, if any, as required throughout the progress of construction operations. Maintain safe control of traffic flow and demarcate areas of Work at all times.

a. Ensure that construction material and equipment not removed from areas of Work during non-working periods are protected in such a manner that they shall not constitute a traffic hazard.

b. Do not park any vehicles other than construction vehicles required for construction operations within the demarcated protected areas of Work.

c. Promptly remove traffic control delineations, guiding devices, signals, signs, pedestrian protection, Roadway plates, barricades, and barriers and whenever operations under this Contract no longer require said Work area protection.

d. Prior to the end of each work shift and not less than twice a day on non-work days, the Contractor's Traffic Maintenance crew shall visually inspect and maintain all elements of the Maintenance of Traffic and Work Area Protection installations.

4.) Throughout progress of Work of this numbered Section:

a. Maintain visual and physical accessibility to fire hydrants. Provide 24 hour advance notice to the Engineer in the event of hydrant obstruction.

b. Conduct Work area protection operations so that Traffic Lane ingress and egress to intersecting Roadways, adjacent structures or property, and bus and taxi stops, if any, can be maintained. Obtain the approval of the Engineer and provide 24 hours advance notice to the Engineer in the event that Work area protection operations obstruct access to work areas.

5.) Placement and Removal of Temporary Signs and Traffic Control Devices:

a. Do not locate signs or other traffic delineations, guiding devices and signs in a manner that would: obstruct or interfere with motorists view of approaching, merging or intersecting traffic; obstruct other permanent signs or route markers; or mislead or misdirect the motorist.

b. Do not place traffic control signs under an overpass or elevated building, or within overpass or building shadow areas, unless otherwise shown on the Contract Drawings, or as directed by the Engineer.

c. On Roadways passing below an overpass or elevated building, do not begin or end traffic cone or other delineation and guiding devices under or less than 100 feet from an overpass or building. Extend delineation and guiding devices as required to comply with this requirement.

d. Unless otherwise shown on the Contract Drawings, Work of installing and removing temporary signs, traffic control devices and pavement marking shall be protected, as a minimum, in accord with Contract Drawing Standard Traffic Details, as applicable.

6.) At excavations within Traffic Lanes which will be open to Roadway traffic prior to completion of construction, provide, install and maintain temporary Roadway plates supported on all edges, and maintain the surface condition of the active Roadway and Roadway plates so that it is consistent with the posted speed limit. Secure plates against displacement by use of suitable steel pins or as directed by the Engineer.

a. Secure plate against displacement and bed in well-tamped pre-mixed cold patch material ramped 1:24 at exposed edges, or

b. Cut a recess in the Roadway surface sized to snugly fit the plate and evenly support the plate around its perimeter. Locate the top of the plate flush with or less than one inch below the adjacent Roadway surface. Secure the plate in the recess in a manner approved by the Engineer.

7.) Use temporary Vehicle-strong barriers at all times when the Work Area contains open excavations or when materials and/or equipment are left in the Work Area without the presence of workers, unless otherwise shown on the Contract Drawings, the Net Cost drawings and sketches furnished by the Engineer, or when otherwise directed by the Engineer. Flare exposed ends of the barriers away from the active Roadway by extending the barriers beyond the roadside recovery area and terminate the barriers with a tapered end section. Where proper flaring of the barriers cannot be obtained, protect the barrier end with Inertial Sand-Filled Barriers or Portable Impact Attenuators. Where Inertial Sand-Filled Barriers or Portable Impact Attenuators are used do not install tapered barrier end section.

8.) Each Work Area not protected by Vehicle-strong Barriers shall be protected by a back-up truck when workers are present, unless otherwise shown on the Contact Drawings.

9.) Vehicles used by the Contractor during performance of Work shall be considered as equipment vehicles and when not protected by a Vehicle-strong barrier, said vehicle shall be protected by a back-up truck,unless otherwise shown on the Contact Drawings.

10.) Slow-moving Vehicles traveling on a Roadway outside of demarcated protected Work Areas shall be followed (approximately 50 feet behind) by a vehicle displaying the same flashing hazard signal lights and sealed beam rotating yellow warning light as required for back-up trucks.

F. Notwithstanding provisions herein requiring or permitting the Authority to approve or disapprove of any traffic control or delineation and guiding device provided by the Contractor, the Contractor shall be responsible for the suitability and performance of all such traffic control devices such that inconvenience to the traveling public is held to an absolute minimum.

(End of Section)

# DIVISION 2

# SECTION 02050

# DEMOLITION AND DISPOSAL

## PART 1. GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for demolition and disposal.

B. Retained Items

Prior to demolition, carefully remove, store and protect materials and equipment, if any, shown on the Contract Drawings as "Retain - Deliver to Engineer".

C. Additionally, for Work in the City of New York, prior to demolition employ a certified exterminator and treat entire structure in accordance with governing health regulations for rodent and insect control, as if the Work were being performed for a private corporation.

### 1.02 DESIGN AND PERFORMANCE REQUIREMENTS

A. The Contractor assumes the risk of any loss due to theft, destruction or disappearance of, or damage to, the structures or portions thereof to be demolished, whether occurring before or after the submission of Proposals on this Contract, arising from any cause whatsoever excepting only affirmative, intentional acts of the Authority.

B. The Authority assumes no responsibility for guarding the structures to be demolished either before or after the Contractor is given access thereto, and does not guarantee that their condition will remain the same after the submission of Proposals as before. The Authority does not imply by this Section that the structures to be demolished are complete structures.

C. Storage or sale of items of salvable value to the Contractor is prohibited on the construction site.

D. Demolition using explosive, incendiary or wrecking ball methods is prohibited.

E. Provide water and wet down the structure(s) being demolished, as well as the sites adjacent to the structure(s) being demolished, to limit raising dust and dirt to lowest practical level. Provide water truck, water line or hydrant connection, and hoses for this purpose.

F. Do not use, or permit the use of, the structure(s) to be demolished for any purpose other than for actual demolition.

G. Do not traverse pavement with tracked vehicles or other equipment which may damage pavement.

H. Do not use heaters without prior approval of the Engineer. Installation of temporary heaters, if used, shall conform to American National Standards Institute (ANSI) A10.10 "Safety Requirements for Temporary and Portable Space Heating Devices and Equipment Used in the Construction Industry".

I. Condition of Adjacent Construction

1. Prior to starting demolition, make an inspection accompanied by the Engineer to determine physical condition of adjacent existing structure(s) or construction that is to remain.

2. During such inspection the Engineer and the Contractor shall mutually agree on existing damage to adjacent existing structure(s) or construction that is to remain, if any, and the Contractor shall subsequently prepare and submit to the Engineer a written description of such mutually agreed upon existing damage, including photographic documentation when requested by the Engineer.

J. Utility Services

1. Do not disrupt service to fire hydrants in any way without the written approval of the Engineer. If, with written approval of the Engineer, water service to any area is disrupted, make provisions to ensure adequate fire protection for such area.

2. At all times during the Work of this Section, maintain accessibility from street to all fire hydrants, traffic signals, power or light poles, mailboxes, and similar utility and public service items adjacent to the construction site.

3. Do not interrupt utilities serving occupied or used areas, except when authorized by the Engineer. Provide temporary services during such interruptions as approved by the Engineer.

4. Arrange in advance of demolition Work for disconnection or rerouting of utility line(s). Identify such capped, plugged, sealed or rerouted lines on a record drawing. Submit such drawing in accordance with 1.03 B.

1.03 SUBMITTALS

For Submittal Requirements, see Appendix "A".

## PART 2. PRODUCTS

2.01 MATERIALS

A. Imported Fill

Soil materials to be delivered to the construction site by the Contractor, approved in accordance with 1.03 C, shall be as follows:

1. For basements, voids and sub-base, soil materials shall consist of stone, gravel, and sand, free from debris, trash, roots and other organic matter, with no particle size exceeding 2 inches in maximum dimension.

2. For tank filling, soil material shall be clean, well-graded sand.

B. Rubble Fill

Rubble fill shall be concrete, brick or other masonry materials resulting from demolition. Break fill material into pieces not exceeding 4 inches in their greatest dimension, with no flat or elongated pieces, with all protruding reinforcing cut or burned off, and with a sufficient percentage of smaller pieces to minimize voids. A flat piece is one having a ratio of width to thickness greater than five; an elongated piece is one having a ratio of length to width greater than five.

## PART 3. EXECUTION

### 3.01 PREPARATION

A. Protection

1. Erect and maintain temporary window or opening covers, covered passageways, barricades or fences as required to ensure safe passage of persons around area of demolition.
2. Erect and maintain enclosed dust chutes as required for the disposal of materials, rubbish, and debris.
3. Erect and maintain dustproof partitions as required to prevent spread of dust, fumes or smoke to other occupied or used areas or structures.
4. Provide temporary interior and exterior shoring, bracing and/or support as required to ensure that movement or settlement of structures to be demolished is safely controlled and collapse is prevented. Ensure that movement, settlement, and/or damage to existing facilities does not occur.

B. Pollution Controls

1. Use water sprinkling, enclosed chutes and/or temporary enclosures to limit dust and dirt rising and scattering in the air. Conform to requirements of 1.02 E.
2. Filter sediment from runoff before it enters drainage systems or waterways using methods in accordance with 1.03 A.6.
3. Do not use water when it may create hazardous or objectionable conditions such as ice or flooding.
4. Pump out the contents of buried tanks shown on the Contract Drawings. Remove such pumped-out materials and dispose of them away from Authority property by safe means so as not to endanger the health of workers and the public.

C. Authority-Retained Items

1. Remove and handle carefully to avoid damage.
2. Prepare as shown on the Contract Drawings.
3. Deliver to a construction site location designated by the Engineer, unless otherwise shown on the Contract Drawings.

## 3.02 DEMOLITION

A. Conduct demolition operations and disposal of debris to ensure minimum interference with the use of, or access to, adjacent buildings or construction site areas. Do not unnecessarily obstruct sidewalks or street.

B. Before commencement of demolition remove all glass in windows, doors, skylights and fixtures.

C. Proceed with demolition in a systematic manner, from top of structure to ground. Complete upper demolition before disturbing lower supporting members.

D. Do not store any materials, rubbish, dirt, debris or waste of any sort resulting from the demolition operations on the floor of partially demolished structures, or adjacent construction site areas.

E. Demolish concrete and masonry in small sections. Lower heavy framing members carefully.

F. Where shown on the Contract Drawings, break and remove on grade and basement slabs.

G. Disposal of Demolished Materials

1. Unless otherwise shown on the Contract Drawings, dispose of debris, rubbish, and other materials resulting from demolition operations away from Authority property.

2. On Authority property, do not burn, bury or otherwise dispose of debris, rubbish or other materials resulting from demolition operations.

H. Contractor's Salvaged Materials

Except for items shown on the Contract Drawings as "Retained - Deliver to Engineer", other removed and salvaged materials not shown for reuse or as retained shall become the Contractor's property. Such materials shall be removed from Authority property at no additional cost to the Authority.

## 3.03 ADJUSTMENTS

A. Unless otherwise shown on the Contract Drawings, provide fill for below-grade areas and voids resulting from the Work of this Section as follows:

1. Fill to be placed one foot or more below grade or paving subgrade, or one foot or more away from foundation walls, edges of footings, or underground utility lines, may at the Contractor's option, be imported soil material or rubble fill as specified in 2.01.

2. Fill to be placed in the remaining one-foot void shall be approved imported soil material conforming to requirements of 2.01 A.1.

B. Place approved rubble fill material in horizontal layers not exceeding one foot in loose depth, with top layer consisting of the smallest size rubble available. Compact each layer of rubble fill with at least four passes of a ten-ton roller, of a type approved by the Engineer.

C. Place approved imported soil materials in horizontal layers not exceeding 6 inches in loose depth. Compact each layer at optimum moisture content of fill material to a density equal to original adjacent ground, unless otherwise directed by the Engineer.

D. Unless otherwise shown on the Contract Drawings, fill buried tanks with approved imported sand conforming to requirements of 2.01 A.2.

E. After placement and compaction of fill, grade surface to meet adjacent contours and to provide surface drainage.

F. Where and as shown on the Contract Drawings, provide for subsurface drainage through slabs on which fill is placed.

## 3.04 REPAIR

Promptly repair, to the satisfaction of the Engineer and at no cost to the Authority, damage caused to adjacent facilities by demolition and removal operations.

END OF SECTION

## SECTION 02050

## DEMOLITION AND DISPOSAL

## APPENDIX "A"

## SUBMITTALS

A. Submit the following to the Engineer prior to start of demolition Work:

1. Certificates of severance of utility services from the respective utilities;
2. For Work in the City of New York, certification that the structure has been effectively treated for rodent and insect control;
3. Description of proposed methods and operations of demolition, for review and approval by the Engineer;
4. Description of sequence of demolition and disposal Work, for review and approval by the Engineer;
5. Written inspection report described in 1.02 I.2; and

B. Submit in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples", of Division 1 - GENERAL PROVISIONS, a record drawing indicating horizontal and vertical locations of disconnected, rerouted or capped utilities, or filled underground tanks. Reference all such items to visible permanent surface features.

C. For imported fill material, submit to the Engineer of Materials, Engineering Materials Laboratory, Port Authority Technical Center, 241 Erie Street, Jersey City, NJ 07310-1397, one 25- pound, representative sample of such material proposed for use under this Section, subject to the following:

1. Not less than three weeks prior to delivery of imported fill material to the construction site, submit sample in clean sturdy container or bag which shall not permit loss of any material.
2. Clearly label sample with Contract number, title and location, material supplier's name and location and identification of fill material.
3. Do not deliver imported fill material to the construction site until the Engineer has checked and approved the sample of such material.

END OF APPENDIX "A"

# DIVISION 2

# SECTION 02073

# CUTTING, PATCHING AND REMOVAL

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for cutting, patching and removal of existing construction.

### 1.02 QUALITY ASSURANCE

A. Cutting, patching and removal shall be performed by workers skilled in the specific trades involved.

B. Job Conditions

1. Remove and dispose of all portions of the existing construction and appurtenant structures shown on the Contract Drawings to be removed and not be relocated or salvaged.
2. All other materials unless otherwise directed by the Engineer, shall be disposed of away from the Authority property.
3. Prior to start of work, make an inspection accompanied by the Engineer to determine physical condition of adjacent construction that is to remain.
4. Protect all existing and new construction including utilities, finishes and equipment from water, damage, weakening or other disturbance.

### 1.03 SUBMITTALS

See Appendix "A" for submittal requirements.

## PART 2. PRODUCTS

### 2.01 MATERIALS

All materials required for patching shall be new. Patching materials shall match in every respect adjacent portions of the existing construction.

## PART 3. EXECUTION

### 3.01 CUTTING, PATCHING AND REMOVAL

A. Perform all cutting, patching and removal as shown on the Contract Drawings. Work shall be performed in accordance with the approved methods using approved materials.

B. Do not cut or remove more than is necessary to accommodate the new construction or alteration.

C. Maintain the integrity of all construction at all times.

D. Protect finished surfaces at all times and repair or replace, if damaged, to match existing construction to the satisfaction of the Engineer.

E. Do not allow removed materials and debris to accumulate at the site; remove them daily. All areas adjacent to, and leading to and from the site, shall be kept free of removed materials and debris.

END OF SECTION

## SECTION 02073

## CUTTING, PATCHING AND REMOVAL

## APPENDIX "A"

## SUBMITTALS

NONE REQUIRED

END OF APPENDIX "A"

# DIVISION 2

# SECTION 02081

# ASBESTOS REMOVAL AND DISPOSAL FOR PORT AUTHORITY OF NEW YORK AND NEW JERSEY

## PART 1. GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for removal and disposal of asbestos-containing materials and/or asbestos-contaminated objects from facilities owned and/or operated by the Port Authority of New York and New Jersey or The Port Authority Trans-Hudson Corporation (PATH), hereinafter called the "Authority" at facilities in the States of New York and/or New Jersey.

B. This Section is organized as follows:

Parts 1 through 3 represent the general portions of the specification. These sections are supplemented with Appendixes "A", "B" and "C" based on project specific abatement tasks for the State in which the work is to be performed (New York or New Jersey).

C. In accordance with Appendixes "A", "B" and "C" herein and the Contract Drawings, perform the following:

1. Prepare the "Work Area" for the removal of asbestos materials.
2. Remove, package, transport and dispose of the type(s) of asbestos-containing materials and/or asbestos-contaminated objects from the "Work Area(s)".
3. Decontaminate and seal surfaces in contact with asbestos-containing materials.
4. If removed materials are to be replaced, new materials shall be approved non-asbestos materials.
5. Re-establish "Work Area" and/or "Work Site" systems and objects.

D. Transport asbestos-containing materials and/or asbestos contaminated objects in accordance with 1.04 A.2 herein.

E. Dispose of asbestos-containing materials and/or asbestos contaminated objects at an approved landfill in accordance with 1.04 A.3 herein.

### 1.02 REGULATORY COMPLIANCE

A. Unless specifically directed otherwise by the Engineer, the Authority shall be sole entity to administer the regulatory compliance, the Work of this Section, and enforce the provisions herein.

B. Notifications

1. The Authority will notify the U.S. EPA for Work of this Section in accordance with 40 CFR Part 61, Section 65 (a)(b), for asbestos-containing materials.

2. The Contractor shall make arrangements for, and ensure that, the entity performing the Work of this Section performs the following:

   a. As directed by the Engineer, comply with the notification and re-notification requirements for the State in which Work is being performed and provide proof of notification and renotification prior to starting or continuing with Work.

C. In accordance with the requirements of the Section of Division 1 - GENERAL PROVISIONS, Entitled "Laws and Ordinances," Work under this Section shall conform to the provisions of the following codes and regulations, except where otherwise noted herein or on the Contract Drawings. Where the requirements of this Section or the Contract Drawings and the following codes and regulations differ, the stricter requirements shall control. Where methods or procedures are specified, they shall constitute minimum measures and shall in no way relieve the contractor of sole responsibility for the means, methods, techniques, sequences, or safety measures in connection with the work.

1. For Work of this Section performed in New York State:

   a. Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York: (12 NYCRR, Part 56) - Industrial Code Rule 56 ASBESTOS.

   b. 6 NYCRR Chapter II Title, 10, Part 73 - Asbestos Safety Program Requirements.

   c. 6 NYCRR, Part 364 - Waste Transporter Permits.

   d. 6 NYCRR, Part 360 - Solid Waste Management Facilities (if disposal site is in New York State).

   e. Administrative Code of the City of New YorkSection 755 (2) - 6.3 - Transport, Storage and Disposal of Waste Containing Asbestos, and Section B32 - 267.0 et. SEQ. - Commercial Refuse Removal.

2. For Work of this Section performed in New Jersey:

   a. New Jersey Administrative Code (N.J.A.C.): Section 5:23-8, Subchapter 8 - Asbestos Hazard Abatement Subcode.

   b. Section 7:26 - Division of Waste Management Rules.

   c. Section 8:60 - Department of Labor Asbestos Certifications.

   d. Section 12:120 - Safety and Health Standards.

3. For Work of this Section performed in New York State and/or New Jersey:

   a. 29 CFR (Code of Federal Regulations) Part 1926.1101, U.S. Occupational Safety and Health Administration (OSHA) - Asbestos Standard for the Construction Industry.

   b. 29 CFR 1910.134 – OSHA, Respiratory Protection

   c. 29 CFR 1910.146 - OSHA, Confined Space Entry.

d. 29 CFR 1926.20 – OSHA, General Safety and Health Provisions.

e. 29 CFR 1926.21 – OSHA, Safety Training and Education.

f. 29 CFR 1926.22 – OSHA, Recording and Reporting of Injuries.

g. 29 CFR 1926.23 – OSHA First Aid and Medical Attention.

h. 29 CFR 1926.24 – OSHA, Fire Protection and Prevention.

i. 29 CFR 1926.25 – OSHA, Housekeeping.

j. 29 CFR 1926.26 – OSHA, Illumination.

k. 29 CFR 1926.27 – OSHA, Sanitation.

l. 29 CFR 1926.28 – OSHA, Personal Protective Equipment.

m. 29 CFR 1926.32 – OSHA, Definitions.

n. 29 CFR 1926.35 - OSHA, Employee Emergency Action Plans.

o. 29 CFR 1926.56 - OSHA, Illumination.

p. 29 CFR 1926.59 - OSHA, Hazard Communications.

q. 29 CFR 1926.95 – OSHA, Criteria for Personal Protective Equipment.

r. 29 CFR 1926.96 – OSHA, Occupational Foot Protection.

s. 29 CFR 1926.100 – OSHA, Head Protection.

t. 29 CFR 1926.101 – OSHA, Hearing Protection.

u. 29 CFR 1926.102 – OSHA, Eye and Face Protection.

v. 29 CFR 1926.103 – OSHA, Respiratory Protection.

w. 29 CFR 1926.104 – OSHA, Safety Belts, Lifelines, and Lanyards.

x. 29 CFR 1926.105 – OSHA, Safety Nets.

y. 29 CFR 1926.106 – OSHA, Working Over or Near Water.

z. 29 CFR 1926.107 – OSHA, Definitions Applicable to this Subpart.

aa. 29 CFR 1926.150 - OSHA, Fire Protection.

bb. 29 CFR 1926.151 – OSHA, Fire Prevention.

cc. 29 CFR 1926.152 – OSHA, Flammable and Combustible Liquids.

dd. 29 CFR 1926.153 – OSHA, Liquified Petroleum Gas.

ee. 29 CFR 1926.154 – OSHA, Temporary Heating Devices.

ff. 29 CFR 1926.153 – OSHA, Definitions Applicable to this Subpart.

gg. 29 CFR Part 1926 Subpart G OSHA, Signs, Signals and Barricades.

hh. 29 CFR Part 1926 Subpart K - OSHA, Electrical.

ii. 29 CFR 1926 Subpart L - OSHA, Scaffolding.

jj. 29 CFR 1926 Subpart X - OSHA, Stairways and Ladders.

kk. 40 CFR Part 61, Subparts A and M, U.S. Environmental Protection Agency (EPA), National Emission Standards for Hazardous Air Pollutants (NESHAP) - Asbestos.

ll. National Fire Protection Association (NFPA), Standard 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

mm. The American National Standard Institute (ANSI) Practices for Respiratory Protection ANSI 88.2-1980.

D. References in this Section to laws, codes, ordinances, regulations, standards or other Federal, state, municipal, local or departmental legal requirements shall be deemed to mean the latest version or revision thereof or successor thereto, notwithstanding any change in numbering, designation or titles in effect at the time of bid opening.

E. Unless specifically directed otherwise by the Engineer, the Authority will be the sole entity to monitor the project.

## 1.03 DEFINITIONS

A. Definitions and other terms used in this Section shall have the meanings set forth in 29 CFR 1910.1101; and for Work in New York State, as set forth in 12 NYCRR Part 56: Subpart 56-1.4, and for Work in New Jersey, as set forth in N.J.A.C. 5:23-8.2; and the following:

1. "Asbestos Abatement Permit Placard" shall mean a permit issued by the Port Authority authorizing the entity performing Work of this Section to commence with such Work

2. Authorized Person" shall mean a person provided by the Authority in accordance with U.S. EPA NESHAP, 40 CFR Part 61, Section 61.145 (c)(8).

3. "Certified Project Designer" shall mean a U.S. EPA Asbestos Hazardous Emergency Response Act (AHERA) Certified Project Designer for Work in New Jersey, or a New York State Department of Labor Certified Project Designer for Work in New York State.

4. "Emergency Exit" or "Egress" shall mean an area on the isolation barrier (i.e.: door or kick-out panel) that may be opened or broken for the immediate egress of people from the work area in case of an emergency.

5. "Initial Exposure Assessment", including "Negative Initial Exposure Assessment" are terms used in the OSHA construction standards. It means a required assessment by a "competent person" concerning the exposure potential of a specific asbestos job, or series of similar asbestos jobs. A "Negative Initial Exposure Assessment" is such an assessment in which it is concluded that employee exposures during the job are likely to be consistently below the Permissible Exposure Level (PEL). Assessments must be based on information and data which are allowed pursuant to criteria in OSHA Standard 1926.1101.

6. "Site Security/Fire Watch" shall mean an employee of the entity performing Work of the Section, who shall at a minimum possess the appropriate, valid state certification as an asbestos handler, who shall be on the "Work Site" at all times during periods of non-Work of this Section to ensure "Work Area" containment integrity, continuous operation of negative air filtration devices, security of the "Work Area" and security of asbestos waste stored at the "Work Site". In addition, when the operation of the existing fire protection system is impaired, deactivated, or compromised, the "Site Security/Fire Watch" person shall, in addition to being familiar with responsibilities of maintaining "Work Area" integrity, be familiar with the emergency response plans and procedures, and the use of the fire extinguisher provided at the "Work Site" for Work of this Section.

7. "Support Structures" shall mean any temporary structure constructed to reach, inspect, or perform Work of this Section.

8. "Work Area" shall mean the designated area within a "Work Site" where Work of this Section occurs which is isolated as required and to which access is restricted.

9. "Work Site" shall mean the construction site location(s) where Work of this Section is being performed.

## 1.04 QUALITY ASSURANCE

### A. QUALIFICATIONS:

1. The entity performing Work of this Section shall be approved by the Authority prior to the commencement of Work of this Section and shall:

   a. Possess valid licenses, permits and certificates for the State in which the Work is to be performed.

   b. Employ for Work of this Section "Certified Project Designers", asbestos abatement handlers, restricted handlers, supervisors and air compressor operators who possess valid certifications and licenses for the State in which the Work is to be performed.

   c. Provide at the "Work Area" a "Competent Person" conforming to the requirements of 29 CFR 1926.32 (f), 1926.1101 (b), 40 CFR 61 Subpart M, and in addition, such person shall have at least three years of experience on asbestos abatement projects as an asbestos abatement supervisor in the State in which Work of this Section is being performed.

   d. Provide a Certified Industrial Hygienist (CIH) with at least three years of applicable experience in asbestos abatement, and with a certification by the American Board of Industrial Hygiene.

   e. Employ an environmental laboratory, approved by the Authority, that conforms to the Quality Control Procedures of 29 CFR 1926.1101 Appendix A, participates in a national sampling testing scheme such as the Proficiency Analytical Testing Program (PAT) or the Asbestos Registry sponsored by the American Industrial Hygiene Association.

f. All subcontractors shall be approved by the Engineer or shall submit subcontractor(s) qualifications with the bid for all proposed Subcontractor(s). Any proposed subcontractor(s) performing work under this specification shall have appropriate qualifications. Subcontractor qualifications submitted shall be in such form and number as may be required by the Authority.

2. The asbestos waste transporter providing transportation services for Work of this Section shall be approved by the Authority prior to the commencement of Work of this Section, and hold the appropriate transporter permits, licenses and certifications for each State in which asbestos transportation is to take place. Such transporter shall transport asbestos-containing materials and/or asbestos-contaminated objects by licensed motor vehicle operators, in vehicles with valid motor vehicle registrations.

3. The landfill disposal site for the asbestos-containing materials and/or asbestos-contaminated objects shall be a site or a facility with valid municipal, state, federal permits (where applicable) and approved by the Authority prior to the commencement of Work at the "Work Area".

## 1.05 WORK AREA CONDITIONS

A. The Authority will perform the following air monitoring and analysis, and will provide analytical results of such air monitoring to the entity performing Work of this Section:

1. Baseline sample results collected within and adjacent to the "Work Area(s)" during normal occupancy conditions prior to the commencement of asbestos abatement activities.

2. Pre-abatement (area preparation) sample results collected within and adjacent to the "Work Areas" during asbestos abatement preparation activities (applicable to work performed in New York State only).

3. Sample results taken outside the "Work Area(s)" during abatement activities.

a. If during the performance of abatement Work, area air sample results taken outside the "Work Area" exceed normal occupancy baseline levels or fiber concentrations in air at or in excess of 0.01 fibers per cubic centimeter (whichever is greater), the entity performing Work of this Section shall take the appropriate corrective action until acceptable levels are achieved, as determined solely by the Engineer.

4. Post-abatement air clearance results.

B. The Entity Performing Work of This Section Shall:

1. Perform initial employee exposure air monitoring in accordance with 29 CFR 1926.1101 (f)(2).

2. Perform full shift daily monitoring for a minimum of twenty (20%) percent of the workers performing a particular task within the "Work Area" each working shift in accordance with 29 CFR 1926.1101 (f)(3).

3. Throughout Work of this Section, the CIH, or the CIH's authorized representative, shall review and sign all air monitoring reports prior to the release of the data to the Contractor. Based upon employee exposure monitoring and analysis of airborne fiber concentration levels, the CIH shall determine the required level of respiratory protection established in accordance with 29 CFR 1926.1101(h).

   a. If based upon the results of employee exposure air monitoring the entity performing Work of this Section requests that monitoring be suspended in accordance with 29 CFR 1926.1101 (f)(4), the CIH shall determine if full shift monitoring accurately represented the airborne exposure to asbestos for the Work, and submit to the Engineer in writing for approval, a recommendation with reasons why monitoring may be suspended.

   b. Report results of employee exposure air monitoring analyses to the Engineer not more than twenty-four (24) hours after the collection of the sample, and post written laboratory results, signed by the CIH, or the CIH's authorized representative, in accordance with 3.01 E.3 herein within two (2) business days.

4. For post-abatement air clearance sampling provide, install, maintain and operate aggressive forced air equipment, e.g., fans, leaf blowers, in accordance with the requirements of the State in which Work is being performed.

5. Re-cleaning, if the "Work Area" fails the Post-abatement air clearance test on the first attempt, shall be performed by the entity performing Work of this Section at no additional cost to the Authority.

6. Ensure that the "Competent Person" stipulated in 1.04 A.1.c attend all meetings related to Work of this Section.

7. Perform Work in accordance with the Contract Documents.

C. Unless otherwise stipulated in Appendix "B" to this Section or as shown on the Contract Drawings, utilities and services, such as water, gas, sewers, electricity, steam heating/cooling ventilation, elevators, fire protection systems, sprinklers and smoke detectors, passing through the "Work Area(s)" shall continue service to areas outside of the "Work Area(s)". Where stipulated in Appendix "B" herein, or shown on the Contract Drawings shutdown and lock-out as necessary to perform Work of this Section. The Contractor shall provide that the entity performing Work of this Section shall coordinate with the Engineer prior to interrupting, re-routing or otherwise affecting any operating system, utility or service. The Authority will perform, and provide certification of utility and service shutdown(s), lockouts, and of required pressurization of ventilation duct systems. Notify the Engineer prior to the impairment or deactivation of the existing "Work Area(s)" and/or "Work Site" fire protection system.

## 1.06 SUBMITTALS

A. See Appendix "A"

## PART 2. PRODUCTS

### 2.01 EQUIPMENT

A. Ensure that the entity performing Work of this Section provides, maintains, and/or uses the following equipment as required:

1. Respirators selected by the CIH based upon airborne fiber concentrations determined in accordance with 1.05 B. herein.
2. Daily employee exposure air monitoring equipment for not less than twenty percent (20%) of workers employed in each particular task per work shift in accordance with 1.05 B. herein.
3. Protective clothing and equipment for personnel exposed to airborne concentrations of asbestos fibers, including but not limited to whole body disposable covering, gloves, head covering, foot covering, hard-hats and eye protection.
4. The Contractor shall maintain stocked first aid kits in the clean room of the decontamination unit and in the work area including, but not limited to bandages, antiseptic wipes, burn cream, eye flushing solution, and tourniquet.
5. Dedicated respirators and personal protective clothing and equipment for the Engineer, and a maximum of three (3) for "Authorized Visitors".
6. Twenty-pound A-B-C multipurpose dry chemical fire extinguishers located in the clean and equipment rooms of the personnel and waste decontamination enclosure, emergency egress locations, and the "Work Area".
7. Negative pressure air filtration equipment.
8. Continuous chart recording manometers to measure differential air pressure.
9. Forced air equipment, e.g., leaf blowers and fans, for use during post-abatement air clearance sampling.
10. Fully enclosed and lockable waste dumpsters, trailers, or roll-offs, with the interior walls and floors lined with one (1) layer of 6-mil fire retardant polyethylene.
11. Asbestos warning signs, leak-tight containers, and transportation labels conforming to 29 CFR 1926.1101(k), and 40 CFR Part 61, Section 61.1(a).
12. Spare containers and labels at the "Work Site", and on the waste transport vehicle for use in case of accidental loss or breakage.
13. HEPA vacuums, rubber or plastic dustpans, squeegees or non-metallic shovels with rounded edges, hand tools, OSHA approved ladders and scaffolds, and inclined chutes where required for Work at heights ten (10) feet or greater above the floor or adjacent ground surface.
14. When "Work Site" electricity is furnished from an existing electrical system, provide temporary electric and lighting from a panel outside of the "Work Area". Furnish and install a temporary electric panel equipped with ground fault circuit interrupters conforming to the National Electric Code for Work in New Jersey, and to the Electrical Code of the City of New York for Work in New York State. Temporary lighting level within the "Work Area" shall at a minimum conform to 29 CFR 1926.56, Illumination.

15. Battery operated emergency lighting within the "Work Area", personnel and waste decontamination enclosures, and emergency egress locations. Self-luminous emergency fire exit and directional signs identifying the path to, and location of, the personnel and waste decontamination enclosures, and emergency egress locations.

## 2.02 MATERIALS

A. Ensure that the entity performing Work of this Section provides, maintains, and/or uses the following materials as required for Work of this Section:

1. Leak-tight containment waste bags of clear or colored plastic, at least 6-mil in thickness with approved warning and transportation labels.
2. Commercially available glove bags of at least 6-mil transparent polyethylene with approved asbestos warning labels.
3. Surfactant, lock-down sealant, and encapsulating products which are recommended by the manufacturers for the specific type of asbestos being abated, and approved by the Engineer.
4. Lumber having a U.L. rating of FR-S. Lumber for temporary support structures shall be U.L. rated FR-S.
5. Minimum 6-mil polyethylene and reinforced polyethylene, with a fire retardant rating conforming to the requirements set forth by the NFPA Standard 701.
6. Other materials such as water-resistant duct tape, adhesives, caulking, nails, fasteners and hardware, as required to perform the Work of this Section.

# PART 3. EXECUTION

## 3.01 PRE-ASBESTOS REMOVAL MEETING AND WORK SITE PREPARATION

A. Prior to the start of Work of this Section at the "Work Site", and after the submission and approval of the information required under 1.04 A and and Appendix "A", the Engineer will schedule a pre-asbestos removal meeting.

B. The following will be performed at the "Work Area" and "Work Site" by the Authority:

1. Post the U.S. EPA notification letter, and if applicable, all re-notifications.
2. Post the Authority "Asbestos Abatement Permit Placard".
3. Post bulk sampling results.
4. As required, isolate, shutdown, pressurize, de-energize and lockout those utilities and services listed in applicable appendices herein.
5. Inspect and evaluate waste container(s) upon arrival at the "Work Site". Damaged, improperly sealing or locking waste container(s) shall be rejected.
6. Place locks on all waste containers.
7. Field-verify the efficiency of the negative air units utilizing velometers and/or manometers.

C. If Appendix "B" to this Section stipulates that a "Work Area" is a Confined Space as defined by 29 CFR 1926.21 and 29 CFR 1910.146, the Contractor shall ensure that entity performing Work of this Section shall be responsible for and shall take the appropriate safety measures stipulated therein.

D. The Contractor shall ensure that the entity performing Work of this Section notifies the building occupants who may be impacted by Work of this Section with a letter, prepared by the Authority, a minimum of ten (10) days prior to the start of Work.

1. The Contractor shall ensure that entity performing Work of this Section posts the "Notice of Abatement Project" signs, provided by the Authority, ten (10) days prior to the start of Work; posted at locations determined by the Engineer.

E. Ensure that the entity performing Work of Section posts the following items on a notification board located at the entrance to the clean room of the personal decontamination enclosure:

1. A copy of the Abatement Contractor's State license.
2. Copies of the air-sampling technician's, project monitor's, supervisor's, handler's and restricted handler's State certificates.
3. OSHA air monitoring results (Within 48 hours of Sample Collection).
4. Emergency first aid procedures and notification telephone numbers.
5. If applicable, air compressor operator certificates of approval or fitness.
6. Name of the Work Site "Competent Person", and a list of names of workers who are authorized to enter the "Work Area(s)".
7. Chain-of-command and telephone numbers in accordance with Appendix "A" (C)(8) herein.
8. Copies of all required City and State asbestos transporter licenses, certificates, and permits.
9. Signs as required by 29 CFR 1926.1101(k) at all entrances to the "Work Area".
10. "No Smoking" signs.
11. A copy of this Specification Section and Appendices.
12. A copy of approved applicable, or project-specific, state variances pertinent to the project.
13. Laboratory results of environmental air samples as defined in Section 1.05 B.3.b.

F. The Contractor shall ensure that the following items shall be available at the "Work Area" and/or "Work Site" by the entity performing Work of this Section for inspection by the Authority or their duly appointed representative:

1. The Contract booklet and Contract Drawings and in addition, a copy of all approved submitted drawings and procedures.
2. Copies of applicable City, State and Federal regulations.
3. Material Safety Data Sheets.
4. NESHAP asbestos generator shipping labels.

5. The record of all manometer recordings.

## 3.02 WORK AREA PREPARATION

A. Work of this Section at the "Work Area" and/or "Work Site" shall not commence until all submittals are approved, and an "Asbestos Abatement Placard" has been issued by the Authority.

B. Work at the "Work Area" shall proceed only when the "Competent Person" and Authority "Authorized Person" are present at the "Work Area".

C. If the scheduled starting date cannot be met, the Contractor shall ensure that the entity performing Work of this Section requests a start date change in writing to the Engineer at least seventy-two (72) hours before the initial notice start date. Schedule changes are subject to the approval of the Engineer. Regulatory re-notifications shall be performed in accordance with 1.02 B.1 and B.2.

1. In the event of failure to commence with Work of this Section on the approved date without the consent of the Engineer to a start date change, the Contractor shall be responsible for the payment of all Authority administrative fees, including, but not limited to, preparation of and courier service for the hand delivery of the U.S. EPA re-notification letter.

D. Submit staging procedures and shift schedules. Notify the Engineer in writing of any shift changes not less than forty-eight (48) hours in advance. Such shift changes shall be subject to the approval of the Engineer.

E. The Contractor shall provide that the entity performing Work of this Section shall perform the following in accordance with Contract Drawings and Appendix "B" herein:

1. After utility shutdown in accordance with 1.05 C., remove filters from the HVAC system, double bag, store and dispose of as asbestos-contaminated waste. Seal all openings in the HVAC and other utility systems within the "Work Area(s)" with at least two (2) layers of 6-mil fire-retardant polyethylene sheeting.

2. Prior to the construction of the decontamination enclosure(s), remove asbestos that may be disturbed by such installation utilizing an approved isolation tent removal procedure to remove a one-foot wide strip at the locations where asbestos may be disturbed.

3. Pre-clean the location where the decontamination enclosure(s) will be constructed using HEPA vacuuming and/or wet cleaning in accordance with Appendix "B" herein.

4. Construct the decontamination enclosure(s) in accordance with the Contract Drawings, Appendix "B" herein, and/or approved Contractor submittals. Provide electric, water, and drainage to make the decontamination enclosure(s) and sanitary facility unit(s) operational.

5. Pre-clean the "Work Area" using HEPA vacuuming and/or wet cleaning methods.

6. Establish the "Isolation Barrier Partitions", "Critical Barriers", "Surface Barriers", or demarcate an area, and seal all openings. Stationary equipment within the "Work Area(s)" shall be enclosed, protected, and ventilated, as required in accordance with the Contract Drawings and/or applicable appendices herein.

7. Pre-clean fixed objects within the "Work Area(s)" and enclose objects to remain in accordance with the Contract Drawings and Appendix "B" herein. Pre-clean movable items before removal from the "Work Area" in accordance with the Contract Drawings and Appendix "B" herein.

8. Paint, or apply tape, in a fluorescent color at the fire extinguisher locations, door frames(s) of the personal and waste decontamination enclosures, emergency egress locations, kick-out panels and along wall bases showing direction towards the nearest exit.

9. Install and continuously operate the negative air filtration system in accordance with the Contract Drawings and/or applicable appendices herein.

10. Provide temporary lighting and power in accordance with 2.01 (A)(14) and Appendix "B" herein.

F. Notify the Engineer in writing that asbestos removal is ready to commence. No less than twenty-four (24) hours after such notification, a pre-removal inspection will be performed by the Engineer.

1. After a successful pre-removal inspection and approval of the Engineer, commence with asbestos removal.

## 3.03 ASBESTOS REMOVAL

A. The Contractor shall provide that the "Competent Person" employed by the entity performing Work of this Section performs the following:

1. Ensures that workers are equipped with respiratory protection and personnel protective equipment in accordance with Section 1.05 B.3.

2. Ensures that the negative air filtration system and manometers are maintained and continuously operated throughout "Work Area" preparation, asbestos removal, clean up, and post-abatement air clearance sampling in accordance with Appendix "B" and the Contract Drawings herein.

3. Ensures that the procedures of 29 CFR 1926.1101, Appendix "F" - "Wetting Agents" are complied with.

4. Ensures that "Site Security/Fire Watch" personnel to keep watch during non-work hours are utilized in accordance with Appendix "B" herein.

5. Ensures that prior to asbestos removal, all asbestos-containing materials are adequately wetted as regulated by the state in which the work occurs and as specified by the manufacturer.

6. Ensures that the removal of the asbestos-containing material is in accordance with Appendix "B" herein, and the Contractor's approved submittals.

7. Ensures that debris and water does not remain or pond on the floor and/or temporary "Support Structures". Adequately wet down, remove, and bag material while wet, concurrently during removal operations utilizing HEPA vacuums, rubber or plastic dustpans, squeegees or plastic shovels for continuous water and debris removal.

8. Ensures that disposal of waste water from the "Work Area" is performed in accordance with Appendix "B" herein.

9. Ensures that a permanently bound entry logbook for each "Work Area" is maintained and made available for the Engineer's inspection signed by all individuals who enter and leave the "Work Area(s)". The log shall identify the abatement contractor, the Authority contract and job number, and the respiratory protection used.

10. Ensures that the permanently bound daily log book for each "Work Area" is maintained with records of the Engineer's inspections and all findings, events, and required corrective action regarding, but not limited to daily inspections, integrity of the decontamination enclosure system(s), "Isolation Barrier Partitions", "Critical Barriers", "Surface Barriers", the negative air filtration system, and all "Work Area" cleanings.

11. Unless directed by the Engineer to do otherwise, ensures that the condition of the waste container is examined by the "Site Security/Fire Watch" person (or "Competent Person" in the event that a Site Security/Fire Watch Person is not required) at least once every twenty-four (24) hours during non-work periods, and that repairs of torn or missing signs on the waste container, or damage affecting the integrity of the waste container are performed or that replacement containers are provided.

12. Ensures that for Work in New York State, the cleaning and surface lock-down encapsulation procedures in Subpart 56-12.1(i) of Industrial Code 56 are complied with.

13. Ensures that for Work in New Jersey, the cleaning and surface lock-down encapsulation procedure in 5:23-8.15(h) of the Asbestos Hazard Abatement Subcode is complied with.

14. Whenever possible, gross removal, packaging and cleaning shall proceed generally from the top downward.

15. Ensures that gross removal, packaging and cleaning shall proceed from locations which are remote from the HEPA units toward the areas of the units.

16. Ensures that wire brushes are not used for asbestos removal.

17. Ensures that compressed air and high-pressure water or steam are not used for asbestos removal.

## 3.04 DISPOSAL

A. Notify the Engineer in writing at least twenty-four (24) hours in advance of any bag out operations or waste container removal.

B. Remove asbestos waste from the "Work Site" only with the approval from the Engineer and an accompanying, properly signed Asbestos Waste Shipping Document issued by the Authority (Waste Shipment Record).

C. Transport the waste consignment to the landfill designated in the Contractor's approved submittals, U.S. EPA notification letter, and indicated on the Waste Shipment Record in accordance with 1.04 A.

D. The collection, co-mingling and transport of generated Authority asbestos waste with the asbestos waste from other generator sources is prohibited. Temporary storage or secondary transfer of the asbestos waste before final disposal is prohibited unless otherwise approved in writing by the Engineer prior to the waste leaving the "Work Site".

## 3.05 FINAL REPORT

A. This final report shall not be a substitute for the requirements of the Section of Division 1 entitled "Asbestos Cost Summary Submittal".

B. Final payment will not be approved prior to the Contractor preparing, itemizing and submitting to the Engineer four (4) copies of a final report containing:

1. A cover page identifying the entity performing Work of this Section with their phone number and business address, name of the "Competent Person", name and business address of the CIH and analytical laboratory, name and business address of the waste transporter, and name and business address of the landfill.

2. Summarize the type(s) of material removed, quantity of material removed, description of containment and engineering controls, amount of waste generated and date(s) transported from facility.

3. Daily project logs, entry logs, and if applicable, time and material sheets.

4. Analytical results of employee exposure air monitoring performed during Work of this Section, and strip or disk chart recordings of differential air pressure to areas adjacent to the "Work Area(s)".

5. Waste Shipment Record signed by the operator of the disposal site indicated in the Contractor's approved submittals.

6. Manometer recording logs. Manometer chart or tape shall include a date and time marker at least once per 24-hour period, and shall clearly indicate scale and zero.

7. The name, title and signature of the person preparing the final report.

END OF SECTION

## SECTION 02081

## ASBESTOS REMOVAL AND DISPOSAL FOR PORT AUTHORITY

## OF NEW YORK AND NEW JERSEY

## APPENDIX "A"

## SUBMITTALS

A. Prior to the "Asbestos Removal Meeting" the entity performing Work of this Section shall submit to the Engineer for approval the items listed below and any additional items requested by the Engineer.

B. Identify each set of submittals with the corresponding paragraph number for which the submittal is being presented.

C. Submit copies of the certifications, licenses and qualifications to perform Work of this Section as required in 1.04 A.1, 1.04 A.2 and 1.04 A.3 and all required project-specific items including, but not limited to, the following:

02081-01 Copy of valid Asbestos Contractor's License

02081-02 Information on Competent Person (i.e.: resume) showing:

02081-03 Three-years project supervision experience.

02081-04 Copy of valid Asbestos abatement Supervisor certificate.

02081-05 Asbestos Handlers certificates for the proposed staff.

02081-06 Information (i.e.: resume) on the "Certified Project Designer" the Contractor plans to utilize showing:

02081-07 Three-years asbestos project design experience.

02081-08 Copy of valid Asbestos Project Designer certificate.

02081-09 Information (i.e.: resume) on the Certified Industrial Hygienist (CIH) the Contractor plans to utilize showing:

02081-10 Three-years asbestos related experience.

02081-11 Copy of valid American Board Industrial Hygiene certificate.

02081-12 Information on the Environmental Laboratory the Contractor plans to utilize, including:

02081-13 Proof of participation in the American Industrial Hygiene Association's Proficiency Analytical Testing Program [PAT].

02081-14 Outline of Respiratory Protection Program for Employees conforming with current regulations - The outline shall bear the signature and approval of a CIH.

02081-15 List of Subcontractors Contractor plans to utilize. Submit all their appropriate qualifications as per Section 02081, Part 1 (1.04)(A)(1)(a) and (f) herein.

02081-16 Name of Asbestos Waste Transporter Contractor plans to utilize -- the entity providing transportation services shall be approved by the Authority prior to the commencement of Work of this Section. Provide documentation showing, for each State in which transportation is to occur, the following:

02081-17 Copies of Transporter's Permits, Licenses and/or Certificates as required by state agencies to operate.

02081-18 Name and title of Transporter's contact person.

02081-19 Business, mobile and pager telephone numbers.

02081-20 U.S. DOT statement of reportable accidents and reportable environmental incidents as per 49 CFR 171.15 and 171.16

02081-21 Name of landfill Contractor plans to utilize. Contractor shall obtain approval from the Authority for utilization of proposed facility prior to commencement of Work of this Section [refer to Appendix "C" herein]; and submit the following documentation for the proposed facility:

02081-22 Municipal permits and/or licenses required to operate.

02081-23 State permits and/or licenses required to operate.

02081-24 Federal permits and/or licenses required to operate.

02081-25 Name, title and telephone number of Landfill's contact person.

02081-26 "Work Area" and "Work Site" procedures.

02081-27 Fire Prevention and First Aid Procedures.

02081-28 Work site communication with police, fire department, Facility Operations and the Engineer.

02081-29 Detailed site-specific Drawings prepared and signed by a "Certified Project Designer" which shall include, but not be limited to, the following:

02081-30 Negative Air Unit Calculations.

02081-31 Engineering Controls (i.e.: work area enclosure; decontamination enclosure system layout and location; work area boundaries; etc. ).

02081-32 "Emergency Egress" location(s).

02081-33 Requirements for electric power, water supply and drainage.

02081-34 Requirements for storage and staging location(s).

02081-35 Project Specific Chain of Command -- Show on Chain of Command form(s) office, beeper, mobile and home telephone numbers of persons having the authority to dispatch personnel to the Project location and commit such persons to the tasks as directed by the Engineer. At a minimum include numbers for Project Supervisor, Competent Person and CIH.

02081-36 Support Structures – Drawings, design details and calculations for temporary "Support Structure(s)", signed and sealed by a Professional Engineer (P.E.) licensed in the State in which the Work of this Section is to be performed. Following installation of "Support Structure(s)", submit P.E.signed inspection report verifying compliance with design.

02081-37 List of all materials and equipment to be used.

02081-38 Catalog cuts for all materials and equipment to be used for Work of this Section, in accordance with the Section of Division 1 entitled "Shop Drawings, Catalog Cuts and Samples,"

02081-39 Material Safety Data Sheets and a copy of the product labels for all chemicals to be used for Work of this Section.

02081-40 A construction Critical Path Method (CPM) or Bar Graph Schedule stating critical dates of the job including start of mobilization, the preparation, removal, and reactivation of each work area, and completion of deactivation.

02081-41 A staffing schedule stating number of workers per shift, name and number of supervisor(s) per shift, hours per shift, shifts per day, and total days to be worked.

02081-42 Any changes in schedule or staffing shall be submitted in writing to the Engineer 48 hours prior to implementation, or as directed by the Engineer.

02081-43 Copies of notifications and re-notifications, prior to sending, in accordance with Section 02081(1.02) (B) herein.

02081-44 Copies of the Final Report as stipulated in Section 02081(3.05) herein.

02081-45 Copies of project-specific variances obtained by the Contractor for Work of this Section.

B. The Contractor shall maintain records signed by a physician documenting worker medical examinations with chest X-rays and pulmonary function tests. The form from Appendix D of OSHA CFR 1926.1101 Title 29 or equal shall be used. These records shall be kept on file by the Contractor for the duration of employment, plus 30 years.

**END OF APPENDIX "A"**

## SECTION 02081

## ASBESTOS REMOVAL AND DISPOSAL FOR PORT AUTHORITY

## OF NEW YORK AND NEW JERSEY

## APPENDIX "B"

## JOB SPECIFIC REQUIREMENTS

A. Description

This Section specifies removal of asbestos material from the "Work Area(s)" shown on the Contract Drawings.

B. Asbestos Type(s)

Test results of asbestos-containing material to be removed indicate that such material contains the following type(s) of asbestos:

| Asbestos-Containing Material | Asbestos Type | Approx. % by Volume of Asbestos in Asbestos-Bearing Material |
|---|---|---|
| Ductbanks | Chrysotile | 25 |

C. Items in "Work Area" to be Removed

There are no items to be removed from the Work Area.

D. Items Remaining in "Work Area" to be Protected

Protect the items in the Work Area, if any, with polyethylene sheeting and duct tape.

E. Utilities for Work of this Section

1. Drainage:

Drainage is not available at the "Work Site". All waste water generated at the "Work Area" or from the decontamination facility shall be collected and disposed of as stipulated in "Water Disposal Procedures" herein.

F. Utilities and Services in Work Area to be Shut Down and to Remain in Service

Affected ductbanks shall be de-energized

G. "Work Site Security/Fire Watch"

Security/Fire Watch is not required.

H. "Work Area" Procedures

Work procedures shall conform to the requirements of this specification.

I. "Water Disposal" Procedures

Prior to disposal of waste water, collect free water, add to asbestos-contaminated material and/or solidify with an approved polymer and dispose of as asbestos-contaminated material; or filter water through a new three stage filter system where the final stage is a 5.0 micron filter to remove asbestos and dispose of in the sanitary drain, if allowed by local treatment works by regulation or as allowed by permit.

J. "Sealing Asbestos-Containing Contact Surfaces"

Seal end surfaces of asbestos-containing material that is to remain, if any, with a sealer approved by the Engineer.

K. Removal of "Work Area Containment and Protection of Items that Remained in the Work Area"

Remove "Work Area" containment and dispose of as asbestos contaminated material. Remove item wrapping and relocate and/or re-secure objects and items that were moved, wrapped and sealed and remained within the "Work area". Dispose of item wrapping as asbestos contaminated material.

L. Re-establishment of Utilities and Services

Re-establish utilities and services that were disconnected and install new filters in air moving system(s) affected by this section.

M. Replacement of Insulation and Fireproofing

Not Used.

**END OF APPENDIX "B"**

## SECTION 02081

## ASBESTOS REMOVAL AND DISPOSAL FOR PORT AUTHORITY OF NEW YORK AND NEW JERSEY

## APPENDIX "C"

Listed below are landfill disposal sites that are currently used, or have previously been used, by the Authority for the disposal of asbestos-containing material and/or asbestos contaminated objects. This list is provided for reference only and does not relieve the Contractor from verifying the facilities current valid state approvals or from submitting required documentation as outlined in Appendix "A". Furthermore, the Contractor is not limited to use of these disposal facilities:

WETZEL COUNTY SANITARY LANDFILL
New Martinsville, West Virginia 26155
304 455-3800

WASTE MANAGEMENT OF NEW YORK, Inc.
Varick Ave, Brooklyn, New York
617 271-9292

TULLYTOWN LANDFILL
(Tullytown Resource Recovery), Tullytown, Pennsylvania
215 736-9400

SUPERIOR GREEN TREE LANDFILL
Kersey, Pennsylvania
800 257-5705

SOUTHERN ALLEGHENIES LANDFILL
Conemaugh Twshp., Pennsylvania
814 479-2537

SOIL REMEDIATION INC.
Lowellville, Ohio

S&S LANDFILL
Route 5, Box 559
Clarkesburg, West Virginia 26155
304 745-3234

PENNSAUKEN SANITARY LANDFILL
Pennsauken, New Jersey

OTTAWA COUNTY LANDFILL
Port Clinton, Ohio 43452 (BFI Ohio)
419 635-2615

NEW MORGAN LANDFILL CO.,INC.
New Morgan Borough, Exton Pennsylvania
610 286-6844

MINERVA ENTERPRISE INC
900 Minerva Road, Waynesburg, Ohio 46688

MEADOWFILL CORPORATION
Route 2, Box 68
Clarkesburg, West Virginia 26330
304753-9470

MAPLEWOOD RECYCLING & SANITARY LANDFILL
Route 640, Amelia County, Virginia
609 273-5818

M.C. ARNONI LANDFILL
Library, Pennsylvania

KELLY RUN LANDFILL
Elizabeth, Alleghany County, Pennsylvania
412 384-3133

IESI BLUE RIDGE LANDFILL
(Formerly R & A Bender Landfill,)
Greene Twnshp, Franklin County, Pennsylvania
717 264-4678

HAM SANITARY LANDFILL
1 Pozoo Road
Peterstown, West Virginia 24963
304-753-9470

HACKENSACK MEADOWLANDS DEVELOPMENT COMMISSION BALER FACILITY
(Use this facility only for Work performed in Hudson County New Jersey)
100 Baler Boulevard
North Arlington, New Jersey 07031

G.R.O.W.S. LANDFILL, INC.
1000 New Ford Mill Road
Morrisville, Pennsylvania 19067
215-736-9400

GREENRIDGE RECLAMATION LANDFILL
East Huntington, Westmoreland County, Pennsylvania

GRAND CENTRAL LANDFILL
Painfield, Northampton County, Pennsylvania

CONESTOGA LANDFILL (BFI)
Exton, Berks County, Pennsylvania
610 286-6844

CENTRAL WASTE INC.
Smith Twnshp., Mahoning County, Ohio
330 823-6220

BROWNING FERRIS INDUSTRIES (BFI)
Fall River, Pennsylvania

110 CLEAN FILL DISPOSAL SITE
136 Spagnioli Road
Melville, New York 11704

END OF APPENDIX "C"

DIVISION 2

SECTION 02094

# WORKER AND ENVIRONMENTAL PROTECTION FOR LEAD-BASED PAINT REMOVAL

## PART 1 - GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for:

1. The installation and use of containment systems for the removal of paint coatings containing lead and other toxic metals in accordance with the Society for Protective Coatings (SSPC) guidelines listed on the attached table 1.

2. Worker and Environmental Compliance Plans for the protection of Contractor workers, the public, and the environment from exposure to harmful levels of lead that may be present in the paint being removed.

3. Ensuring that all waste is collected, handled, stored, transported, and disposed off in accordance with applicable regulations.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section.

A. Code of Federal Regulations (CFR)

| | | |
|---|---|---|
| 1. | 29 CFR 1910.120 | Hazardous Waste Operations and Emergency Response |
| 2. | 29 CFR 1910.134 | Respiratory Protection |
| 3. | 29 CFR 1926 | Occupational Safety and Health Regulations for Construction |
| 4. | 29 CFR 1926.51 | Sanitation |
| 5. | 29 CFR 1926.62 | Lead |
| 6. | 40 CFR 50 | National Primary and Secondary Ambient Air Quality Standards |
| 7. | 40 CFR 261-264 | Hazardous Waste Standards |

| | | |
|---|---|---|
| 8. | 40 CFR 265.13 | General Waste Analysis |
| 9. | 40 CFR 268 | Land Disposal Restrictions |
| 10. | 49 CFR 171-179 | Transportation Regulations |

B. New Jersey Administrative Code (NJAC)

| | | |
|---|---|---|
| 1. | NJAC, Title 8, Chapter 62 | New Jersey Department of Health, Standards for Lead Certification |
| 2. | NJAC, Title 5, Chapter 17 | New Jersey Lead Hazard Evaluation Abatement Code |

C. New York Code of Rules and Regulations (NYCRR)

| | | |
|---|---|---|
| 1. | Title 6, Chapter III, 364-373 | Hazardous Waste Management Regulations |

D. Society for Protective Coatings (SSPC)

| | | |
|---|---|---|
| 1. | SSCP Guide 6 | Guide for Containing Debris Generated During Paint Removal Operations |
| 2. | SSPC Guide 7 | Guide for Disposal of Lead-Contaminated Surface Preparation Debris |

REGULATORY REQUIREMENTS

E. Comply with the requirements of this section as though the Authority were a private corporation. Comply with the requirements of all applicable Federal, State, and City laws, codes, and regulations, including, but not limited to the regulations of the:

1. United States Environmental Protection Agency (USEPA);
2. Occupational Safety and Health Administration (OSHA);
3. New Jersey Department of Environmental Protection (NJDEP);
4. New Jersey Department of Health and Senior Services (NJDHSS);
5. New Jersey Department of Labor (NJDOL);
6. New York State Department of Environmental Conservation (NYSDEC);
7. New York State Department of Health (NYSDOH); and
8. New York State Department of Labor (NYSDOL).

F. Comply with all applicable regulations even if the regulation is not specifically referenced herein. If a Federal, State, or City regulation is more restrictive than the requirements of this Section, follow the more restrictive requirements.

## 1.03 QUALIFICATIONS AND EXPERIENCE

A. Contractor and its Subcontractors

1. For Work in New Jersey, verify that the Contractor or its subcontractor who will be working with lead is certified under the Lead Hazard Evaluation and Abatement Code for Steel Structures and Commercial Buildings, N.J.A.C. 5.17-2.1. Certification must be maintained throughout the duration of the Contract.

B. Laboratory Qualifications/Occupational Physician

1. Verify that the analytical laboratories performing metals analysis on air, water, soil and solid waste, are accredited by The American Industrial Hygiene Association (AIHA), and has successfully participated (previous 12 months at a minimum) in the AIHA ELPAT program and PAT program.

2. Verify that the laboratory conducting the worker blood analyses is approved by OSHA, NJDHSS and NYSDOH, as applicable.

3. Verify the certifications of the Occupational Physician.

C. Competent Person/Supervisor. Employ one who:

1. Has a minimum of two years industrial painting field experience, with a minimum of ninety days field supervisory or management experience in paint removal projects;

2. Has proof of completion of 29 CFR 1926.62 Lead in Construction training within the last 12 months;

3. Has proof of 29 CFR 1910.120 (initial or refresher) HAZWOP Supervisor training within the last 12 months;

4. For work in New York, has proof of completion of Society for Protective Coatings (SSPC) Competent Person for Deleading of Industrial Structures (SSPC C-3) course or equivalent. Certification must be maintained throughout the duration of the Contract.

5. For work in New Jersey, has proof of completion of the New Jersey Lead Abatement Supervisor Program for Commercial Buildings and Super Structures, N.J.A.C. 5.17-2.1. Certification must be maintained throughout the duration of the Contract.

D. Workers. Confirm that:

1. For work in New Jersey, all workers have proof of completion of the New Jersey Lead Abatement Worker Program for Commercial Buildings and Super Structures, N.J.A.C. 5.17-2.1. Certification must be maintained throughout the duration of the Contract.

2. All workers have proof of completion of 29 CFR 1926.62 Lead in Construction training within the last 12 months.

1.04 SUBMITTALS

See Appendix A.

PART 2 - PRODUCTS

2.01 PERSONAL PROTECTIVE MATERIALS AND MONITORING EQUIPMENT

A. Monitoring and Testing Equipment

1. Supply the instrumentation needed for monitoring worker and area exposures.

2. Supply all equipment needed for the operation of all instrumentation and monitors (e.g., generators, batteries, power cords, fuel, etc.).

B. Personal Protective Equipment and Hygiene Facilities

1. Provide all personal protective equipment (PPE) needed for Contractor's workers and for up to four Engineering representatives at each shift.

2. Repair or replace PPE as required to assure that it continues to provide its intended purpose.

C. Containment Materials

1. Supply all equipment and materials needed to contain debris in accordance with the provisions of this Section. This may include ground covers, rigging, scaffolding, planking, containment materials, dust collection and ventilation equipment and HEPA vacuums.

PART 3 - EXECUTION

3.01 WORKER PROTECTION CRITERIA FOR LEAD

A. Competent Person - confirm that daily inspections of the work area will be made by a competent person.

B. Written Compliance Program (WCP) – Prepare a WCP in accordance with 29 CFR 1926.62 (e)(2)(i). Maintain a copy of the WCP at the construction site for review by all employees and interested parties.

C. Engineering and Work Practice Controls – Implement engineering and work practice controls, including administrative controls, to reduce and maintain employee exposure to lead below the PEL.

D. Exposure Monitoring/Initial Assessment – Collect representative personal air samples in accordance with 29 CFR 1926.62 (d)(1)(iii). Protect workers during

initial exposure assessment in accordance with 29 CFR 1926.62 (d)(2)(i). If historical data will be used in accordance with 29 CFR 1926.62 (d)(3)(iii), provide prior to start of work for evaluation by the Engineer.

E. Respiratory Protection- Implement a Respiratory Protection Program in accordance with 29 CFR 1910.134. Proper selection, use, maintenance and inspection of respirators is required. Provide medical clearance and fit tests for respirator users.

F. Protective Clothing and Equipment - Provide clean protective clothing and equipment in accordance with 29 CFR 1926.62 (g) and ensure they are used by all employees whose exposures exceed the PEL. Provide closed containers for items to be cleaned, such as work shoes and facemasks. If the clothing is disposable, label the containers as clothing contaminated with lead, if applicable. Apply hazardous waste labels as appropriate after testing.

G. Housekeeping – In accordance with 29 CFR 1926.62 (h), clean accumulations of dust or debris containing lead daily and conduct all cleaning with HEPA (High Efficiency Particulate Air)-filtered vacuums. Containerize the debris for proper disposal. Bags and containers should be appropriately labeled as lead-containing waste.

H. Personal Hygiene Facilities and Equipment/Decontamination Zone – In accordance with 29 CFR 1926.62 (i), provide clean change areas, showers, lavatory, eating facilities, and hand washing facilities as necessary for workers who may be exposed to lead at or above the OSHA PEL.

I. Medical Surveillance and Medical Removal Protection – In accordance with 29 CFR 1926.62 (j) and (k), perform initial and periodic blood sampling and analysis for lead and zinc protoporphyrin (ZPP) when an employee is exposed to lead at or above the OSHA Action Level of 30 ug/m3. Provide the Engineer with blood analysis results.

J. Employee Training and Information - In accordance with 29 CFR 1926.62 (l), provide initial and annual refresher site specific training for all employees who may be exposed to lead at or above the OSHA Action Level.

K. Signs and Restricted Zones - In accordance with 29 CFR 1926.62 (m), establish restricted zones around areas or activities that might generate airborne emissions of lead in excess of the OSHA Action Level and post caution signs around each restricted zone.

L. Record keeping - In accordance with 29 CFR 1926.62 (n), retain all records related to training, medical examinations, blood analysis, exposure monitoring, respirator fit testing, inspections by a competent person, and other related documentation.

M. Visible Assessments - Conduct daily assessments of visible emissions and releases to the air, soil, water, and sediment, as applicable. Undertake all necessary corrective action to control emissions.

3.02 ON-SITE MANAGEMENT, TRANSPORTATION, AND DISPOSAL OF PAINT DEBRIS, WASTEWATER, AND ANY OTHER WASTE GENERATED FROM THE WORK.

A. General

1. Contractor is responsible for the collection, handling, storage, transportation and disposal of all hazardous wastes generated from this Work. The Authority will provide the EPA identification number for lead waste disposal for permitting purposes.

2. The Contractor is responsible for the collection, handling, transportation, and disposal of all solvent wastes generated from this Work. The Contractor must acquire their own EPA identification number for the disposal of solvent wastes.

3. The Contractor is responsible for the collection, handling, transportation, and disposal of all non-hazardous municipal/construction waste and waste water generated from this Work.

4. Recover all waste products generated during the paint removal Work, including but not limited to rags, tape, disposable coveralls, filters, and sediments.

5. Store waste only at location designated by the Engineer. Transport the waste to the designated storage area at the end of each working day, at a minimum.

6. Hazardous waste generation reports and fees/taxes imposed by the States shall be handled and paid for by the Contractor.

B. Items provided by the Contractor

1. Hazardous Waste - Provide DOT-approved containers of the appropriate size and type for the hazardous waste generated, including but not limited to, paint chips, protective clothing, and the interior lining of the containment. Use containers that are resistant to rust and corrosion, (painted if constructed of steel), that have tight fitting lids or covers, and which are water resistant and leak proof.

2. Municipal/Construction Waste - Provide all containers for non-hazardous municipal/construction waste. Use containers that are free of loose debris when brought to the construction site.

3. Spent Solvents - Provide all DOT-approved containers for spent solvents. Do not mix spent solvents with paint debris, water or other lead contaminated waste.

C. Waste Sampling, Testing, And Classification

1. Sampling: Collect and have analyzed, representative samples of each waste stream generated by the Work. Collect the samples under the observation of the Engineer.

2. Testing

   a) Solid Waste: Direct the laboratory to test the solid waste in accordance with 40 CFR 261, Appendix II, Method 1311, Toxicity Characteristic Leaching Procedure (TCLP), to determine if it is hazardous.

   b) Waste water - test the waste water for Total metals (As, Cd, Cr, Cu, Pb, Hg, Mo, Ni, Zn), hexavalent chromium, pH, suspended solids, oil and grease, BOD, temperature, total cyanide, TPH, and other analytical parameters required for disposal characterization or by the disposal facility.

3. Laboratory Report

   a) Include the following minimum information in each report : Identity of the RCRA listed waste streams and identity of the waste stream(s) analyzed, the number of samples collected and tested, dates of sampling and testing, laboratory test procedures utilized, the names and signatures of the individuals collecting the samples and analyzing the laboratory tests, interpretation of the test results, and final determination.

   b) Include copies of the chain-of-custody forms in the documentation of hazardous waste and non-hazardous waste streams.

D. Waste Handling, Packaging, And Storage

1. Comply with 40 CFR 262 for the on-site handling, packaging, and storage of all waste generated by the Work.

2. All paint debris shall be vacuumed and collected in DOT-approved 55-gallon drums at the end of each Work period. Paint debris shall include paint chips and dust and shall not include any other construction debris, trash or chemical solvents. All disposable protective clothing and interior lining of the containment system shall be collected in DOT-approved drums at the end of each Work period.

3. At the Work areas, store waste in locations designated by the Engineer. Do not place hazardous waste on unprotected grounds (e.g. cover the ground with impervious tarping). Locate in a secure area with signs around the perimeter, and shield adequately to prevent dispersion of the waste by wind or water.

4. Properly transport all non-hazardous waste municipal/construction waste from the Work areas to the designated storage area. Verify that the waste is completely covered during transportation.

5. Maintain all drums in good operating condition with all lids and closing mechanisms intact and operational to prevent escape of debris by winds, spilling of contents, or access by unauthorized personnel.

6. Store non-hazardous waste separately from hazardous waste. Do not mix hazardous waste with non-hazardous waste. Do not mix different types of hazardous waste unless specifically approved by the Engineer.

7. Verify that all waste is transported to the appropriate recycling or disposal facility within 60 days after waste is first placed into the container.

8. Train all personnel in the proper handling of hazardous waste at the Work site in accordance with 29 CFR 1910.120, including the procedures to follow in the event of a release or spill, required notifications, and methods of clean-up. Maintain all training records on-site.

E. Labeling of Containers

1. Immediately label all containers of waste and paint debris to identify the contents. Label containers of paint debris as "LEAD PAINT WASTE, CONTAINS LEAD". Include the Contract Number and locations. Provide similar labels on containers of other waste, wastewater and debris.

2. After the TCLP test results are received, or after determination of hazardous waste status based on RCRA list at 40 CFR 261, Subpart D, immediately apply hazardous waste labels, if the waste tests hazardous. Label each container of hazardous waste in accordance with 40 CFR 262, and 49 CFR 171-179.

F. Waste Transportation and Disposal (with the Exception of Waste Water)

1. Hazardous Waste

a) Prepare the hazardous waste manifest for each shipment and provide to the Engineer for review and signature.

b) Arrange for the transportation of all hazardous waste by a licensed transporter in accordance with 40 CFR 263, 49 CFR 171-179, and 6 NYCRR 364.

c) Provide a certification for each manifested shipment that the waste was accepted by the recycling or disposal facility, and properly treated and disposed. Comply with all of the

manifesting, certification, and reporting requirements for hazardous waste in accordance with 40 CFR 262, 40 CFR 268, and 6 NYCRR 372, including certificates of final disposal for each shipment.

2. Non-Hazardous Municipal/Construction Waste

a) Properly transport, and dispose of all non-hazardous municipal construction waste.

b) Verify that waste is completely covered during transport.

c) If lead or hazardous substances were detected during the laboratory testing, notify the disposal facility that such metals or materials are present in the waste.

d) Comply with additional City regulations as applicable.

G. Waste Water Handling And Disposal

1. Provide containers for the collection and retention of all waste water including but not limited to the water used for steam cleaning, hygiene purposes, decontamination and cleanup activities. Filter visible paint chips and particulate from the waste water prior to placing it into the containers. Make disposal arrangement with the local publicly owned treatment works (POTW), sanitation company, or other appropriate permitted facility.

H. Cleaning of Haul Routes - Clean waste transportation haul routes upon completion of operation at end of each hauling.

END OF SECTION

DIVISION 2

SECTION 02094

WORKER AND ENVIRONMENTAL PROTECTION FOR LEAD-BASED PAINT REMOVAL

APPENDIX A

SUBMITTALS

1.0 GENERAL - Provide all submittals of this Appendix in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1, General Provisions.

2.0 PRE-CONSTRUCTION

A. Provide a site-specific WCP. Include the methods and procedures that will be followed for complying with this Section and 29 CFR 1926.62 for Lead.

1. Scope of Work – provide site specific information such as method of lead removal, lead work location(s), duration of lead work, crew size, login procedures, key personnel, competent person(s), containment classifications and the location of the WCP during the project.

2. Qualifications and Experience - provide written qualifications, experience, training, and certification information for the contractor and subcontractors, laboratories, physician, competent person/supervisor and workers, as stated in 1.03 of this Section.

3. Engineering and Work Practice Controls – provide a written program describing method of lead removal, air monitoring, containment/collection systems, equipment, and safety. Include catalog cuts for all equipment.

4. Exposure Assessments – provide a written program for site exposure assessments. Include details of personal air monitoring and note specific lead disturbance tasks. Identify personnel performing air sampling. Provide certifications of laboratory conducting air-sampling analysis. If historical data is to be used, provide to Engineer for evaluation.

5. Respiratory Protection - provide a written program in compliance with 29 CFR 1926.103. Address the selection, use, maintenance and inspection of respirators, and qualifications for respirator users. Include copies of fit test records for all crew and catalog cuts of respirators. Include letter from physician stating workers are fit to wear respirators.

6. Protective Clothing and Equipment - provide a written program for selection, use, replacement and disposal of protective clothing and equipment. Include catalog cuts for all PPE.

7. Housekeeping – provide a written program describing cleaning frequency, cleaning with HEPA vacuums, cleaning with biodegradable lead detergents, containerizing, storing and disposing of lead dust and paint chips.

8. Personal Hygiene Facilities and Equipment/Decontamination Zone – provide a written program describing decontamination procedures, hand wash, showers, break areas and change areas. Include catalog cuts for decontamination unit and hand wash station.

9. Medical Surveillance and Medical Removal Protection – provide a written program describing frequency and type of blood testing, medical removal, and physical examinations. Provide certifications for laboratory conducting blood work, certifications of occupational physician, and copies of blood lead and ZPP testing for workers and competent person(s).

10. Employee Training and Information – provide a written program describing training requirements and frequency. Provide evidence of training for all workers.

11. Signs and Restricted Zones – provide a written program for establishing restricted zones and use of Lead Work signs.

12. Record keeping – provide a written program describing record keeping procedures.

13. Visible Assessments – provide a written program for assessments of visible emissions.

14. Chemical Safety and Handling - provide a written program for the safe use and storage of chemicals on-site. Provide MSDS for chemicals to be brought on-site.

B. Waste Handling Plan – Provide a written program that addresses the proper handling and disposal of all waste as described in 3.02 of this Section.

1. Transporter Qualifications, Experience, and Permits: Provide the names, addresses, qualifications, and contact persons for the proposed transporter(s) of hazardous waste, non-hazardous waste, and waste water. Provide evidence that each transporter has current registration approved by NYSDEC and NJDEP, as applicable as stated in 3.02 F of this Section.

2. Disposal Facility Qualifications, Experience, and Permits: Provide the name, address, telephone number and contact person for each waste disposal facility proposed for use in the Contract. Provide evidence that each disposal facility has current registrations and permits for the operation of such facilities, or written approval from the state (and by

the USEPA or other local agency, if applicable) in which it operates as stated in 3.02 F of this Section.

C. Contingency Plan and Emergency Procedures

1. Submit a Contingency Plan and Emergency Procedures to respond to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water at the construction site.

   a) Describe arrangements agreed to by local police departments, fire departments, hospitals and state and local emergency response teams.

   b) List names, addresses, and phone numbers of all persons qualified to act as emergency coordinators. Include a list of all emergency equipment at the construction site (fire extinguishers, spill control equipment, communications and alarm systems and decontamination equipment).

   c) Include an evacuation plan for workers. Describe signals to be used to begin evacuation.

2. Submit evidence that a copy of the plan has been submitted to all local police departments, fire departments, hospitals, and State and local emergency response teams that may be called upon to provide emergency services.

3.0 CONSTRUCTION PHASE

A. Provide a complete analytical package of TCLP test results of waste samples within 4 weeks after sample collection.

B. Provide a complete analytical package of waste water test results of waste sample collection within 4 weeks after sample collection.

C. Waste Manifests - Submit to the Engineer one copy of

1. Executed and signed manifests for each load of waste material transported from the construction site. Provide the manifest within one day of shipment.

2. Executed waste manifest form signed by a responsible party of the disposal facility. Provide the form within one day of receipt. If the copy is not received within 35 days from the date of shipment, contact the Engineer, and assist as directed, in efforts to locate the shipment, and in the completion of the EPA Exception Reports (if the signed manifest is not received within 45 days of the date of shipment).

3. Certificate of final disposal for each manifest or certificate of recycling for recycled material. Provide the certification within one day of receipt.

D. Bills of Lading - Provide bills of lading for the disposal of all non-hazardous municipal/construction waste within one week of the date of shipment.

E. Waste water - Provide written documentation of the receipt of disposal of all waste water within one week of the date of shipment.

F. Clean-up - Prior to issuance of Certificate of Final Completion, provide the Engineer with a letter report presenting the results of the inspections conducted to verify the final cleanliness of the construction site, surrounding property, waterways, equipment, buildings, and structures.

END OF APPENDIX A

DIVISION 2

SECTION 02094

# WORKER AND ENVIRONMENTAL PROTECTION FOR LEAD-BASED PAINT REMOVAL

## TABLE 1

**Containment Criteria for Removal of Paint Containing Lead and Other Toxic Metals[1]**

| Containment Removal Method | Containment SSPC Class[2] | Containment Material Flexibility | Containment Material Permeability[3] | Support Structure | Material Joints | Containment Entryway | Ventilation System Required | Negative Pressure Required | Exhaust Filtration Required |
|---|---|---|---|---|---|---|---|---|---|
| Hand Tool Cleaning[4] | 3P | Rigid or Flexible | Permeable or Impermeable | Minimal | Partially Sealed | Overlapping or Open Seam | Natural | No | No |
| Power Tool Cleaning w/ Vacuum[4] | 3P | Rigid or Flexible | Permeable or Impermeable | Minimal | Partially Sealed | Overlapping or Open Seam | Natural | No | No |
| Power Tool Cleaning w/o Vacuum[5] | 2P | Rigid or Flexible | Permeable or Impermeable | Rigid or Flexible | Fully or Partially Sealed | Overlapping or Open Seam | Natural[5] | No | No[5] |
| Chemical Stripping[6] | 3C | Rigid or Flexible | Permeable or Impermeable | Minimal | Partially Sealed | Open Seam | Natural | No | No[6] |
| Wet Methods[7] | 2W-3W | Rigid or Flexible | Permeable or Impermeable | Rigid, Flexible, or Minimal | Partially Sealed | Overlapping or Open Seam | Natural[7] | No | No[7] |
| Abrasive Blast Cleaning[8] | 1A | Rigid or Flexible | Impermeable | Rigid or Flexible | Fully Sealed | Airlock or Resealable | Mechanical | Yes | Yes |

[1]This table provides general design criteria only. It does not guarantee that specific controls over emissions will occur because unique site conditions must be considered in the design. Other combinations of materials may provide controls over emissions equivalent to or greater than those combinations shown above.

[2]The SSPC Classification is based on SSPC Guide 6. Note that for work over water, water booms or boats with skimmers must be employed, where feasible, to contain spills or releases. Debris must be removed daily at a minimum.

[3]Permeability addresses both air and water as appropriate. In the case of water or chemical removal methods, the containment materials must be resistant to both chemicals and water. Ground covers should always be impermeable, and of sufficient strength to withstand the impact and weight of the debris and the equipment used for collection and clean-up.

[4]Ground covers and/or free hanging tarpaulins may provide suitable controls over emissions without the need to completely enclose the work area.

[5]Ventilation is not required provided the emissions are controlled as specified in this Section, and provided worker exposures are properly controlled. If unacceptable worker exposures to lead or other toxic metals occurs, incorporate a ventilation system into the containment.

[6]Ground covers must always be impermeable and of sufficient strength to withstand the weight and impact of the debris and the equipment used for cleaning. If debris escape through the seams, then additional sealing of the seams and joints is required. All containment materials and materials used for sealing must be resistant to both chemicals and water. If unacceptable worker exposures to lead or other toxic metals occurs, incorporate a ventilation system.

[7]This method applies to pressure washing, high pressure water jetting with and without abrasive, and wet abrasive blast cleaning. Although both permeable and impermeable containment materials are included, ground covers and the lower portions of the containment must be water impermeable with fully sealed joints, and of sufficient strength and integrity to facilitate the collection and holding of the water and debris for proper disposal. Ventilation is not required provided the emissions are controlled as specified in this Section, and provided worker exposures are properly controlled. If unacceptable worker exposures to lead or other toxic metals occurs, incorporate a ventilation system into the containment.

[8]Ground covers must be of sufficient strength to withstand the impact and weight of the abrasive and the equipment used for cleaning. Ground covers must also extend beyond the containment boundary to capture escaping debris. If vacuum blasting is employed, ground covers and/or free hanging tarpaulins may provide suitable controls over emissions without the need to completely enclose the work area.

# DIVISION 2

# SECTION 02221

# EXCAVATION, BACKFILLING AND FILLING

## PART 1. GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for excavation, backfilling and filling.

B. Definitions

1. As used herein, excavation shall mean the removal of existing pavement, concrete foundations and all materials other than bedrock (ledge rock) encountered within the limits of excavation that are not specified to be removed under the Section entitled "CUTTING, PATCHING AND REMOVAL".

2. As used herein, backfilling shall mean the filling of excavations made for construction purposes and shall extend only to existing grades or design grades, whichever are lower.

3. As used herein, filling shall mean the placement of fill material in conformance with requirements of this Section at or above existing grades.

### 1.02 REFERENCES

American Society for Testing and Materials (ASTM)

| | |
|---|---|
| ASTM D 422 | Standard Test Method for Particle - Size Analysis of Soils |
| ASTM D 1556 | Standard Test Method for Density of Soil in Place by the Sand-Cone Method |
| ASTM D 1557 | Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft$^3$ (2,700 kN-m/m$^3$) |
| ASTM D 2167 | Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method |
| ASTM D 2922 | Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth) |
| ASTM D 3017 | Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth) |
| ASTM D 4318 | Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils |

New Jersey Interagency Engineering Committee (NJIEC)

Standard Soil Aggregate Gradations

## 1.03 JOB CONDITIONS

A. Protect excavations as follows:

1. Prevent water from entering excavated areas and, if it does, remove it immediately to maintain a dry condition at all times.

2. Dispose of water in a manner not to cause injury to the public health or damage to public or private property.

3. If water enters excavated areas and weakens or disturbs underlying soil, remove the weakened or disturbed soil and replace it in conformance with 3.02 A.5.

4. Where shown on the Contract Drawings or where required for protection of adjacent utilities or structures or where required for performance of the Work, secure the sides of excavations against movement as follows:

   a. Install sheet piling or sheeting held in place by waling and bracing members. Top of sheeting shall extend at least six inches above ground.

   b. Do not excavate below the bottom of sheet piling or sheeting except as necessary to install sheeting.

   c. Fill voids behind sheeting immediately with material conforming to I-12 designation defined in 2.01 A.1 or otherwise approved by the Engineer.

   d. Comply with all other provisions of the Specifications that may impose additional or stricter requirements.

5. For excavations extending to a depth of 5 feet or more, and where sheeting is not required to conform with provisions of 1.03 A.4 above, excavate slopes to a safe angle of repose, or protect trench excavations by use of a portable trench shield.

6. Restore all areas impacted by excavation to their original condition, matching pavement types and sections to meet original pavement grades.

B. Do not traverse paved areas with tracked vehicles or equipment such as carry-all scrapers which may damage such pavement unless protected to the satisfaction of the Engineer.

C. Do not place fill or backfill on frozen subgrade.

D. Do not perform rolling or other compaction at any time when the ground water level is above a plane two feet below the surface to be compacted. When the ground water level is above such plane, lower it by approved methods and maintain it below such level prior to and during the compaction operations.

E. Protect from damage trees and other vegetation that are to remain in place.

## 1.04 SUBMITTALS

See Appendix "A" for submittal requirements.

## PART 2. PRODUCTS

### 2.01 MATERIALS

A. Fill

1. Unless otherwise shown on the Contract Drawings, fill shall consist of clean sand and gravel containing no organic matter, conforming to the following NJIEC Standard Soil Aggregate Gradations:

| | Total Percent Passing by Weight NJIEC Designation | | |
|---|---|---|---|
| | I-7 | I-10 | I-12 |
| Sieve Sizes | | | |
| 4 inch | | 100 | 100 |
| 2 inch | | 80-100 | |
| 1 inch | 100 | | |
| 3/4 inch | | 60-100 | 70-100 |
| 1/2 inch | 80-100 | | |
| No. 4 | | 40-100 | |
| No. 8 | 35-100 | | |
| No. 16 | 25-90 | 20-70 | |
| No. 50 | 5-50 | 5-40 | 0-75 |
| No. 100 | 0-8 | 0-30 | |
| No. 200 | 0-2 | 0-20 | 0-5 |

2. The Contract Drawings show the locations in which each designation of fill is required.

B. Backfill

1. Unless otherwise shown on the Contract Drawings, material shall conform to the requirements for I-12 designation, subject to 2.01 B.2 below.

2. Where the entire backfill is above the water table, material conforming to the requirements for I-10 designation may be used in lieu of I-12 designation, except under foundations, aircraft pavement and utilities.

C. Sources

1. When fill and backfill material are provided by the Authority, the location of the stockpile and NJIEC Designation (if applicable) are shown on the Contract Drawings. Samples of material will not be required for testing.

2. Material excavated at the construction site shall be used for fill or backfill to the extent that it conforms with the requirements specified in 2.01 A.1 and 2.01 B.1 as noted on contract drawings. Samples shall be submitted for testing by the Engineer for conformance with the requirements of this Section.

3. If sufficient quantities of material are unavailable from sources described in 2.01 C.1 and 2 above, furnish material from sources off site.

## PART 3. EXECUTION

### 3.01 PREPARATION

A. Clearing and Grubbing

Remove trees, clear and grub areas to be excavated or in which construction is to be performed, as follows:

1. Remove trees, stumps, all roots larger than 2 inches in diameter, and all matted root systems.
2. Remove all topsoil, debris, organic matter and any other objectionable material not suitable for use as backfill or fill or for support of structures or pavements.
3. Backfill all holes and other low spots resulting from clearing and grubbing with material conforming with 2.01 B before proceeding with compaction of fill as specified in 3.03 or with other construction in the area.

### 3.02 EXCAVATION

A. General

1. Excavation shall consist of the removal of materials as defined in 1.01 B.1, and the removed materials shall be segregated as suitable and unsuitable and stockpiled as shown on the Contract Drawings.
2. When excavation of bedrock (ledge rock) is required as shown on the Contract Drawings, the provisions for removal are specified in the Section entitled "ROCK EXCAVATION".
3. Excavate to elevations required for installation of permanent construction in such manner as not to disturb the subgrade below such elevations.
4. Where existing foundations or other existing construction are encountered which may cause hard spots, remove them to a minimum of two feet below subgrade for pavement or structures.
5. Should bottom of excavation be weakened or disturbed or carried below required depth:
   a. Under footings - compact bottom, as specified in 3.03 below and replace over-excavation with concrete of the same Class and Type as that specified for the footing or foundation.
   b. Elsewhere - Compact bottom as approved by the Engineer and refill with material conforming to I-12 designation defined in 2.01 A.1.
6. Perform excavation around and adjacent to existing structures, pipes and conduits which are to remain in place, without damage to or movement of existing construction. Use hand excavation to locate and expose near-surface structures, pipes and conduits. When excavation is to be performed under such structures, pipes and conduits, support them in a manner as approved by the Engineer to ensure uninterrupted operation of the supported items.

B. Dewatering

1. Where excavations are to extend below the water table, prior to placement of any permanent construction or filling or backfilling any excavated area, lower the water table in such an area to two feet below the elevation of the required subgrade and maintain this condition until the construction or pavement is placed thereon.

2. Dewater in a manner to prevent the loss of ground due to the migration of soil fines into the dewatering system.

C. Trenching for Utilities

1. Shape bottom of trench to uniform invert section.

2. When excavating in soft soils which may be subject to lateral movement or bottom heave conform with requirements shown on the Contract Drawings.

D. Disposal of Excavated Material

All debris and all material either unsuitable for or in excess of that required for backfill or fill, shall be disposed of away from the construction site.

E. Restrictions

1. Do not place backfill until the Engineer has inspected and approved the Work and indicated where backfill may be placed.

2. Leave all pipe joints exposed until all tests on such pipe, required by other Sections of the Specifications, have been performed.

3. Remove all temporary structures, sheet piles, sheeting, bracing and forms and all organic materials and debris of every nature, taking care, upon the removal of sheet piling, sheeting and temporary supports, not to cause movement of adjacent ground or structures or create the danger of a slide.

## 3.03 PLACEMENT AND COMPACTION

A. Equipment

1. Steel vibratory rollers shall have provision for regulation of vibration frequency. The Engineer shall be informed of the type and size of equipment to be used before the start of any compaction efforts.

2. Placement and spreading equipment shall be reviewed and approved by the Engineer.

3. Unless otherwise shown on the Contract Drawings, pneumatic-tired rollers shall have minimum weight of 20 tons and a tire pressure of between 60 and 150 psi as directed by the Engineer. For aircraft pavements, the minimum roller weight shall be 50 tons.

4. When mechanical tampers are to be used, the Engineer shall be informed of the type and size for approval before compaction efforts with this equipment can begin.

B. Compaction Requirements

Backfill and fill shall be compacted to achieve a density of 95 percent of the maximum density as determined by Procedure C of ASTM D 1557, except where alternate density requirements are approved by the Engineer or shown on the Contract Drawings.

C. Subgrade, Excavated and Existing Surfaces

Compaction of subgrade, excavated and existing surfaces will consist of a proof-rolling operation performed as follows:

1. Compact surface with a minimum of six passes of an approved vibratory steel roller operated at a speed not to exceed three miles per hour and at the optimum operating frequency recommended by the manufacturer.
2. In areas where surface consists of a fine grained soil, compact with a minimum of six passes of an approved pneumatic-tired roller.
3. Overlap passes of roller a minimum of six inches.
4. In areas where use of a roller is impractical, compact surface while at or near optimum moisture content with mechanical tampers.

D. Backfill and Fill

1. Moisture content of backfill and fill material shall be within a range of plus or minus two percent of optimum, as determined by Procedure C of ASTM D 1557.
2. Backfill, conforming with I-12 gradation, and fill, conforming with I-7 and I-12 gradation, shall be placed in 14-inch, loose layers and compacted with a minimum of six passes of an approved vibratory roller operated at a speed not to exceed three miles per hour.
3. Passes shall be overlapped a minimum of six inches.
4. Backfill and fill, conforming with I-10 gradation, shall be placed in 12-inch, loose layers and compacted with a minimum of six passes of an approved pneumatic-tired roller.
5. In areas where a 14-inch layer over existing material is not adequate to support the construction equipment, increase thickness of first lift as approved by the Engineer.
6. In areas adjacent to structures and utilities as shown on Contract Drawings, compaction equipment shall be restricted and as directed by the Engineer.
7. In areas where use of a roller is impractical, place fill in maximum 8-inch, loose layers and compact with approved mechanical tampers to specified density.
8. Compact backfill as specified in 3.03 D.6 above for fill. In pipe trenches, each layer of backfill shall be not more than eight inches in thickness before compaction. Backfill shall be placed on both sides of the pipe, simultaneously.
9. The surface of filled or backfilled areas, which are to receive pavement or on which a structure is to be placed, shall be within plus or minus 1/2 inch of the elevations shown on the Contract Drawings and shall be free of depressions or projections greater than 1/2 inch when tested with a 16-foot straight edge.
10. The surface of filled areas at other locations shall be within plus or minus one inch of elevations shown on the Contract Drawings unless a closer tolerance is necessary to meet requirements of other Sections of the Specifications or the Contract Drawings.

## 3.04 FIELD TESTS

A. Inspection and Testing

1. The Engineer will perform Quality Assurance testing on delivered field samples of material submitted from each source, for conformance with 2.01. Gradation and maximum density will be determined in accordance with ASTM D 422 and Procedure C of ASTM D 1557, respectively. If deemed appropriate by the Engineer, Atterberg Limits will be determined on fine-grained soils in accordance with ASTM D 4318.

2. If the sample from a source is approved and if the Engineer requests, conduct the Engineer's representative to that source. Additional samples will be selected and tested.

3. The Engineer will notify the Contractor of approval of material source within seven days after receiving samples. Approval of a source of backfill or fill material shall be subject to material continuing to meet the requirements of 2.01.

4. When performing Quality Assurance testing, the Engineer will determine the density of compacted fill or backfill by in-place density tests or from undisturbed samples cut from the compacted fill or backfill as required. Notify the Engineer 24 hours prior to start of filling or backfilling to allow the Engineer time to make provisions for such testing.

5. To evaluate whether material has been compacted to specified density the Engineer will compare results of in-place density tests with results of control tests on material of the same designation using Procedure C of ASTM D 1557.

6. If fill or backfill have not been sufficiently compacted as determined by in-place density tests, the compaction effort shall be continued and moisture content shall be adjusted as necessary until the specified compaction is obtained.

7. The Engineer will check conformance to elevations shown on the Contract Drawings and required tolerance for surface straightness.

8. Provide labor and equipment to take samples as directed and to assist the Engineer in other tests.

B. Testing Requirements for Fill and Backfill

1. Control Tests

   Fill and backfill material field samples will be tested in the laboratory by the Engineer as part of the Quality Assurance program. These control tests consist of determining maximum density and optimum water content by Procedure C of ASTM D 1557, and gradation by ASTM D 422. When deemed appropriate by the Engineer, Atterberg Limits will be determined on fine-grained soils.

2. In-Place Density Tests

Quality Control consisting of in-place density testing, as a minimum, shall be performed by the Contractor to determine densities achieved after compaction efforts. An in-place Quality Control plan shall be submitted to the Engineer for review and approval. This plan should address, as a minimum, items such as in-place test type and frequencies for different materials; equipment type, calibration and maintenance; operator identity and qualifications, etc.

Quality Assurance testing will be performed by the Engineer after compaction operations, at the standard frequencies already established by Port Authority testing bulletins. Test methods may either sand-cone (ASTM D 1556), rubber balloon (ASTM D 2167), or nuclear device (ASTM D 2922), with moisture content for nuclear method determined by ASTM D 3017. Tests will measure the density of the layer immediately below each compacted layer and the density of the uppermost or final layer.

C. Proofrolling in Pavement areas or under footings

1. After excavation has been performed to the elevation of pavement subgrade, proofroll the area shown on the Contract Drawings with two passes of a pneumatic-tired roller in the presence of the Engineer.

2. If, in the sole determination of the Engineer, the proofrolling produces noticeable weaving of the surface, excavation of unsuitable material may be required below pavement subgrade, within the limits and to the depth ordered by the Engineer.

3. In no case will the depth of such removal of unsuitable material exceed three feet below the pavement subgrade.

4. Remove all such unsuitable material and replace it with suitable backfill material in accordance with the requirements of 2.01 B.

5. The Contractor will be reimbursed for any ordered excavation of unsuitable material below the elevation of pavement subgrade or under footings and subsequent backfilling (but not for the proofrolling specified in 3.04 C.1) at the "Net Cost" for such Work. "Net Cost" shall be computed in the same manner as is compensation for Extra Work, including any percentage addition to cost, as set forth in the clause of the Contract providing compensation for Extra Work. Performance of such Net Cost Work shall be subject to all provisions of the Contract relating to performance of Extra Work. Compensation for said Net Cost Work shall not be charged against the total amount of compensation authorized for Extra Work.

**END OF SECTION**

## SECTION 02221

## EXCAVATION, BACKFILLING AND FILLING

## APPENDIX "A"

## SUBMITTALS

A. Submit to the Manager, Materials Engineering Division, Engineering Materials Laboratory, Port Authority Technical Center, 241 Erie Street, Jersey City, N.J. 07310-1397, proposed material suppliers and sources for each designation of fill or backfill to be used under this contract. The submittal document must contain, as minimum information, the Contract location, title and number; designation of intended material use; source and supplier of material being submitted. Sample submittal paperwork must be received by the Manager of Materials at least three weeks prior to delivery of material to site. Do not delivery any material until the Engineer has checked and approved material supplier and source. Delivered material must receive on-site approval as per Section 3.04, Paragraph A, prior to use.

B. The Contractor shall be responsible for Quality Control procedures. Before the actual start of earth work, the Contractor must submit a Quality Control Plan for review and approval by the Engineer.

C. Where sheet piling or sheeting is required as shown on the Contract Drawings, submit detailed Shop Drawings and design calculations of the sheeting and bracing system to the Engineer for review in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS. Submit such drawings and calculations three weeks prior to commencement of such excavation. Shop Drawings and calculations shall be prepared by a Professional Engineer, licensed in the State in which the work will be performed, who has a minimum of five years experience in the design of soil retaining structures. The Shop Drawings shall be sealed and signed by the Professional Engineer.

END OF APPENDIX A

# DIVISION 2

# SECTION 02850

# PLYWOOD SIGN PANELS AND WOOD SIGN POSTS

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for the following:

A. Plywood sign panels for use in the construction of temporary (TYPE 1) and permanent (TYPE 2) guide, warning and regulatory roadway signs. Sign type usage, TYPE 1 or TYPE 2, shall be identified on the Contract Drawings for each required sign.

B. Wood sign posts and footings for both TYPE 1 and TYPE 2 sign panel side-of-road installations.

### 1.02 REFERENCES

The following is a listing of organizations and publications referenced in this Section:

American Association of State Highway and Transportation Officials (AASHTO)

Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals (LTS-2).

Manual for Signing and Pavement Markings of the National System for Interstate and Defense Highways (MUTCD)

| | |
|---|---|
| AASHTO M 168 | Wood Products |

American Society for Testing and Materials (ASTM)

| | |
|---|---|
| ASTM A 153 | Zinc Coating (Hot Dip) on Iron and Steel Hardware |
| ASTM B 209 | Aluminum and Aluminum-Alloy Sheet and Plate |
| ASTM B 211 | Aluminum-Alloy Bar, Rod and Wire |
| ASTM B 221 | Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes |
| ASTM D 245 | Methods for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber |
| ASTM A 307 | Carbon Steel Externally Threaded Standard Fasteners |
| ASTM A 325 | Quenched and Tampered-Steel Bolts and Studs with suitable Nuts and Plain Washers |
| ASTM D 2555 | Methods for Establishing Clear Wood Strength Values |

American Wood Preservers Association (AWPA)

| | |
|---|---|
| AWPA C 1 | Timber Products - Preservative Treatment by Pressure Processes |
| AWPA C 14 | Wood for Highway Construction, Pressure Treatment |

Douglas Fir Plywood Association

Federal Highway Administration (FHWA)

Manual on Uniform Traffic Control Devices for Streets and Highway (MUTCD)

Standard Alphabets for Highway Signs

Standard Lower-case Alphabets for Highways

United States Department of Commerce (USDC)

Product Standard PS-1 Soft Plywood, Construction and Industrial

1.03 DESIGN AND PERFORMANCE REQUIREMENTS

A. Design of signs and sign structure shall provide sufficient strength to withstand a wind loading of 80 miles per hour as per AASHTO LTS-2.

B. Sign supports and framing shall be designed to meet the required wind loading. Posts shall be designed for direct embedment in the soil by excavation and back fill, or by driving with hand or mechanical equipment.

1.04 QUALITY ASSURANCE

Each plywood sheet shall be grade marked and certified in accordance with the standards adopted by the Douglas Fir Plywood Association.

1.05 DELIVERY, STORAGE AND HANDLING

All sign components and materials shall be transported and handled in a manner that shall cause no permanent deformation, injury or damage. Sign components and materials to be stored shall be stored above ground.

1.06 SUBMITTALS

Refer to Appendix "A" for submittal requirements.

## PART 2. PRODUCTS

2.01 MATERIALS

A. Plywood Sign Panels

1. Plywood sign panels shall conform to the requirements set forth in USDC Product Standard PS-1 for Douglas Fir Plywood.

2. The plywood panels for TYPE 1 signs shall be exterior-type plywood, 5-ply and A-C grade or better.

3. The plywood panels for TYPE 2 signs shall be high-density overlay, exterior marine-type plywood, 5 ply and B-B grade or better. Inner plies for TYPE 2 panels shall be B grade veneers or better.

4. The thickness of plywood sign panels and plywood battens shall be not less than 1/2 inch for TYPE 1 panels and not less than 3/4 inch for TYPE 2 signs.

5. The overlay surface for TYPE 2 plywood sign panels shall consist of a cellulose-fibre or sheet, in which not less than 40 percent by weight of the laminate shall be a thermo-setting resin of the phenol or melamine type. The resin-impregnated material shall be not less than 0.009 inches thick and shall weigh at least 60 lbs per 1000 square feet of single face, including both resin and fiber. The resin impregnation shall be sufficient to attach the surfacing material to the plywood. The bond shall be equal in performance to the glue lines between the sheets of veneer that make up the plywood.

6. The face of the cellulose-fibre overlay surface for TYPE 2 panels shall be hard, smooth, and of such quality that further finishing by paint or varnish is not required to fabricate the sign as specified in 2.03 of this Section.

B. Panel Sheeting and Screen Printing

1. Reflectorized Sheeting

   Shall be Scotchlite Brand Engineer Grade Series 2200 (heat activated adhesive) or Series 3200 (pressure sensitive adhesive) as manufactured by the Traffic Control Materials Division of the 3M Co., 223-3N 3M Center, St. Paul, Minnesota 55144, or approved equal.

2. Non-Reflectorized Sheeting

   Shall be Scotchcal Brand film Series 650 (heat activated adhesive) or Series 3600 (pressure sensitive adhesive) as manufactured by the Traffic Control Materials Division of the 3M Co., or approved equal.

3. Screen Printing Inks, Thinners and Toners

   a. Scotchlite Brand Process Colors Series 700 for use on Reflectorized Sheeting.

   b. Scotchcal Brand Process Colors Series 3900 and 4100 for use on Non-Reflectorized Sheeting.

   c. Approved equals for use on approved reflective and non-reflective sheetings.

4. Panel sheeting (reflective or non-reflective) and screen printing usage shall be shown on the Contract Drawing.

C. Wood Sign Posts

1. Wood sign posts shall be dry, No. 1 grade, S4S, Douglas Fir, Southern or Ponderosa Pine, Hemlock, Spruce or Western Larch conforming to the applicable requirements of AASHTO M 168. The posts shall be straight and true, free of splits, knots and warps or, of steel or aluminum components.

2. All the posts shall be pressure-treated with CCA in accordance with the applicable requirements of AWPA C1 and AWPA C 14.

3. Posts shall be surfaced four sides, have a uniform cross-section, and shall be sized not less than 4 inches by 4 inches. The post shall be graded for the following stress grades in accordance with the grading rules developed from ASTM D 245 for the selected stress grades. Using the clean wood properties of ASTM D 2555, the bending stress of the post in a TYPE 1 panel installation shall be not less than 1200 psi, and not less than 4000 psi for a TYPE 2 panel installation.

D. Stiffeners, Brackets and Miscellaneous Hardware

1. Horizontal and vertical sign panel stiffeners (Z bars) and panel brackets shall be fabricated of aluminum alloy 6061-T6 conforming to ASTM B 221.

2. Other miscellaneous aluminum hardware including bolts, nuts, washers, screws, rivets, pull-type lockbolts and serrated or knob stem blind rivets shall be fabricated to meet the requirements of ASTM B 209 and ASTM B 211 for Alloy 2024-T4. Component designated as Alloy 2024-T4 shall be given a chromated sealed anodic coating.

3. High strength steel bolts, nuts and washers shall conform to ASTM A 325. High-strength bolts, nuts and washers shall be galvanized in accordance with ASTM A 153.

E. Footings

1. Soil bearing plates shall be attached at the bottom of the post as required in 1.03 of this Section, or as shown on the Contract Drawings.

2. Breakaway post, if required, shall be as shown on the Contract Drawings. Breakaway post and footings shall be designed in accordance with the requirements of 1.03 of this Section.

3. Concrete footings, if required by 1.03 of this Section, shall be Class "B" concrete conforming to the Section entitled "Concrete."

4. Portable sign supports shall be as described in "Maintenance of Traffic and Work Area Protection" of Division 1 - GENERAL PROVISIONS.

## 2.02 CONSTRUCTION FEATURES

A. Sign face text, symbol, and border layouts shall be in accordance with "Maintenance of Traffic and Work Area Protection", of Division 1 - GENERAL PROVISIONS, or the Contract Drawings conforming to the requirements of:

1. The AASHTO Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways.

2. The FHWA MUTCD.

3. The FHWA Standard Alphabets for Highway Signs.

4. The FHWA Standard Lower-case Alphabets for Highways.

B. Sign characters shall be as shown on the Contract Drawings and shall include letters, numerals, symbols and borders.

C. Sign corner and border radii shall be approximately one-eighth of the height of the sign but shall not exceed 12 inches. Sign borders shall be of the same type character as the legend and shall be approximately the same width as the stroke width of the major lettering or the sign.

## 2.03 FABRICATION

A. Holes shall be drilled; cut edges shall be smooth and true, and free from burrs or ragged breaks. All fabrication except for cutting the lower ends of embedded posts shall be done in the shop. The plywood panels shall be clean, dry, and free from oils, dust, grit, or any other contaminants that would adversely affect the adhesion of the Reflectorized and Non-Reflectorized sheeting.

B. In preparing TYPE 1 panels for Reflectorized and Non-Reflectorized Sheeting, the entire Grade A surface to be covered shall be wiped down with a tack cloth to remove all saw dust and sanding residue.

C. In preparing TYPE 2 panels for Reflectorized and Non-Reflectorized Sheeting, the entire portion of the overlay surface to be covered, shall first be given a light, firm abrasion with steel wool (medium to fine grade) saturated with xydol, V.M.&P. Naphtha or similar commercial solvent. The surface shall then be wiped clean and dry. An alternate method of panel pre-treatment that consists of a solvent wipe, immediately followed by vapor degreasing (tri-chloroethylene) for a minimum period of 6 minutes may be used.

D. All panel and batten surfaces to be glued shall be slightly roughened and then glued with waterproof adhesive prior to assembly.

E. After panel preparation, the edges and back or rear surface of all TYPE 2 panels and battens shall be painted with two coats of approved white exterior paint.

# PART 3. EXECUTION

## 3.01 INSTALLATION

A. The Contractor shall erect and remove signs as shown on the Contract Drawings, or as ordered by the Engineer, and in such a manner that the traveling public is informed and protected at all times.

B. Side-of-road ground mounted signs shall normally be erected so that the sign face is truly vertical to the profile line and the intersection angle measured between the sign face and the centerline of the travel lane, which the sign serves shall be 93 degrees. Where lanes divide or on curves, sign faces shall be oriented so as to be most effective both day and night, and to avoid the possibility of specular reflection.

C. The wood sign posts for side-of-road mounting shall be embedded in the soil to the depth required by the design specified in 1.03 of this Section. The hole for the embedment shall be excavated using a manual post-hole digger or appropriate size power driven auger. After the hole has been excavated, the post shall be aligned to the sign face direction, held vertical in the hole and suitable excavated material shall be tamped in the annular space. Holes resulting from sign post removals shall be filled by the Contractor to restore the area to its original state as directed by the Engineer.

D. All signs shall be securely fastened to their supports with bolts, nuts and washers of aluminum (2024-T4 alloy) or hot-dip galvanized steel conforming to 2.01 D of this Section, as required by the design specified in 1.03 of this Section.

E. Plywood battens and aluminum panel stiffeners shall be utilized as required by 1.03 of this Section and shall conforming to the applicable requirement of 2.01 of this Section.

F. Horizontal and vertical sign clearances shall be as shown on the Contract Drawings.

G. Other non-wood post mounting of plywood signs, such as overhead sign installations shall be as shown in the Contract Drawings.

H. Concrete footings, if required by 1.03 of this Section, shall be placed in accordance with the requirements of the Section of these Specifications entitled "Concrete," and shall not extend more than 4 inches above grade.

## 3.02 FIELD INSPECTION

A. Immediately prior to erection, all material shall be inspected by the Engineer for damage.

B. The Engineer will inspect each completely erected sign for proper location, line and grade of signs, vertical post alignment, condition, appearance, reflectorization and visibility.

C. As the Work progresses, the location, position and condition of all signs shall be monitored by the Contractor in accordance with "Maintenance of Traffic and Work Area Protection" of Division 1 - GENERAL PROVISIONS.

END OF SECTION

## SECTION 02850

## PLYWOOD SIGN PANELS AND WOOD SIGN POSTS

## APPENDIX "A"

## SUBMITTALS

A. Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts and Samples" of Division 1 – GENERAL PROVISIONS:

1. Detailed sign face layout for all TYPE 2 sign panels showing letter height, width, brush stroke, spacing between letters, words, symbols and lines, border width, symbols details, and overall dimensions of the sign panels. Detailed sign face layouts are not required for TYPE 1 sign panels.
2. Shop drawings of sign panel and posts showing the sizes of the members and their connection details. The shop drawings shall also show the total length of the posts for each sign and give an elevation view of each of the completely erected signs with vertical clearance below the lowest sign panel to adjacent roadway, and other relevant dimensions.
3. Catalog cuts of all the materials to be used for sign faces.

B. Prior to fabrication, submit computations for the design of the sign panels and supports, as required in 1.03 of this Section, signed by a Professional Engineer licensed to practice in the State where the Work is to be performed.

END OF APPENDIX "A"

# DIVISION 2

# SECTION 02851

# ALUMINUM SIGN PANELS

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for the following:

A. Aluminum sign panels for use in the construction of directional, guide, warning and regulatory roadway signs.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

American Association of State Highway and Transportation Officials (AASHTO)

Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals (LTS-2)

Manual for Signing and Pavement Markings of the National System for Interstate and Defense Highways

American Society for Testing and Materials (ASTM)

| | |
|---|---|
| ASTM A 153 | Zinc Coating (Hot-Dip) on Iron and Steel Hardware |
| ASTM A 193 | Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service |
| ASTM A 194 | Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service |
| ASTM A 325 | High-Strength Bolts for Structural Steel Joints |
| ASTM A 325 | High-Strength Bolts for Structural Steel Joints |
| ASTM B 209 | Aluminum and Aluminum-Alloy Sheet and Plate |
| ASTM B 211 | Aluminum-Alloy Bar, Rod and Wire |
| ASTM B 221 | Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes |

American Welding Society (AWS)

| | |
|---|---|
| AWS D 1.2 | Structural Welding Code - Aluminum |

Federal Highway Administration (FHWA)

Manual on Uniform Traffic Control Devices for Streets and Highway (MUTCD)

Standard Alphabets for Highway Signs

Standard Lower-case Alphabets for Highways

Standard Traffic Signs

1.03 DESIGN AND PERFORMANCE REQUIREMENTS

A. Design of signs, supports and framing shall provide sufficient strength to withstand a wind loading of 80 miles per hour as per AASHTO LTS-2.

1.04 DELIVERY, STORAGE, AND HANDLING

All sign components and materials shall be transported and handled in a manner that shall cause no permanent deformation, injury or damage. Sign components and materials to be stored shall be stored above ground.

1.05 SUBMITTALS

Refer to Appendix "A" for submittal requirements.

## PART 2. PRODUCTS

2.01 MATERIALS

A. Aluminum Sign Panels

1. Aluminum sheets and plates shall comform to ASTM B 209, alloy 6061-T6.
2. Fabricate panels from standard sheet widths. The thickness for panel sizes of 30 inches by 30 inches or smaller shall be 0.080 inch and the thickness of larger panels shall be 0.125 inch unless otherwise shown on the Contract Drawings.
3. The panel blanks shall be free from laminations, blisters, open seams, pits, holes, or defects that may affect their strength, appearance or use. The thickness shall be uniform and the blanks shall be commercially flat.

B. Panel Sheeting and Screen Printing

1. Reflectorized Sheeting

   Scotchlite Brand High Intensity Grade Series 2800 (heat activated adhesive) or Series 3800 (pressure sensitive adhesive) as manufactured by the Traffic Control Materials Division of the 3M Co., 223-3N 3M Center, St. Paul, Minnesota 55144, or approved equal, and shall meet or exceed the reflecting requirements associated with High Intensity Grade, sheetings.

2. Non-Reflectorized Sheeting

   Scotchcal Brand film Series 650 (heat activated adhesive) or Series 3600 (pressure sensitive adhesive) as manufactured by the Traffic Control Materials Division of the 3M Co., or approved equal.

3. Screen Printing Inks, Thinners and Toners

   a. Scotchlite Brand Process Colors Series 700 for use on Reflectorized Sheeting, or approved equal

   b. Scotchcal Brand Process Colors Series 3900 and 4100 for use on Non-Reflectorized Sheeting, or approved equal

4. Panel sheeting (reflective or non-reflective) and screen printing usage shall be as shown on the Contract Drawings.

C. Stiffeners, Brackets and Miscellaneous Hardware

1. Horizontal and vertical sign panel stiffeners (Z bars) and panel brackets shall be fabricated of aluminum alloy 6061-T6 conforming to ASTM B 221.

2. Other miscellaneous aluminum hardware including bolts, nuts, washers, screws, rivets, pull-type lockbolts and serrated or knob stem blind rivets shall be fabricated to meet the requirements of ASTM B 209 and B 211 for Alloy 2024-T4. Component designated as Alloy 2024-T4 shall be given a chromated sealed anodic coating.

3. High strength steel bolts, nuts and washers shall conform to ASTM A 325. High-strength bolts, nuts and washers shall be galvanized in accordance with ASTM A 153.

4. Stainless steel nuts shall conform to ASTM A 194, Grade 8F, except that the nuts shall be lock nuts with semifinished hex nuts equivalent to American Standard Heavy Series. Stainless steel bolts, washers, and screws shall conform to ASTM A 193, austenitic steel.

## 2.02 CONSTRUCTION FEATURES

A. Sign face text, symbol, and border layouts shall be in accordance with the Contract Drawings and conform to the following requirements of:

1. The AASHTO Manual for Signing and Pavement Marking of the National System for Interstate and Defense Highways.

2. The FHWA Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD).

3. The FHWA Standard Alphabets for Highway Signs.

4. The FHWA Standard Lower-case Alphabets for Highways.

B. Sign characters shall be as shown on the Contract Drawings.

C. Sign corner and border radii shall be approximately one-eighth (1/8) of the height of the sign but shall not exceed 12 inches; or as shown in the FHWA Standard Traffic Sign. Sign borders shall be of the same type character as the legend and shall be approximately the same width as the stroke width of the major lettering or the sign, or as shown in the FWHA Standard Traffic Sign.

## 2.03 FABRICATION

A. All shearing, cutting and punching shall be performed prior to preparing the blanks for application of reflective material. All edges and corners shall be filed or ground smooth, leaving the entire sign blank free from sharp edges and burrs.

B. The blanks shall be cleaned, degreased, and chromated or otherwise properly prepared in accordance with the sheeting manufacturer's recommendations. After treatment, clean cotton gloves shall be used in handling the sign blank until the reflective sheeting is applied. All fabrication except for cutting the lower ends of embedded posts shall be done in the shop. The aluminum panels shall be clean, dry, and free from oils, dust, grit, or any other contaminants that would adversely affect the adhesion of the Reflectorized and Non-Reflectorized sheeting.

C. Welding of aluminum shall consist of inert gas shielded metal arc welding with consumable electrodes. All welding of aluminum shall be performed in the shop. No field welding or aluminum shall be permitted. All welders shall be qualified in accordance with the qualification procedures of AWS D 1.2.

D. Necessary drilling of holes required for shop and field assembly after sheeting is applied shall be done such that the drill bit does not snag, rip, or damage the sheeting outside of the drill hole. Holes shall be deburred prior to assembly.

E. Exposed bolt heads on the face of the assembly sign shall be touched up with enamel paint of the same color as the sheeting surrounding the bolts.

## PART 3. EXECUTION

### 3.01 INSTALLATION

A. Erect, cover, and remove signs as shown on the Contract Drawings.

B. Side-of-road ground mounted signs shall be erected so that the sign face is truly vertical to the profile line and the intersection angle measured between the sign face and the centerline of the travel lane, which the sign serves shall be 93 degrees. Where lanes divide or curve, sign faces shall be oriented so as to be most effective both day and night, and to avoid the possibility of specular reflection.

C. All sign panels shall be securely fastened to their supports with bolts, nuts and washers of aluminum (2024-T4 alloy), hot-dip galvanized steel, or stainless steel conforming to 2.01 D, and 1.03 of this Section.

D. Horizontal and vertical sign clearances shall be as shown on the Contract Drawings.

### 3.02 FIELD INSPECTION

A. Immediately prior to erection, all material will be inspected by the Engineer for damage that is attributable to improper transportation, handling or storage procedures.

B. An inspection of each completely erected sign shall be made in the daylight for proper location, line and grade of signs, vertical post alignment, condition, appearance and visibility. The completely erected signs may also be inspected at night by the Engineer.

C. As the Work progresses, the location, position and condition of all signs shall be monitored by the Contractor in accordance with the requirements of "Maintenance of Traffic and Work Area Protection" of Division 1 - GENERAL PROVISIONS.

D. Any deviation from the above-indicated procedure shall be approved by the Engineer.

END OF SECTION

## SECTION 02851

## ALUMINUM SIGN PANELS

## APPENDIX "A"

## SUBMITTALS

A. Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts and Samples" of Division 1 – GENERAL PROVISIONS:

1. Detailed sign face layout for all sign panels showing letter height, width, brush stroke, spacing between letters, words, symbols and lines, border width, symbols details, and overall dimensions of the sign panels.
2. Shop drawings of sign panels showing the sizes of the members and their connection details including joining and anchorage, stiffening, and bracing.
3. Catalog cuts of all the materials to be used for sign faces.

B. Prior to fabrication, submit computations for the design of the sign panels and supports, as required in 1.03 of this Section, signed by a Professional Engineer licensed to practice in the State where the Work is to be performed.

END OF APPENDIX "A"

# DIVISION 3

# SECTION 03100

# CONCRETE FORMWORK

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for cast-in-place concrete formwork.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

| | |
|---|---|
| | American Concrete Institute (ACI) |
| ACI 347 | Guide to Formwork for Concrete |
| ACI 117 | Standard Specifications for Tolerances for Concrete Construction and Materials |
| ACI 318 | Building Code Requirements for Reinforced Concrete |
| | American Society for Testing and Materials (ASTM) |
| ASTM D 1751 | Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-Extruding and Resilient Bituminous Types) |
| | National Forest Products Association (NFPA) |
| | National Design Specifications for Wood Construction |
| | West Coast Lumber Inspection Bureau |
| | American Plywood Association (APA) |
| | Douglas Fir Plywood Association (DFPA) |

### 1.03 DESIGN AND PERFORMANCE REQUIREMENTS

A. Design calculations shall be prepared by a Professional Engineer licensed in the State where the Work is to be performed. Design calculations shall be made available to the Engineer to facilitate inspection.

B. For wood products furnished for the Work of this Section, the Contractor shall comply with the applicable provisions of "National Design Specifications for Wood Construction" of the National Forest Products Association (NFPA).

C. For all other products furnished for the Work of this section, the contractor shall comply with the reference standards of the local building code.

D. Shop Drawings

1. All formwork and shoring shop drawings shall be signed and sealed by a Professional Engineer licensed in the State where the Work is to be performed. Shop drawings shall be made available to the Engineer to facilitate inspection.

2. Shop drawings shall indicate:

a. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports;

b. Means of leakage prevention for concrete exposed to view in the finished construction;

c. Sequence and timing of erection and stripping, assumed compressive strength at time of stripping, height of lift and height of drop during placement;

d. Vertical, horizontal and special loads in accordance with "Loads" of ACI 347 (Section 2.2) and camber diagrams, if applicable;

e. Notes to formwork erector showing size and location of conduits and pipes embedded in concrete according to ACI 318 (Section 6.3).

1.04 SUBMITTALS

For Submittals - see Appendix "A".

## PART 2. PRODUCTS

2.01 MATERIALS

A. Earth Forms

Use only for footings where shown on the Contract Drawings.

B. Lumber Forms

Use for edge forms and unexposed finish concrete. Boards shall be 6 inches or 8 inches in width, shiplapped or tongue and groove, "Standard" Grade Douglas Fir, conforming to the "Standard Grading and Dressing Rules No. 17", of the West Coast Lumber Inspection Bureau. Boards shall be four sides surfaced.

C. Plywood Forms

Use for exposed finish concrete. Forms shall conform to U.S. Product Standard PA 1-66. Each panel shall carry the grade trademark of the American Plywood Association along with the Douglas Fir Plywood Association (DFPA) Quality stamp and shall be full size (4-foot x 8-foot) panels.

1. Plywood for surfaces to receive membrane waterproofing shall be a minimum of 5/8 inch thick and shall be "B-B Plyform Class 1 Exterior" grade.

2. Plywood where "Smooth Finish" is required, as shown on the Contract Drawings, shall be "HD Overlay Plyform Class 1 Exterior" grade, a minimum of 3/4 inch thick.

D. Prefabricated Forms

Prefabricated forms shall be as listed below and where shown on the Contract Drawings:

1. Pan Type Void Forms

   Removable steel or reinforced plastic of sizes and profiles required to produce completed Work shown.

2. Tubular Column Type

   Metal, fiberglass-reinforced plastic, or spirally wound laminated fiber materials; inside surface treated with release agent; of sizes required to produce completed Work shown.

E. Steel Forms

Sheet steel, suitably reinforced and designed for the particular use shown on the Contract Drawings.

F. Form Liners

Smooth, durable, grainless and non-staining hardboard, unless otherwise shown on the Contract Drawings.

G. Framing, Studding, and Bracing

Stud or No. 3 Structural Light Framing grade.

H. Form Ties and Spreaders

Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. No wire ties, wood spreaders or through bolts will be permitted.

I. Form Anchors and Hangers

Anchors and hangers used for exposed concrete shall not leave exposed metal at surface. Hangers supporting forms from structural steel shall be symmetrically arranged on supporting members to minimize twisting or rotation of member. Penetration of structural steel members will not be permitted.

J. Form Coating Agent

Provide one of the following unless otherwise shown on the Contract Drawings:

1. "Arcal-80"; Arcal Chemical Corporation
2. "Synthex"; Industrial Synthetics Company
3. "Nox-Crete Form Coating"; Nox-Crete Company

K. Vapor Retarder

Where shown on the Contract Drawings, 8 mil thick poly-ethylene sheet

L. Bituminous Joint Filler: ASTM D 1751

## PART 3. EXECUTION

### 3.01 PREPARATION

A. Earth Forms

Trench earth forms neatly and accurately and at least 2 inches wider than footing widths shown on the Contract Drawings, unless otherwise indicated. Construct wood edge strips at top of each side of trench to secure reinforcing and prevent trench from sloughing. Form sides of footings where earth sloughs. Earth forms shall be tamped firm and cleaned of all debris and loose material before depositing concrete.

B. Formwork – General

Sloped surfaces steeper than 1.5 horizontal to 1 vertical should be provided with a top form to hold the shape of the concrete during placement, unless it can be demonstrated to the engineer that top forms can be omitted. Construct forms to the correct shape and dimensions, mortar tight, of sufficient strength, and so braced and tied together that the movement of men, equipment, materials or the placing and vibrating of the concrete shall not throw them out of line or position. Forms shall be strong enough to maintain their shape under all imposed loads. Camber where necessary to assure level finished soffits unless otherwise shown on the Contract Drawings. Carefully verify the horizontal and vertical positions of forms and correct all inaccuracies to the satisfaction of the Engineer before placing concrete in any form. Complete all wedging and bracing before placing concrete.

C. Forms for "Smooth Finish" Concrete

Use steel, plywood or lined board forms. Plywood and form liners shall be clean, smooth, uniform in size and free from damaged edges and holes. Form lining shall have close-fitting square joints between separate sheets and shall not be sprung into place. Sheets of form liners and plywood shall be full size wherever possible and joints shall be taped to prevent protrusions in concrete. Use special care in forming and stripping wood forms to protect corners and edges. All horizontal joints shall be level and continuous. Wood forms shall be kept wet at all times until stripping.

D. Forms for Surfaces to Receive Membrane Waterproofing

Use plywood or steel forms. After erection of forms, tape form joints to prevent protrusions in concrete.

E. Framing, Studding and Bracing

Space studs at 16 inches on center maximum for boards and 12 inches on center maximum for plywood. Framing, bracing, centering and supporting members shall be of ample size and strength to carry safely, without deflection, all dead and live loads to which forms may be subjected, and shall be spaced sufficiently close to prevent any bulging or sagging of forms. Soffits of all beam forms shall be constructed of material a minimum of two inches thick. Concrete out of line, level or plumb will be cause for rejection by the Engineer of the whole Work affected. Distribute bracing loads over base area on which bracing is erected. When placed on ground, protect against undermining, settlement or accidental impact.

## 3.02 INSTALLATION

A. Tolerances

Formwork shall be constructed so that concrete surfaces shall be within construction tolerances specified in "Standard Specifications for Tolerance for Concrete Construction and Materials" of ACI 117. Tolerances not met will be corrected to the satisfaction of the Engineer at no cost to the Authority.

B. Chamfered Corners

As shown on the Contract Drawings, provide moldings in forms for all chamfering required. Moldings shall be 45-degree right triangles in profile, of size required, milled from wood free from visible defects.

C. Forms Ties

Form ties shall be of sufficient strength and used in sufficient quantities to prevent spreading of the forms. Place ties at least one inch away from the finished surface of the concrete. Leave inner rods in concrete when forms are stripped. Space all form ties to be equidistant, and symmetrical and lined up both vertically and horizontally unless otherwise shown on the Contract Drawings.

D. Cleanouts and Access Panels

Provide removable cleanout sections or access panels at the bottoms of all forms to permit inspection and effective cleaning of loose dirt, debris, and waste material. Clean all forms and surfaces against which concrete is to be placed of all chips, sawdust, and other debris and thoroughly blow out with compressed air just before concrete is placed.

E. Arrangement

Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

F. Construction Joints

Provide a surfaced pouring strip where construction joints intersect exposed surfaces to provide a straight line at joints. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage. Construction joints shall show no overlapping of concrete and shall, as closely as possible, present the same appearance as butted plywood joints. Joints in a continuous line shall be straight, true, and sharp.

G. Embedded Items

Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, waterstops and other features. No wood or uncoated aluminum shall be embedded in concrete. Obtain any required information pertaining to embedded items to be furnished for the Work specified in other Sections. Securely anchor all embedded items in correct location and alignment prior to placing concrete. Conduits and pipes, including those made of coated aluminum, must meet the requirements of ACI 318 (Section 6.3). Approved coatings for aluminum shall be as follows unless otherwise shown on the Contract Drawings:

1. Conlux

   Primer - Bond Plex 46 or 66 (water borne urethane)
   Topcoat - Epolon Multi-Mil 39 (epoxy polyamide)

2. Sherwin Williams

   Topcoat - Heavy Duty Epoxy B67/B60B3 (epoxy polyamide)
   Note: self-priming

3. Benjamin Moore

   Primer - Epoxy Rust Inhibitive Primer (epoxy polyamide)
   Topcoat - Epoxy Enamel (epoxy polyamide)

H. Openings for Items Passing Through Concrete

Frame openings in concrete where shown on the Contract Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of Work specified under other Sections. Coordinate all Work of this nature in order that there shall be no unnecessary cutting and patching of concrete. Perform any cutting and repairing of concrete required as a result of failure to provide for such openings at no cost to the Authority.

I. Screeds

Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs. Slope slabs to drain where required or as shown on the Contract Drawings. Before depositing concrete, remove all debris from the space to be occupied by the concrete and thoroughly wet all forms. Remove freestanding water.

J. Screed Supports

For concrete over waterproof membranes and vapor barrier membranes, use screed supports of a cradle, pad or base type which shall not puncture the membrane. Staking through the membrane will not be permitted.

K. Shores and Falsework

Provide shores and falsework of adequate strength to protect persons and adjacent structures. Falsework and supports shall be adequate in size and strength to resist the loads imposed upon them without deformation, deflection, or settlement. All members must be straight and true without twists or bends. Use wedges in pairs or jacks where required to bring forms, shoring, or falsework for beams, girders, slabs, and other parts of the structure to the necessary elevations and uniform bearing before placing concrete. Do not use single wedges. Vertical and lateral loads shall be carried to ground by the formwork system or by bracing. Where shores rest on ground, provide adequate mud sills or other bases. Construct forms to permit their removal without disturbing the original shoring. Ensure that there is no movement of shores, braces or other supports during placement of concrete.

L. Reuse and Coating of Forms

Thoroughly clean forms and reapply form coating before each reuse. For exposed Work, do not reuse any form which cannot be reconditioned to "like new" condition. Discard forms considered unsatisfactory by the Engineer. Apply form coating to all forms in accordance with the manufacturer's specifications, except where "Scored Finish" is required as shown on the Contract Drawings. Do not coat forms for concrete that is to receive a "Scored Finish". Apply form coatings before placing reinforcing steel.

M. Inspection

Notify the Engineer after placement of reinforcing steel in the forms, but prior to placing any concrete, so that his inspection may be made.

## 3.03 REMOVAL OF FORMS AND SHORES

A. The forms and supporting shoring shall not be removed until the members have acquired sufficient strength to support their weight and the loads superimposed thereon safely and until the time and sequence of removal have been approved by the Engineer. Formwork shall be removed without damage to the concrete, in a sequence that does not allow the members to be subject to impact or loading eccentricities. Any repair required as a result of damage to the concrete shall be made to the satisfaction of the Engineer at no cost to the Authority.

B. Except when otherwise approved by the Engineer, or when minimum attained concrete strengths are specified on the Contract Drawings, forms shall be left in place for not less than the total number of days as specified in ACI 347.

END OF SECTION

## SECTION 03100

## CONCRETE FORMWORK

## SUBMITTALS

## APPENDIX "A"

The following items shall be submitted to the Engineer for approval, except as otherwise noted.

A. Shop Drawings

1. As per Division 1, "Shop Drawings, Catalog Cuts and Samples";
2. Formwork and shoring shop drawings for areas accessible to the public and/or concrete exposed to view in the finished construction shall be submitted to the Engineer (as indicated in Section 1.03 D) at least 21 days prior to ordering any material or constructing any formwork;
3. Provide a layout of all embedded items, including electrical and telephone conduit and plumbing and drainage pipes, at least 15 days prior to concrete placement.

B. Catalog Cuts, Material Certification and Test Results

1. As per Division 1, "Shop Drawings, Catalog Cuts and Samples";
2. Material certifications, brand names and test results (where required) for all formwork materials. Submit at least 35 days prior to concrete placement.

C. Samples

1. As per Division 1, "Shop Drawings, Catalog Cuts and Samples";
2. Form ties and spreaders with manufacturer's specifications, submit at least 21 days prior to ordering any material;
3. Tapes for form joints with manufacturer's literature;
4. Form liners with manufacturer's specifications, submit at least 21 days prior to ordering any material;
5. Form coating agent with manufacturer's literature.

D. Design Computations

Design computations for areas accessible to the public and/or concrete exposed to view in the finished construction shall be submitted to the Engineer (as indicated in Section 1.03 A) at least 21 days prior to ordering any material or constructing any formwork.

END OF APPENDIX "A"

# DIVISION 3

# SECTION 03200

# CONCRETE REINFORCEMENT

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for furnishing and installing concrete reinforcement.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

| | |
|---|---|
| | American Association of State Highway and Transportation Officials (AASHTO) |
| AASHTO M32 | Steel Wire, Plain, for Concrete Reinforcement |
| AASHTO M55 | Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement |
| AASHTO M221 | Welded Deformed Steel Wire Fabric for Concrete Reinforcement |
| AASHTO M31 | Deformed and Plain Billet-Steel Bars for Concrete Reinforcement |
| AASHTO M284 | Epoxy-Coated Reinforcing Steel Bars |
| | American Concrete Institute (ACI) |
| ACI 315 | Details and Detailing of Concrete Reinforcement |
| ACI 318 | Building Code Requirements for Reinforced Concrete |
| | American Society for Testing and Materials (ASTM) |
| ASTM A 82 | Steel Wire, Plain, for Concrete Reinforcement |
| ASTM A 184 | Fabricated Deformed Steel Bar Mats for Concrete Reinforcement |
| ASTM A 185 | Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement |
| ASTM A 497 | Welded Deformed Steel Wire Fabric for Concrete Reinforcement |
| ASTM A 615 | Deformed and Plain Billet-Steel Bars for Concrete Reinforcement |
| ASTM A 767 | Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement |
| ASTM A 775 | Epoxy-Coated Reinforcing Steel Bars |
| | American Welding Society (AWS) |
| AWS D 1.4 | Structural Welding Code - Reinforcing Steel |
| | Concrete Reinforcing Steel Institute (CRSI) |
| | Manual of Standard Practice Placing Reinforcing Bars |

1.03 BRIDGE WORK

For Work of this Section involving bridges, the Contractor shall comply with the applicable provisions of "Standard Specifications for Highway Bridges" of the American Association of State Highway and Transportation Officials (AASHTO). Materials shall be in accordance with AASHTO designations where shown after the ASTM designation in parenthesis. Where not shown, comply with ASTM Designation.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver concrete reinforcement in bundles marked with metal tags indicating size, length and mark number.

B. Store and handle materials to prevent corrosion, damage to coating or contamination that could impair bond.

1.05 SUBMITTALS

For submittals see Appendix "A".

## PART 2. PRODUCTS

2.01 MATERIALS

A. Reinforcing Bars: ASTM A 615 (AASHTO M31), deformed, Grade 60, unless otherwise shown on the Contract Drawings.

Coated bars where shown on the Contract Drawings shall comply with the following:

1. Galvanized Reinforcing Bars

   ASTM A 767, Class-I hot-dip galvanized, after fabrication and bending.

   Repair sheared and cut ends and damaged coating with a zinc-rich formulation conforming to ASTM A 767 in accordance with the material manufacturers' recommendations.

2. Epoxy-coated Reinforcing Bars: ASTM A 775 (AASHTO M284)

   Repair sheared and cut ends and damaged coating with an epoxy patching material conforming to ASTM A 775 (AASHTO M284) in accordance with the patching material manufacturers recommendations.

B. Welded Wire Fabric

Types shall be as shown on the Contract Drawings and shall comply with the following:

1. Plain, ASTM A 185 (AASHTO M55), flat sheets for size W5 and larger and coiled rolls for sizes below W5.

2. Deformed, ASTM A 497 (AASHTO M221), flat sheets for sizes D5 and larger and coiled rolls for sizes below D5.

C. Fabricated Steel Bar Mats

Fabricated steel bar mats shall be in accordance with ASTM A 184, when shown on the Contract Drawings, and as follows:

1. Bar grade, size and spacing as shown on the Contract Drawings.
2. Welded connections, unless otherwise shown on the Contract Drawings.

D. Steel Wire

Steel wire shall comply with ASTM A 82 (AASHTO M32), plain finish, unless otherwise shown on the Contract Drawings.

## 2.02 ACCESSORIES

A. Tie Wire

Provide minimum 16-gage, annealed type. Provide nylon, plastic or epoxy-coated wire for use with epoxy-coated and galvanized reinforcing bars, if any.

B. Supports for Reinforcement

Provide bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use galvanized steel wire bar type supports complying with CRSI standards and as follows:

1. For supporting epoxy-coated reinforcing bars, use plastic coated supports, or supports fabricated from or coated with a dielectric material.
2. For slabs-on-grade, use supports with horizontal plate runners.
3. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, use supports with plastic capped legs (CRSI, Class 1).
4. Where architectural concrete is shown on the Contract Drawings, use plastic side form spacers.

## 2.03 FABRICATION

A. Fabricate concrete reinforcement as shown on the Contract Drawings and on approved shop drawings, in accordance with ACI 315 "Tolerances".

B. Bend all concrete reinforcement cold. Heating of bars or wire fabric is prohibited.

C. Where welding of concrete reinforcement is shown on the Contract Drawings, weld in accordance with AWS Dl.4.

## PART 3. EXECUTION

### 3.01 INSTALLATION

A. Place concrete reinforcement as shown on the Contract Drawings and on approved shop drawings. Where not shown on the Contract Drawings, comply with CRSI "Placing Reinforcing Bars".

B. Clean concrete reinforcement of loose rust, mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

C. Accurately position, support and secure concrete reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support concrete reinforcement by chairs, runners, bolsters, spacers, and hangers in accordance with CRSI Manual of Standard Practice". Do not interfere with placement of embedded items.

D. When a vapor barrier is shown on the Contract Drawings, do not cut or puncture during concrete reinforcement placement.

E. Place concrete reinforcement to obtain covers shown on the Contract Drawings for concrete protection, or in accordance with ACI 318 "Concrete Protection for Reinforcement", if not shown on the Contract Drawings. Arrange, space and securely tie bars and bar supports to hold concrete reinforcement in position during concrete placement operations. Set ties so ends are directed into concrete, not toward exposed concrete surfaces.

F. Install welded wire fabric in lengths as long as practical. Lap adjoining pieces at least one full mesh and lace splices with wire, but in no case shall lap be less than requirements of ACI 318 "Splices of Welded Deformed Wire Fabric in Tension" or "Splices of Welded Plain Wire Fabric in Tension". Offset end laps in adjacent widths to prevent continuous laps in either direction.

G. After concrete placement, do not field bend partially embedded concrete reinforcement except as shown on the Contract Drawings.

H. Repair damaged bars and welds, if any, in accordance with 2.01A.

END OF SECTION

# SECTION 03200

# CONCRETE REINFORCEMENT

## SUBMITTALS

## APPENDIX "A"

The following items shall be submitted to the Engineer, except as otherwise noted.

A. Shop Drawings

1. As per Division 1, "Shop Drawings, Catalog Cuts and Samples".
2. Details indicating placement, cover, splice locations, lap lengths, mechanical splice hardware, grade, bar size, length, mark number, bending schedule, bending diagram, weld designations, type of coating, material used to repair coating, and types of chairs, spacers, hangers and tie wire for all concrete reinforcement.
3. All proposed changes to the size, spacing or arrangement of the reinforcing steel shown on the Contract Drawings shall be clearly flagged as such on the shop drawings.

B. Catalog Cuts, Material Certification and Test Results

1. As per Division 1, "Shop Drawings, Catalog Cuts and Samples".
2. Catalog cuts for chairs, spacers, hangers and mechanical splices.
3. Test results and certification from the galvanizer that the weight, application and testing of zinc coating conforms with specifications and ASTM A 767.
4. Certified mill test reports for all concrete reinforcement.

C. Samples

1. As per Division 1, "Shop Drawings, Catalog Cuts and Samples".
2. Mechanical Splice Hardware.
3. Material used to repair coating.

D. Design Computations

1. Design computations for all proposed changes to the size, spacing or arrangement of the concrete reinforcement shown on the Contract Drawings.

END OF APPENDIX "A"

# DIVISION 3

# SECTION 03302

# PORTLAND CEMENT CONCRETE, SHORT FORM

## PART 1. GENERAL

### 1.01 SUMMARY

This Section and its appendices specify requirements for Portland Cement Concrete mix proportions, materials used in concrete mixes, and curing.

For requirements for furnishing Portland cement concrete, see Section 03303, entitled PLACEMENT OF PORTLAND CEMENT CONCRETE, SHORT FORM.

### 1.02 REFERENCES

The following is a listing of the publications, standards and codes referenced in this Section, of which the latest edition shall govern:

American Association of State Highway and Transportation Officials (AASHTO):

Standard Specifications for Highway Bridges

| | |
|---|---|
| M 182 | Burlap Cloth Made From Jute or Kenaf |
| TP 26 | Quality of Water to be Used in Concrete |

American Concrete Institute (ACI)

Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete

| | |
|---|---|
| 301 | Specifications for Structural Concrete for Buildings |
| 304R | Guide for Measuring, Mixing, Transporting and Placing Concrete |
| 305R | Hot Weather Concreting |
| 306R | Cold Weather Concreting |
| 308 | Standard Practice for Curing Concrete |
| 318 | Building Code Requirements for Reinforced Concrete |

American Society for Testing and Materials (ASTM):

| | |
|---|---|
| C 31 | Practice for Making and Curing Concrete Test Specimens in the Field |
| C 33 | Specification for Concrete Aggregates |
| C 39 | Test Method for Compressive Strength of Cylindrical Concrete Specimens |
| C 94 | Specification for Ready-Mixed Concrete |
| C 138 | Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete |
| C 143 | Test Method for Slump of Hydraulic Cement Concrete |
| C 150 | Specification for Portland Cement |

| | |
|---|---|
| C 171 | Specification for Sheet Materials for Curing Concrete |
| C 172 | Practice for Sampling Freshly Mixed Concrete |
| C 173 | Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method |
| C 231 | Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method |
| C 260 | Specification for Air Entraining Admixtures for Concrete |
| C 309 | Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete |
| C 311 | Test Method for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete |
| C 494 | Specifications for Chemical Admixtures for Concrete |
| C 618 | Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete |
| C 989 | Specification for Ground Granulated Blast Furnace Slag for Use in Concrete and Mortars |
| C 1064 | Test Method for Temperature of Freshly Mixed Portland cement Concrete |
| C 1315 | Specification for Liquid Membrane-Forming Compound Having Special Properties for Curing and Sealing Concrete |
| D 3665 | Practice for Random Sampling of Construction Materials |
| D 5199 | Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes |

## 1.03 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements

1. Cold weather concrete construction shall conform to ACI 306R.
2. Do not mix or place concrete when the ambient temperature is below 35°F, or when conditions indicate that the temperature will fall below 35°F within 72 hours, unless the areas to receive fresh concrete are insulated or enclosed and heated to maintain 50°F as approved by the Engineer.
3. Reinforcement, forms and soils with which concrete will be in contact shall be completely frost-free. If required, apply heat to raise their temperature to a minimum of 35°F. The use of chemicals to eliminate frost shall not be permitted.

B. Hot Weather Requirements

1. Hot weather concrete construction shall conform to ACI 305R.
2. Do not place concrete for pavements, overlays, bridge decks or ramps when the ambient temperature exceeds 90°F or the rate of evaporation exceeds 0.2 lbs/ft2/hr, in accordance with ACI 305R, Figure 2.1.5. Schedule Work so that concrete can be placed during the coolest part of the day (late afternoon or at night).
3. If the concrete temperature reaches 92°F as measured in accordance with ASTM C 1064, it shall be rejected.

1.04 QUALITY CONTROL

A. General

1. Maintain a level of Quality Control sufficient to consistently provide the end result performance properties specified herein. In addition:

a. Supply the approved mix proportions. Forward to the Engineer all delivery tickets, which shall carry an automated, time-date stamp and shall indicate the batch weights of all batching constituents.

b. Ensure that all plant mixing equipment and trucks are calibrated and New Jersey or New York State Department of Transportation approved.

c. Ensure that all personnel performing concrete testing are, at a minimum, certified ACI Grade I Concrete Laboratory Testing Technicians or Concrete Field Testing Technicians, as appropriate.

1.05 SUBMITTALS

A. For submittals see Appendix "A".

B. Do not deliver any concrete to the construction site until all approvals have been obtained.

## PART 2. PRODUCTS

2.01 MANUFACTURERS AND SOURCES OF SUPPLY

A. Do not use cement, fly ash and slag or fine or coarse aggregates, that have not been approved by either the New Jersey or New York State Department of Transportation.

2.02 MATERIALS

A. Cement: Conforming to ASTM C 150, Type I and II; conforming to Type III where early strength gain is required and permitted; or others as may be specified on the Contract Drawings.

B. Fly Ash: Conforming to ASTM C 311 and ASTM C 618, Class F or Class C, except the maximum loss on ignition shall be less than 4%.

C. Slag: Conforming to ASTM C 989, Grade 120.

D. Fine and coarse aggregates shall conform to ASTM C 33.

E. Water: Conforming to AASHTO TP 26. Clean and potable for both mixing and curing concrete.

F. Air Entraining Agent: Conforming to ASTM C 260.

G. Admixtures: All admixtures shall conform to ASTM C 494. They shall not contain more than 0.05% chloride ions, and shall be used in accordance with the manufacturer's recommendations. Dosage charts, including the effects of concrete temperatures from 50°F to 90°F, shall be submitted to the Engineer. All admixtures shall be manufactured by one of the following:

1. Euclid Chemical Company
2. W.R. Grace & Company
3. Master Builders Technologies
4. Sika Corporation

H. Curing Materials:

1. Liquid Membrane Forming Curing Compound shall be one of the following:
   a. "DOT Resin Cure (Type II)" as manufactured by Conspec Marketing & Manufacturing Company, Inc.
   b. "Euco Kurez Vox (White)" as manufactured by Euclid Chemical Company
   c. "1200 White" as manufactured by W.R. Meadows
   d. or an approved equal meeting the requirements specified in 2.02.H.2.
2. Liquid Membrane Forming Curing Compound: conforming to ASTM C 1315 and to the following:
   a. For horizontal exterior applications, curing membranes are restricted to ASTM C309 Type 2, Class B materials. ASTM C 309 Type 1 D, Class B membranes are acceptable for other exterior applications. ASTM C309 Type 1, Class B membranes are acceptable for interior applications only.
3. Burlap: Conforming to AASHTO M 182, Class 3, weighing approximately 9 oz./sq. yd. dry.
4. Sheet Material: Conforming to ASTM C 171.
   a. Polyethylene Film:
      (1) White opaque, where curing surface is exposed to sun
      (2) Clear, for other applications
         (a.) White Burlap Polyethylene Sheet
5. Cotton Mats: conforming to ASTM D 5199 with a minimum thickness of 40 mils, ASTM C 156 with a maximum water loss of 0.0065 oz./in.2, ASTM D 4833 with a minimum puncture strength of 70 pounds, and ASTM E 1347 with a minimum reflectance of 75%. The following cotton mats may be used in lieu of burlap for wet curing operations:
   a. "Transguard 4000" as manufactured by Reef Industries, Inc., Houston, Texas.
   b. Or an approved equal conforming to the requirements specified in 2.02.R.5.

I. Evaporation Retardant: This material shall not be used as a finishing tool. Use one of the following:

1. "Euco-Bar" as manufactured by Euclid Chemical Company
2. "E-Con" as manufactured by L&M Construction Chemicals, Inc.
3. "Confilm" as manufactured by Master Builders Technologies
4. "SikaFilm" as manufactured by Sika Corporation
5. "Aquafilm" as manufactured by Conspec Marketing & Manufacturing Company, Inc.

## 2.03 MIX PROPORTIONS

A. Develop mixes in accordance with the latest editions of ACI 211, ACI 301 and ACI 318 to produce design performance criteria in accordance with the Contract documents, with a degree of excess as determined by Chapter 5 of ACI 318, and to meet all of the applicable performance criteria as specified in the Contract documents. Prior to concrete construction and after approval of all materials to be used in the concrete, submit a mix proportion showing that all performance criteria have been met. Mix proportions submitted shall be based upon laboratory trial mix test results and/or mixes successfully used within the two years preceding the date of the submittal of the mix for the Work of this Section. Verify that the independent testing laboratory used to develop the mix proportions and to perform testing has AASHTO Accreditation for all test methods required to be performed and for development of the required mix. Ensure that the technical staff preparing the mix proportions and performing the associated testing is certified by ACI for all the tests being performed. Submit to the Engineer proof of certifications prior to the start of development of the mix proportion and testing. The mix shall include copies of test reports, including test dates, and a complete list of materials, including type, brand, and source. The mix proportion shall also conform to the following:

1. Substitute either fly ash or slag at the minimum rate of 15% by weight of cement. The maximum rates of substitution shall be 30% for fly ash and 40% for slag. Fly ash and slag substitution up to 50% in the same mix may be permitted upon approval by the Engineer.
2. Compute water to cement ratio by all the water in the mix that is from admixtures and aggregates, plus added water, divided by the weight of cementitious material that is equal to the total weight of cement plus fly ash, or slag. In order to meet the specified water to cement ratio, account for any admixtures which increase the water to cement ratio by 0.01 or greater.
3. Do not add High Range Water Reducer to the concrete mix at the plant. Deliver High Range Water Reducer to the site in a tank fixed to the truck such that the tank discharges directly into the mixing drum, or add High Range Water Reducer to the drum from a calibrated dispensing unit. A calibrated dispensing unit shall be defined as a manufactured dispenser with clear volume indications marked on the outside of the unit. It shall be available at all times during the concrete placement for re-dosing purposes. Submit a re-dosing chart showing the dosages necessary to increase the slump, in inches per cubic yard of concrete remaining in the drum, over the range of concrete temperatures from 50° to 90° F. If re-dosing occurs, the re- dosing chart shall be used, but under no circumstances shall the total dosage exceed the maximum dosage recommended by the manufacturer. The truck shall mix the load for a minimum of an additional 5 minutes prior to releasing the load.
4. The percentage of air in the mix shall fall within the range as outlined in the table shown in 2.04.A.2. entitled, "Air Content Target Range for Freshly Mixed Concrete." Determine air content by testing in accordance with ASTM C 231 for normal and heavyweight concrete mixes.

## 2.04 QUALITY ACCEPTANCE LIMITS

A. Develop mixes to meet the following performance criteria Quality Acceptance Limits unless otherwise noted on the Contract Drawings:

1. Compressive Strength (ASTM C 39): The design compressive strength at 28 days.

2. Air Content (ASTM C 138, ASTM C 173 or ASTM C 231): The minimum and the maximum limits shall be as specified in the table below:

AIR CONTENT TARGET RANGE FOR FRESHLY MIXED CONCRETE

| MAXIMUM SIZE AGGREGATE (SIZE #) | AIR CONTENT | | |
|---|---|---|---|
| | Min. | | Max. |
| 2" or above (# 467 and above) | 3.5% | - | 7.5% |
| 1 ½" (# 57) | 4.0% | - | 8.0% |
| 1" (# 67) | 4.5% | - | 8.5% |
| ½" (# 8) | 5.5% | - | 9.5% |
| 3/8" | 6.0% | - | 10.0% |

Note: For a specified compressive strength greater than 5000 psi, the minimum and maximum air content, as indicated above, shall both be reduced by 1.0%. For all concrete applications not exposed to freeze-thaw cycling or deicing chemicals, no air entrainment is required.

## PART 3. EXECUTION

### 3.01 BATCHING AND MIXING CONCRETE

A. Measurement of Proportions

1. All concrete batching shall be in conformance with ASTM C 94 and ACI 304R.
2. For very high early strength concrete requiring 2000 psi or greater in 6 hours or less time, the method of batching shall be restricted to a calibrated mobile mixer, or from a transit mixer that is loaded on site with bulk bags of the very high early strength cement. Bulk bags shall contain sufficient very high early strength cement by weight to batch for a minimum of 3 cubic yards of concrete.

B. Mixing Concrete

1. Plants and truck mixers shall conform to ASTM C 94, and shall be either New Jersey or New York State Department of Transportation inspected and approved. Documentation of such conformance shall be available to the Engineer at all times.
   a. Measure water and cement accurately to within 1% of the required amounts before loading into the mixer. Accurately measure fine and coarse aggregate to within 2% of the required amounts before loading into the mixer.
   b. Mixers which are found to be mechanically unsatisfactory shall be immediately repaired or withdrawn from use.
2. The Engineer may permit one re-tempering of the concrete subject to the following:
   a. The addition of water to the concrete mix at the construction site shall not be permitted for mix designs with a water to cement ratio of 0.40 or less. For all other mixes, water may be added, but the total amount of water shall not exceed the mix proportion water to cement ratio.
   b. High range water reducer redosing shall conform to the manufacturer's approved redosage chart and shall not exceed the recommended manufacturer's limitation, nor shall it retard the initial set of the concrete by more than 30 minutes.

c. Concrete that is re-mixed or re-tempered after it has partially hardened or has attained its initial set will be rejected.

d. The Engineer reserves the right to reject concrete that has not been placed within 90 minutes from the time the cement had first contact with water, or if the concrete temperature reaches 92°F as measured in accordance with ASTM C 1064.

## 3.02 PRE-PLACEMENT FIELD REQUIREMENTS

A. Prior to any construction site delivery of concrete, furnish, deliver and maintain insulated curing boxes of sufficient size and strength to contain all the specimens (cylinders and beams) made by the Engineer in any two (2) consecutive Work periods. Such boxes shall be equipped to regulate the temperature in the range of 60°F to 80°F, and to provide the moisture to maintain the curing conditions specified in ASTM C 31. Locate the boxes where directed by the Engineer. Protect the boxes from vibration and other disturbances during specimen curing.

B. Pump Concrete

1. Grout used to prime the pump line shall not be included in the placement. Make provisions for the disposal of the grout at the end of the pump line outside Authority property and at no cost to the Authority. Placement shall not begin until concrete is visible at the end of the pump line.

2. Permit no water to enter the pump hopper at any time during placement operations.

   Submit written procedures for pumping to the Engineer for approval. The procedures shall contain, but not be limited to, pumping scheme, pump description, line diameter, line length, and the number of turns and line offsets.

## 3.03 CURING

A. Give careful attention to the curing of all concrete. Submit to the Engineer for approval a curing procedure plan prior to placing any fresh concrete. Cure concrete in accordance with ACI 308 and the following specifications. Commence curing procedures immediately after the fresh concrete has been placed.

1. Provide suitable means, such as insulating blankets or heated enclosures, for maintaining a concrete temperature of at least 50°F after placement, until it has attained 4,000 psi. At the end of this period, remove protection in such a manner that the drop in temperature of any portion of concrete shall be gradual and not exceed the provisions of ACI 306R Table 3.1 during the first 24 hours after removal of protection.

2. Allow all concrete to attain 4,000 psi compressive strength or the specified design compressive strength, whichever is lower, before being exposed to freeze-thaw cycles.

B. Liquid Membrane Forming Curing Compounds and Sheet Materials for curing

1. Immediately after placing or finishing, commence the curing process of concrete not covered by forms. Avoid loss of moisture by placing a curing membrane on the surface. Use one of the curing materials listed in 2.02.H., which may be supplemented by initially using an evaporation retardant listed in 2.02.I., as long as wet curing is not required, subject to the following:

a. Polyethylene film or burlap polyethylene sheet, if used, shall be lapped at edges and ends at least 1-foot and shall have all ends and edges taped to adjacent sheets or surfaces to completely seal areas to be cured. Secure in a sufficient manner that will not allow the film, the sheets, or the securing mechanism to be removed by wind forces, resulting in fresh concrete exposure without protection. Burlap, in conformance with AASHTO-M182, shall be broken and presoaked for 24 hours prior to use.

b. Liquid membrane forming curing compound, if used, shall beapplied by approved pressure spraying or distributing equipment in two uniform full applications perpendicular to each other as recommended by the manufacturer. Allow the first coat to become tacky before applying the second coat. Each application shall be the full quantity recommended by the manufacturer.

2. Recoat areas subjected to heavy rainfall within 3 hours of such occurrence.

3. Follow manufacturer's recommendations for agitation during application and warming where necessary during cold weather.

4. Do not use liquid membrane forming curing compound where the surface being cured is to receive a finish that will be bonded to the concrete surface or where a floor hardener is to be applied, unless a certification of compatibility and a minimum five year performance record is submitted in advance to the Engineer for approval. The Engineer will check for uniformity through random sampling and testing. Testing may include determination of membrane infrared spectrum, pH, specific gravity and solids content.

## 3.04 QUALITY ASSURANCE TESTING, SAMPLING, AND INSPECTIONS

A. The Engineer will perform Quality Assurance testing during mixing and placing of concrete on samples taken from the end of the line or at the point of discharge in accordance with ASTM C 172. The Engineer will take samples of concrete from each Work period based on random sampling procedures described in ASTM D 3665.

1. The Engineer may perform the following quality assurance tests: slump, air content, compressive strength, unit weight, temperature and water to cement ratio. If any of these tests indicate results out of tolerance with those specified herein, or on the Contract Drawings, or as given in the approved mix proportion, the concrete may be rejected.

a. Compressive strength: A minimum of six cylinders will be made for each 50 cubic yards or a portion thereof in accordance with ASTM C 31 and tested at the time requirements specified in accordance with ASTM C 39.

b. Slump test: Performed during the placement in accordance with ASTM C143. The Engineer will perform one test for each set of test specimens.

c. Unit Weight: The plastic unit weight of concrete will be determined in accordance with ASTM C 138. The Engineer will perform one test for each set of test specimens.

d. Air Content Test: Performed during the placement in accordance with ASTM C 138, ASTM C 231 or ASTM C 173. The Engineer will perform one test for each set of specimens.

B. In accordance with the Section of Division 1 entitled, "Inspections and Rejections," provide labor and means for obtaining all samples required for trial batches and field-testing performed by the Engineer, at no additional cost to the Authority.

1. Provide a representative sample, in the quantity requested by the Engineer, of all cement, fly ash, slag, fine and coarse aggregate, admixtures, evaporation retardant, and liquid membrane forming curing compound during any day of production when the Engineer requests a sample. Take samples in the presence of the Engineer at the point of storage, at either the concrete producer's plant or the construction site, that will be used for the Work of this Contract. For cement, fly ash, and slag samples, either use a sampling port on the silo, drop material in a loader bucket between loads or take samples from the boot using a "Sample Thief" during loading.

## 3.05 CORRECTION OF DEFICIENCIES

If concrete is found to be deficient as defined below, follow Engineer's directions at no additional cost to the Authority:

A. Strength Deficiency: If any individual compressive strength test result of cylinders falls below the specified compressive strength by more than 500 psi, investigate the in-place compressive strength of the concrete using cores in accordance with ACI 318-02, Section 5.6.5. If the average of the compressive strength test results of the cores is less than 85% of the specified compressive strength or if the compressive strength of a single core is less than 75% of the specified compressive strength the concrete shall be considered deficient. At Engineer's direction, either remove and replace concrete or accept a 50% reduction in payment for the in-place cost of the concrete.

B. Cracking Deficiency: Concrete slabs or structures that exhibit any cracks prior to opening to vehicular operations or loading shall be considered deficient. At Engineer's direction either remove and replace deficient concrete or seal cracks in accordance with Specification Section 03734, "Concrete Crack Repair."

END OF SECTION

# DIVISION 3

# SECTION 03302

# PORTLAND CEMENT CONCRETE SHORT FORM

# SUBMITTALS

# APPENDIX "A"

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts and Samples" of DIVISION 1 – GENERAL PROVISIONS:

A. List of materials for Work of this Section.

B. Shop Drawings of forms and test pour details at least 15 calendar days before the test.

C. Catalog Cuts, Material Certification and Test Results:

1. At least 35 calendar days prior to concrete placement, the following:

a. Name and address of proposed concrete Supplier, type of plant, documentation of State Certification for plant and ready mix trucks, AASHTO Accreditation certification for the independent testing laboratory (required after January 1, 2003), and a certification for an on-site individual in a supervisory capacity from one of the programs specified in 2.03.A.

b. Material certifications, source, brand name and test results (where required) of cement, fine and coarse aggregate, fly ash, slag and concrete admixtures following guidelines of Appendix "B".

c. Brand name and chemical composition of form oil or release agents, evaporation retardant and liquid membrane curing compounds.

d. Certification that admixtures conform to the requirements of 2.02.F & G. submitted with Appendix "B," "Concrete Materials and Mix Proportion Data". Include dosing and re-dosing charts, which shall demonstrate the effects of concrete temperatures from 50°F and 90°F.

D. Samples :

1. Cement, stone, sand, fly ash, slag, admixtures, evaporation retardant, curing compound. Furnish these to the Engineer in whatever quantities he may require. This applies to all mix proportions, including changes to an approved mix proportion.

2. At the request of the Engineer, provide cement, fly ash and/or slag Mill Certifications at any time.

E. Construction Procedures and Quality Control Documents and Plans:

1. At least 35 calendar days prior to concrete placement, the following:

a. Cold and Hot Weather Concreting Plans to the Engineer in accordance with 1.03 of the Specification. Materials and methods for protecting concrete from freezing.

b. Pumping Procedure Plan, including, at a minimum, the pumping scheme, pump description, line diameter, line length, and the number of turns and line offsets.

c. Method and sequence (timing) of adding concrete admixtures, high range water reducers, non chloride accelerators.

d. Mixing and placement procedures and methods, as well as, catalog cuts of equipment for installation. For hand mixes, provide the methods of proportioning, mixing (including minimum time requirements), transferring, and placing the concrete.

e. Curing Procedure Plan in accordance with 3.03 A, including the method and materials for curing.

f. Materials and procedures for filling cracks and patching honeycombs and/or spalls.

2. Daily copy of batch records in accordance with 1.04.A.1.a of the Specification.

F. Concrete Mix Proportion:

1. Appendix "B," "Concrete Materials and Mix Proportion Data" at least 35 calendar days prior to concrete placement in accordance with 2.03.A of the Specification. To substantiate the mix proportion, submit all data and field results in accordance with 2.03.A. of the Specification.

2. ACI Grade I or II Field and/or Laboratory certification for all personnel performing concrete testing.

3. Written request to the Engineer for approval if a change in the weights of fine and coarse aggregate and cement is required in the approved mix proportion.

4. AASHTO accreditation for all testing to be performed by the independent laboratory in the formulation and testing of mix proportion to be submitted.

END OF APPENDIX "A"

## SECTION 03302

## PORTLAND CEMENT CONCRETE SHORT FORM

## APPENDIX "B"

## CONCRETE MATERIALS AND MIX PROPORTION DATA

A. Materials

1. Cement: Type..... Source/Brand .....
2. Sand: Fineness ..... | Modulus..... Source.....
3. Stone: Size ..... Class..... | Source.....
4. Fly Ash: Type..... | Source.....
5. Slag: Grade Source.....
6. Admixtures (Source/Brand):.....
7. Air Entraining Agent .....
8. Non Chloride Accelerator..... .....
9. Retarder.....
10. Water Reducer .....
11. Water Reducer Retarder.....
12. High Range Water Reducer .....
13. High Range Water Reducer Retarder .....

B. Mix Proportion

1. Proposed method of placement: Transit Mixer/Portable Mixer/ Pumping/Pipe Diameter:.....
2. Proportion of Ingredients

Cement ..... lbs./cu. yd.

Fly Ash ..... lbs./cu. yd.

Slag ..... lbs./cu. yd.

Stone ..... lbs./cu. yd.

Sand ..... lbs./cu. yd.

Water ..... lbs./cu. yd..... gallons

Air Entraining Agent: ..... ounces/cu. yd.

Admixtures (specify type and amount):

..... at ..... ounces/cu. yd.

..... at ..... ounces/cu. yd.

..... at ..... ounces/cu. yd.

..... at ..... ounces/cu. yd.

3. Mix Properties:

Compressive Strength: f'c = ..... psi at ..... days/hours

Slump: ..... inches

Water to Cementitious Ratio: .....

Air Entrainment: ..... %

Sand/Stone Ratio:

Combined aggregate gradation chart (% retained on each sieve)

Unit Weight: ..... lbs./cu. ft.

C. Conformance with ACI 318:

Attach a report on mix design and test/statistical data documenting conformance with ACI 318, Chapter 5, or ACI 304R, Chapter 8, as they apply to the Work of the Contract.

D. Concrete Supplier/Batch Plant

1. Name: .....

2. Address: .....

3. Contact Name: .....

4. Telephone number/Fax number/E-mail address:

.....

5. Quality Control technician(s):

Name(s): .....

.....

.....

Telephone number(s):

.....

.....

END OF APPENDIX "B"

# DIVISION 3

# SECTION 03303

# PLACEMENT OF PORTLAND CEMENT CONCRETE, SHORT FORM

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for casting Portland cement concrete.

For requirements for furnishing Portland cement concrete see Section 03302, entitled PORTLAND CEMENT CONCRETE, SHORT FORM.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

American Society for Testing and Materials (ASTM)

| | |
|---|---|
| ASTM D 1751 | Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-Extruding and Resilient Bituminous Types) |
| ASTM D 1752 | Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction |

New Jersey Department of Transportation (NJDOT)

Standard Specification for Road and Bridge Construction - 2001

### 1.03 ENVIRONMENTAL REQUIREMENTS

A. For Cold Weather Requirements see Section 03302, entitled PORTLAND CEMENT CONCRETE, SHORT FORM.

B. Reinforcement, forms and soils with which concrete will be in contact shall be completely frost-free.

C. Comply with all provisions of this Section for placing and curing.

D. For Hot Weather Requirements see Section 03302, entitled PORTLAND CEMENT CONCRETE, SHORT FORM.

### 1.04 QUALITY ASSURANCE

A. A pre-concrete construction meeting will be conducted at the construction site by the Engineer at least 10 days prior to the first pour to review the Contractor's submitted mix proportion and to discuss the methods and procedures to achieve the required concrete quality.

B. For concrete where riding surface tolerances are required, as indicated on the Contract Drawings, the following requirements shall be met:

1. Surface smoothness deviations shall not exceed 1/8 inch in 10 feet. Any deficiencies shall be corrected as specified in 3.05A and 3.05B.

2. Vertical deviation from the grade shown on the Contract Drawings shall not exceed plus or minus 0.04 foot at any point.

C. Specified concrete finishes, as shown on the Contract Drawings, shall conform to the requirements set forth in 3.02D.2. Deficiencies shall be corrected as specified in 3.05 C.

1.05 SUBMITTALS

A. For submittals - see Appendix "A".

B. Do not deliver any concrete to the construction site until all approvals as required in this Section, and as required by Section 03302, have been obtained.

## PART 2. PRODUCTS

2.01 MATERIALS

A. Expansion Joints (Except For Bridge Decks), Contraction Joints and Waterstops:

1. Waterstops shall be of types and sizes shown on the Contract Drawings.
2. Premoulded expansion joint filler, when shown on the Contract Drawings:
   a. Cork type shall be ASTM D 1752, Type II;
   b. Bituminous type shall be ASTM D 1751.
3. Joint Sealant when shown on Contract Drawings: Federal Specification SS-S-1401, latest revision.

B. For Curing Materials see 2.02H, Section 03302, entitled PORTLAND CEMENT CONCRETE, SHORT FORM.

C. For Evaporation Retardant see 2.02I, Section 03302, entitled PORTLAND CEMENT CONCRETE, SHORT FORM.

## PART 3. EXECUTION

3.01 PREPARATION

A. Construction Joints

1. Number, locations and details shall be as shown on the approved shop drawings.
2. Planes of joints shall be normal to direction of pressure and shall include suitable keys and dowels.
3. Avoid lips and other irregularities between adjoining sections of concrete. Secure forms tightly against previously placed concrete.

B. Expansion and Contraction Joints

1. After curing concrete, clean grooves or saw cuts to receive joint sealant by scrubbing with a mechanical wire brush to loosen dirt and other foreign matter. Blow out loose matter with filtered compressed air.
2. Install joint sealant to finish flush with concrete surface, except where otherwise shown on the Contract Drawings.

C. Preparation for Placing Concrete

1. Straighten bent dowels, whether placed under this Contract or by others, using tools approved by the Engineer. Do not apply heat to dowels.
2. Clean all dowels and all steel that will be embedded in concrete of all loose rust, scale, paint, grease and other objectionable materials.

3. Examine coated reinforcement for integrity of coating. Repair all damaged areas in accordance with the requirements of Specification Section 03200 entitled CONCRETE REINFORCEMENT. The repair crew shall be available at the time of examination.
4. Check all locking devices for formwork to ensure that they are in place and properly secured.
5. For preparation of surfaces to receive concrete, conform to 3.02 A and the Contract Drawings for all procedures, equipment limitations, and requirements to be performed prior to placing concrete.
6. Provide vent holes (1/4 inch diameter, minimum) in edge angles and embedded plates at joints where vibrating alone will not ensure elimination of voids. Submit to Engineer for review with shop drawings all vent hole locations and procedures for placement of concrete at joints.

## 3.02 APPLICATION

A. Bonding New Concrete to Existing Concrete:

Where new concrete will be placed against existing concrete surfaces:

1. Before starting concrete placement, abrasive blast or shot blast existing concrete surfaces. Abrasive blasting shall conform to Section 02574, entitled ABRASIVE BLASTING OF PAVEMENTS.
2. Thoroughly clean existing concrete surfaces of dust, concrete particles and other debris to the satisfaction of the Engineer.
3. Immediately prior to placing concrete, moisten existing concrete with water. Remove puddles of standing water.
4. Broom a thin layer of material from the leading edge of the concrete being placed into the wetted surfaces. Do not allow broomed material to dry before covering it with additional material as required for final grade.

B. Placing Concrete:

1. Place concrete only in the presence of the Engineer and by methods approved by him.
2. For concrete cast against earth or an approved compacted subgrade, and for concrete overlays, place concrete against surfaces in a saturated surface dry condition.
3. Prior to placing concrete remove all standing water or puddles.
4. Do not place concrete on or next to frozen surfaces.
5. Transfer concrete from mixer to place of deposit rapidly to prevent formation of cold joints.
6. Use equipment and methods for placing that shall permit rapid placement of fresh concrete of the required consistency and shall preclude segregation.
7. The method and equipment used to transfer concrete from mixer to forms will be subject to prior approval by the Engineer.
8. Subject to the foregoing requirements, convey concrete by approved means to its final position.
9. Except where otherwise approved by the Engineer, consolidate concrete by internal mechanical vibration subject to the following:
   a. Type, number and method of application of vibrators will be subject to prior approval by the Engineer.

b. In locations where spading is approved in lieu of mechanical vibration, spade coarse aggregate away from the forms and into the plastic mass; rod concrete around embedded materials and into corners and spaces to be filled.

10. Avoid formation of laitance and accumulation of excessive water on surface of concrete as it is deposited. Remove any accumulated bleed water by approved means before placing other concrete.

11. Place concrete so as to require as little rehandling as possible.

12. Deposit concrete as near to joints as possible without disturbing them.

13. Thoroughly consolidate concrete.

14. Screed and float concrete for riding surfaces as it is placed and use an approved evaporation retardant or fog spray.

C. Concrete Placing and Finishing Equipment for slab and other Riding Surfaces:

1. For slab or overlays less than 8 inches thick, vibrating surface pans or screeds will be allowed.

2. Manual tools, such as bull floats, trowels, brooms and other similar hand tools are acceptable.

D. Consolidation and Finishing

1. Slabs and other Riding Surfaces

a. Machine finishing shall conform to NJDOT Standard Specifications Subsection 405.13, Item B.

b. Finishing at and adjacent to joints shall conform to NJDOT Standard Specifications Subsection 405.13, Item C.

c. Strike off and screed concrete as soon as it is placed. Use an approved portable screed.

d. After the concrete has been struck off and consolidated, further finish it by means of a longitudinal float. After floating, any excess water and laitance in excess of 1/8 inch thick shall be removed and disposed of outside of Authority property.

e. While the concrete is still in a workable condition, immediately fill, strike off, consolidate, and refinish any depressions with freshly mixed concrete.. Cut down and refinish high areas.

2. Specified concrete finishes, as shown on the Contract Drawings, shall be in accordance with the following requirements:

a. "Smooth Finish" shall be a surface of concrete obtained by the use of special forms as specified in the Section entitled "Concrete Formwork". All fins and other irregularities in the exposed surfaces of concrete shall be removed by rubbing the irregularities with a carborundum brick and clean fresh water. Any mortar patches shall be rubbed with a carborundum brick as above specified.

b. "Scored Finish" shall be a surface of concrete obtained by roughening in an approved manner or by etching with sharp-pointed steel tools to key or otherwise improve the mechanical bond of the surface. Such scoring shall roughen at least ten percent of the area so scored.

c. "Float Finish" shall be a surface of concrete obtained by the use of a wood float. A float finish shall be applied to horizontal surfaces immediately after screeding and before initial setting has begun.

d. "Trowel Finish" shall be a surface of concrete obtained by the use of a steel trowel, after screeding and floating the surface of the concrete to produce a dense, smooth, even surface suitable for painting or the application of floor covering. The troweling shall not take place until the surfaces have set sufficiently to sustain knee boards without damage. Troweling shall eliminate all irregularities and leave the concrete surface with a smooth, hard finish, free from marks and blemishes to the satisfaction of the Engineer.

e. "Traction Finish" shall consist of a monolithic layer of abrasive concrete having a minimum thickness of 3/4 inch and which shall be Emericrete, as manufactured by the Walter Maguire Company, Inc., or approved equal. Prepare the base and install the monolithic finish in accordance with the recommendations of the manufacturer of the abrasive concrete. The surface shall be given a wood float finish. The sides and edges of pavement slabs shall be rounded with an approved edging tool to the minimum radius obtainable in the sole opinion of the Engineer.

f. "Burlap Finish" shall be a surface of concrete obtained by the use of a burlap drag, after screeding and floating the surface of the concrete. The burlap shall be dragged in one direction in a straight line before initial setting has begun and in such a manner that the full width of the slab being finished is dragged in one operation. Burlap shall be rinsed or washed as often as is necessary to prevent the presence of hardened particles and consequent scarring of the concrete.

g. Stair treads and platforms of steel stairs shall be filled with mortar mixed in the proportions of one part Portland cement to three parts of fine aggregate, mixed with water to a satisfactory consistency. Coat the surface of the mortar with three pounds of aluminum oxide crystals per square yard of surface, uniformly applied, and trowel the surface to a smooth hard finish. Aluminum oxide crystals shall be grade AL203 crystals ranging from No. 12 to No. 30 in size and shall contain not more than six percent of iron or other impurities.

h. "Broom Finish" shall be achieved as follows:

(1) Finish the concrete when the water sheen has practically disappeared. Use push broom or floor brush type, not less than 18 inches wide and made of good quality bass or bassine fibers not more than 4-1/2 inches long and with handles longer than half the width of the slab.

(2) Use an adequate number of brooms to keep up with other operations. Proper finish shall be achieved prior to initial set of the concrete.

(3) Wash and thoroughly dry brooms at frequent intervals and remove worn or damaged brooms from the construction site.

(4) Draw broom across previously finished surface from the centerline to each edge of the slab with a slight overlap of strokes.

(5) Corrugations made in surface shall be uniform, approximately 1/16 inch in depth, and not more than 1/8 inch in depth.

(6) Complete brooming before concrete is in a condition such that the surface will be torn or unduly roughened and before initial set of concrete.

(7) Immediately following brooming, carefully finish the edges of slab along sides and at joints with an approved edging tool to form a smooth rounded surface of required radius and subject to the following:

(a.) Where corners or edges of slabs have crumbled and at any areas which have leaked sufficient mortar to make proper finishing difficult, remove loose fragments and soupy mortar, fill solidly with a mixture of correct proportions and consistency and finish.

(b.) Edges shall be smooth, true to line and free of unnecessary tool marks.

i. "Tine finish" and acceptance criteria for "Tine finish" shall conform to the requirements of the NJ DOT Standard Specifications, Subsection 405.13, Item G.

j. "Saw Cut Grooved Surface" shall conform to the requirements of the NJ DOT Standard Specifications, Division 500. For deck slabs, conform to Subsection 501.15, Item 3. For overlays, conform to Subsection 518.06, Item C13.

k. Concrete Curbs and Sidewalks

(1) Give sidewalks a "Float Finish," tool edges and joints for a width of two inches and round corners to a radius of 1/4 inch with an approved edging tool.

(2) Install expansion joints at not more than 20-foot intervals in sidewalks with matching joints in curbs. Use 1/4-inch bituminous joint filler.

(3) Score sidewalks in squares as approved by the Engineer.

3. Removal of Forms

Removal of forms shall be subject to the following:

a. Remove forms in accordance with the requirements of Specification Section 03100 entitled CONCRETE FORMWORK.

b. After removal of forms, patch areas of concrete which, in the opinion of the Engineer show excessive honeycomb by cutting out defective areas, keying and refilling them with a mortar of cement and sand in the same proportions as those in the approved concrete mix design.

c. After forms are removed, cure sides of slabs greater than 12 inches in thickness in accordance with 3.03.

d. Immediately after removal of forms, holes and voids in the surfaces of concrete, resulting from bolts and ties, shall be wetted and filled with a mortar containing cement and fine aggregate in the same proportions as in the approved concrete mix design, and utilizing cement which shall produce mortar of the same color as the concrete. Exposed mortar surfaces shall then be finished smooth and even with a wood float, except that those surfaces exposed to view in the finished structure shall be finished with a steel trowel to match adjacent surfaces. All fins and other surface irregularities shall be removed promptly by chipping, grinding or other methods approved by the Engineer to give a uniform finish. Where no specific surface finish for formed concrete surfaces is indicated on the Contract Drawings, no further finishing will be required.

3.03 JOINTS

A. Saw Cut Control Joints

1. The Contractor shall attempt to saw cut each control joint at the point when a thumb print can not be made on the surface and as soon as the concrete can support the weight of the saw and the operator without marring the surface or disturbing the final finish. At a minimum, these two checks shall be performed by the Contractor every hour until the control joints can be cut. Unless otherwise shown on the Contract Drawings, saw cut depth shall be the greater of 10% of the slab thickness or one inch. Saw shall produce a cut that does not ravel or damage the concrete. If approved for use, a liquid membrane forming curing compound must be applied prior to cutting. In general, control joints for standard concrete should be cut within 6 to 8 hours of concrete placement, and within 2 to 4 hours for very high early strength concrete. However, the timing of cuts will ultimately depend on the mix proportion and the ambient temperature.

3.04 For CURING requirements, see 3.04, Section 03302, entitled PORTLAND CEMENT CONCRETE SHORT FORM. For exterior slab and overlay work, perform wet-curing procedures immediately after the concrete has been finished.

3.05 CORRECTION OF DEFICIENCIES

A. Diamond Grinding and Partial Depth Removal

1. Cured riding surfaces that do not meet the smoothness or finished grade requirements set forth in 1.04B shall be corrected, to obtain the specified smoothness deviation, as follows:

   a. High spots between 1/8" and 1/2" and surfaces that exceed the finished grade requirements shall be identified and ground with diamond grinding equipment.

   b. Low spots between 1/8" and 1/2" and surfaces that are below the finished grade requirements shall be corrected by partial depth removal of the entire slab to 1" below rebars by hydrodemolition or approved means and constructing an overlay in conformance with these specifications.

2. The diamond grinding equipment shall be subject to approval by the Engineer and shall have a minimum grinding head of 36 inches.

3. Where grinding is required, the entire width of the riding surface by the length of defective area shall be ground. In the sole opinion of the Engineer, if the deficiencies are closely spaced and grinding individual areas will adversely affect ride, the entire surface shall be ground.

4. Slurry produced from grinding operations shall be disposed of outside of Authority property.

5. Diamond grinding, partial depth removal and construction of an overlay, if required to correct deficiencies, shall be performed at no additional cost to the Authority.

B. If the slab concrete is found to have developed any plastic shrinkage cracks prior to being loaded by traffic, the Contractor shall repair it at his cost with an approved epoxy or methacrylate repair system or remove as directed by the Engineer.

C. If concrete finishes do not meet the requirements set forth for the specified finishes, re-finish or remove as directed by the Engineer, at no additional cost to the Authority.

END OF SECTION

## SECTION 03303

## PLACEMENT OF PORTLAND CEMENT CONCRETE, SHORT FORM

## SUBMITTALS

## APPENDIX "A"

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts and Samples" of DIVISION 1 – GENERAL PROVISIONS:

A. Shop Drawings for number, location and details of contraction, control, expansion and construction joints at least 15 days prior to concrete placement.

B. Catalog Cuts, Material Certification and Test Results

C. Construction Procedures, and Quality Control and Assurance Documents

1. At least 35 days prior to concrete placement, the following:

   a. Surface Preparation Plan for surfaces on which concrete will be placed.

   b. Type, number and method of application of concrete vibrators.

   c. Method of concrete placement and consolidation adjacent to joint assemblies and embedded hardware.

   d. Control Joint Location Plan.

   e. Method of curing and curing and materials.

D. Design Computations

1. If required by the Engineer or noted on the Contract Drawings, design computations shall be signed and sealed by a Professional Engineer licensed in the state where Work is being done.

END OF APPENDIX "A

# DIVISION 5

# SECTION 05506

# MISCELLANEOUS STEEL

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for metal fabrications of loose steel lintels, shelf angles and miscellaneous steel framing and supports.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

| | |
|---|---|
| | American National Standards Institute |
| ANSI A 14.3 | Safety Requirements for Fixed Ladders |
| ANSI B 18.2.1 | Square and Hex bolts and Screws Inch Series |
| ANSI B 18.6.1 | Wood Screws (Inch Series) |
| ANSI B 18.6.3 | Machine Screws and Machine Screw Nuts (M4) |
| ANSI B 18.21.1 | Lock Washers (Inch Series) |
| ANSI B 18.22.1 | Plain Washers |
| | American Society for Testing and Materials (ASTM): |
| ASTM A 27 | Steel Castings, Carbon for General Application |
| ASTM A 36 | Structural Steel |
| ASTM A 47 | Ferric Malleable Iron Castings |
| ASTM A 48 | Specification for Gray Iron Casting |
| ASTM A 123 | Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products |
| ASTM A 153 | Zinc Coating (Hot-Dip) on Iron and Steel Hardware |
| ASTM A 307 | Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength |
| ASTM A 563 | Specification for Carbon and Alloy Steel Nuts |
| ASTM A 780 | Practice for Repair of Damaged Hot-Dip Galvanized Coatings |
| ASTM A 786 | Specification for Rolled Steel Floor Plates |
| ASTM B 633 | Specification for Electro-deposited Coatings of Zinc on Iron and Steel |
| ASTM C 1028 | Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method |
| ASTM E 488 | Test Method for Strength of Anchors in Concrete and Masonry Elements |
| ASTM F 568 | Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners |

American Welding Society, Inc. (AWS)

| | |
|---|---|
| AWS D1.1 | Structural Welding Code – Steel |
| AWS D1.3 | Structural Welding Code – Sheet Steel |

Federal Specifications (FS)

| | |
|---|---|
| FS-FF-B-588C(1) | Bolt, Toggle, and Expansive Sleeve, Screw |
| FS TT-P-664D | Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant |

Steel Structures Painting Council (SSPC)

| | |
|---|---|
| Paint 20 Zinc | Rich Primers (Type I – Inorganic and Type II - Organic) |
| PA - 1 | Shop, Field and Maintenance Painting |
| SP - 3 | Power Tool Cleaning |
| SP - 6 | Commercial Blast Cleaning |

1.03 DESIGN AND PERFORMANCE REQUIREMENTS

Where ladders are shown on the Contract Drawings, provide assemblies which, when installed, comply with the following minimum requirements for structural performance, unless otherwise shown on the Contract Drawings.

A. Treads and Platforms of Ladders

Capable of withstanding a uniform load of 100 lbf per sq. ft. or a concentrated load of 300 lbf so located as to produce maximum stress conditions.

B. Handrails and Toprails

Capable of withstanding the following loads applied as indicated below, when tested per ASTM E 935.

1. Concentrated load of 200 lbf applied at any point in any direction.

   a. Uniform load of 50 lbf per linear ft. applied simultaneously in both vertical and horizontal directions.

   b. Concentrated and uniform loads above need not be assumed to act concurrently.

C. Guards

Intermediate rails balusters and panel fillers capable of withstanding a uniform load of 25 lbf per sq. ft. of gross area of guard, including open areas of which they are part of fabrication as required or as shown on the Contract Drawings.

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications

Firm experienced in producing metal fabrications similar to those indicated for Work of this Contract with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.

B. Welding Standards

Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel and AWS D1.3 "Structural Welding Code-Sheet Steel."

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

C. Field Measurements

Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.05 SUBMITTALS

See Appendix "A" for submittal requirements.

## PART 2. PRODUCTS

2.01 MATERIALS

A. Ferrous Metals

1. Metal Surfaces for fabrication of Work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

2. Steel Plates, Shapes and Bars: ASTM A 36.

3. Rolled Steel Floor Plates: ASTM A 786.

4. Steel Bar Grating: ASTM A 569 or ASTM A 36.

5. Steel Tubing

Cold-formed, ASTM A 500; or hot-rolled. ASTM A 501.

a. For exterior installations, provide steel tubing with hot-dip galvanized coating per ASTM A 53.

6. Steel Pipe

ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is shown on the Contract Drawings; standard weight (schedule 40), unless otherwise shown on the Contract Drawings.

7. Brackets, Flanges and Anchors

Cast or formed metal of the same type material and finish as supported construction.

8. Gray-Iron Castings: ASTM A 48, Class 30.

9. Malleable-Iron Castings: ASTM A 47, Grade 32510

10. Concrete Inserts

Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

B. Fasteners

1. General

Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use of where built into exterior walls. Select fasteners for the type, grade and class required for application shown on the Contract Drawings.

2. Bolts and Nuts

Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), with hex nuts, ASTM A 563 and, where indicated, flat washers.

3. Machine Screws: ANSI B18.6.3.

4. Lag Bolts: ANSI B18.2.1

5. Wood Screws: Flat head, carbon steel, ANSI B18.6.1.

6. Plain Washers: Round, carbon steel, ANSI B18.22.1

7. Lock Washers: Helical, spring type, carbon steel, ANSI B18.22.1.

8. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

   a. Material: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

9. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.

C. Paint

1. Shop Primer for Ferrous Metal

Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with substrates and finish paint systems shown on the Contract Drawings, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

2. Galvanizing Repair Paint

High zinc dust content paint for regalvanizing welds in galvanized steel, complying with SSPC-Paint-20.

D. Grout

Pre-mixed, factory-packaged as manufactured by one of the following, or approved equal, for specified application:

1. Non-metallic non-shrink types:

   a. "5 Star Grout", US Grout Corporation, Fairfield, CN

   b. "Masterflow 713", Master Builders, Cleveland, OH

2. Metallic non-shrink type

   a. "Embeco 636", Master Builders

   b. "Vibro Foil", WR Grace and Co., Construction Products Div., Cambridge, MA

## 2.02 FABRICATION

A. Use materials of size and thickness shown on the Contract Drawings, or if not shown, as required to produce strength and durability in finished product for use intended. Work to dimensions shown on the Contract Drawings or approved shop drawings, using proven details of fabrication and support. Use type of materials shown on the Contract Drawings or specified in this Section for various components of Work.

B. Form exposed Work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing Work.

C. Weld corners and seams continuously, complying with AWS D1.1 and D1.3 recommendations as applicable. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

D. Form exposed connections with hairline joints flush and smooth, using concealed fasteners wherever possible. Exposed fasteners, where used, shall be of type as shown on the Contract Drawings or, if not shown, Phillips flathead (countersunk) screws or bolts.

E. Provide for anchorage of type as shown on the Contract Drawings, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

F. Galvanizing

Provide a zinc coating for those items shown on the Contract Drawings or specified in this Section to be galvanized, complying with other portions of this Section or ASTM A 123 for galvanized rolled, pressed and forged steel shapes, plated, bars and strip 1/8 inch thick and heavier, and assembled steel fabrications and ASTM A 153 for galvanizing iron and steel hardware.

G. Fabricate joints that will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

H. Fabricate items to sizes, shapes and dimensions required for application shown on the Contract Drawings. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

I. Shop Assembly

Preassemble items in shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly match mark units for reassembly and coordinated installation.

J. Ladders

1. Fabricate ladders for the locations shown on the Contract Drawings, with dimensions, spacings, details and anchorages as shown. Comply with requirements of ANSI A14.3, unless otherwise shown.

   a. Unless otherwise shown, provide 1/2 inch x 2 1/2 inches continuous structural steel flat bar side rails with eased edges, spaced 18 inches apart.

   b. Provide 3/4-inch diameter solid structural steel bar rungs, spaced 12 inches o.c.

2. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.

3. Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet - 0 inch o.c. Use welded or bolted steel brackets, designed for adequate support and anchorage, and to hold ladder clear of the wall surface with a minimum of 7-inch clearance from wall to centerline of rungs.

4. Extend rails 42 inches above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, gooseneck the extended rails back to the structure to provide secure ladder access.

5. Provide non-slip surface on top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resin adhesive, or by using a type of manufactured rung that is filled with aluminum oxide grout.

6. Provide ship's ladders where shown on the Contract Drawings. Fabricate of open type construction with structural steel channel or steel plate stringers, pipe handrails, and open steel grating treads, unless otherwise shown on the Contract Drawings. Provide all necessary brackets and fittings for installation.

7. Galvanize ladders, brackets and fasteners.

K. Ladder Safety Cages

Fabricate from structural steel flat bars, assembled by welding. Unless otherwise shown on the Contract Drawings, provide 5/16 inch x 4 inch top and bottom hoops and intermediate hoops spaced not more than 20 feet - 0 inches o.c.; 5/16 inch x 2 inches hoops at 4 feet - 0 inches o.c. between the 4 inch wide hoops; and 5/16 inch x 2 inches vertical bars at 12 inches o.c., secure assembled safety cage to ladder rails and adjacent construction shown.

1. Galvanize ladder safety cages and fasteners.

L. Loose Bearing and Leveling Plates

Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of the required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

M. Loose Steel Lintels

1. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

2. Weld adjoining members together to form a single unit where shown on the Contract Drawings.

3. Size loose lintels for equal bearing of 1 inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise shown on the Contract Drawings.

4. Galvanize loose steel lintels to be installed in exterior walls.

N. Shelf and Relieving Angles

Fabricate shelf and relieving angles from steel angles of sizes indicated and for attachment to concrete framing. Provide slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and not more than 24 inches o.c., unless otherwise shown on the Contract Drawings.

O. Miscellaneous Framing and Supports

1. Provide miscellaneous steel framing and supports that are not a part of structural steel framework, as required by the Contract Drawings to complete the Work.

2. Fabricate miscellaneous units to sizes, shapes and profiles shown on the Contract Drawings or, if not shown, of required dimensions to receive adjacent other Work to be retained by framing. Except as otherwise shown on the Contract Drawings, fabricate from structural steel shapes, plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

3. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed. Except as otherwise shown on the Contract Drawings, space anchors 24 inches o.c. and provide minimum anchor units of 1 1/4 inch x 1/4 inch x 8 inch steel straps.

4. Fabricate support for suspended toilet partitions as follows:

   a. Beams

      Continuous steel shapes of size required to limit deflection to L/360 between hangers, but use not less than C8 by 11.5 channels or another shape with equivalent structural properties.

b. Hangers

Steel rods, 1/2-inch minimum diameter, spaced not more than 36 inches o.c. Thread rods to receive anchor and stop nuts. Fit hangers with wedge-shaped washers for full bearing on sloping flanges of support beam.

c. Braces and Angles

Steel angles of size required for rigid support of beam and for secure anchorage.

5. Galvanize miscellaneous framing and supports at exterior locations and where shown on the Contract Drawings.

P. Miscellaneous Steel Trim

1. Provide shapes, sizes and profiles shown on the Contract Drawings. Unless otherwise shown on the Contract Drawings, fabricate units from structural steel shapes, plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other Work.

2. Galvanize miscellaneous steel trim at exterior locations and at interior locations where shown on the Contract Drawings.

Q. Floor Plate

Fabricate raised-pattern floor plates from rolled-steel floor plate of thickness and in pattern shown on the Contract Drawings.

R. Abrasive-Surface Floor Plate

Fabricate from steel plate, of thickness shown on the Contract Drawings, with manufacturer's standard abrasive granules, rolled into surface. Provide material with coefficient of friction (COF) of 0.6 or higher when tested according to ASTM C 1028.

S. Extruded Nosings and Treads

1. Fabricate units of material, sizes, and configurations indicated. If not indicated, provide cast-iron units with an integral abrasive finish. Furnish in lengths as required to accurately fit each opening or conditions.

a. Provide solid abrasive type units without ribs.

2. Available Manufacturers

Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

American Safety Tread Co., Inc.
Balco/Metalines, Inc.
Safe-T-Metal Co.
Wooster Products Inc.

3. Drill for mechanical anchors with countersunk holes located not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise shown on the Contract Drawings. Provide closer spacing if recommended by the manufacturer.

T. Cast Nosings, Treads, and Thresholds

1. Fabricate units of material, sizes, and configurations shown on the Contract Drawings. If not shown, provide cast-iron units with an integral abrasive finish. Furnish in lengths as required to accurately fit each opening or conditions.

   a. Cast units with an integral abrasive grit consisting of aluminum oxide, silicon carbide, or a combination of both.

2. Available Manufacturers

   Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

   American Safety Tread Co., Inc.
   Balco/Metalines, Inc.
   Safe-T-Metal Co.
   Wooster Products Inc.

3. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with the manufacturer.

4. Drill for mechanical anchors with countersunk holes located not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise shown on the Contract Drawings. Provide closer spacing if recommended by the manufacturer.

5. Apply black asphaltic coating to concealed bottoms, sides, and edges of cast-iron units set into concrete.

6. Provide a plain surface texture, except where fluted or cross-hatched surfaces are shown on the Contract Drawings.

U. Corner Guards

Provide corner guards of steel angles sizes as shown on the Contract Drawings, but not less than 3 x 3 x 5/16 inch extending from floor to 3 feet 6 inches above floor. Provide with 3/8-inch steel base plates for bolting to floor, and with 1/4-by-2-inch steel strap braces at top. Provide at least 2 vertical angles at each location, except at internal corners, and extend strap between angles and from each angle to wall or column.

V. Wheel Guards

Provide wheel guards of 3/4-inch- thick, hollow-core, gray-iron castings, of size and shape shown on the Contract Drawings. Provide holes for countersunk anchor bolts and grouting.

W. Pipe Bollards

1. Fabricate pipe bollards from Schedule 80 steel pipe. Cap bollards with 1/4-inch minimum steel plate.

2. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch-thick steel plate welded to bottom of sleeve.

2.03 SHOP PAINTING

A. Apply shop primer to surfaces of metal fabrications, except those that are galvanized or shown on the Contract Drawings to be embedded in concrete or masonry, in compliance with requirements of SSPC-PA1 for shop painting.

B. Surface Preparation

Prepare ferrous metal surfaces to comply with requirements for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications as follows:

1. Exterior: SSPC-SP6

2. Interior: SSPC-SP3

## PART 3. EXECUTION

3.01 PREPARATION

A. Field Measurements

Take field measurements prior to preparation of shop drawings and fabrication, or where not possible, allow for field trimming and fitting.

B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the site of the Work.

3.02 INSTALLATION

A. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

B. Cutting Fitting and Placement

Perform cutting, drilling and fitting required for installation of metal fabrications. Set Work accurately in location, alignment and elevation plus level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

C. Fit exposed connections accurately together to form tight hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

D. Field Welding

Comply with AWS D1.1 and D1.3 for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding Work.

E. Setting Loose Plates

1. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates or surfaces.

2. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic, non-shrink grout in exposed locations, unless otherwise shown on the Contract Drawings.

F. Installing Supports for Toilet Partitions

Anchor supports securely to and rigidly brace from overhead building structure.

G. Installing Nosings, Treads, and Thresholds

1. Install with anchorage system indicated to comply with manufacturer's recommendations.

2. Seal thresholds exposed to exterior with elastomeric sealant, complying with the applicable Division 7 Section on joint sealants, to provide a watertight installation.

3.03 ADJUSTMENTS

A. Touch-Up Painting

Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting.

Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces:

Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

**END OF SECTION**

## SECTION 05506

## MISCELLANEOUS STEEL

## APPENDIX "A"

## SUBMITTALS

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:

A. Product Data

Manufacturer's specifications, anchor details and installation instructions for products used including paint products.

B. Shop Drawings

Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.

C. Submit design calculations signed and sealed by a Professional Engineer licensed in the state in which Work is to be performed, showing compliance with Design and Performance Requirements loading criteria, when required by the Contract Drawings.

END OF APPENDIX "A"

# DIVISION 9

# SECTION 09910

# PAINTING

## PART 1. GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for shop and construction site application of paint as shown on the Contract Drawings.

B. Unless otherwise shown on the Contract Drawings, or specified herein, Work of this Section includes surface preparation and painting of the following items and surfaces:

1. Exterior and interior painting in accordance with Appendix "B" to this Section.
2. Exposed bare and covered pipes and ducts, and conduits, including color coding (if any), and hangers and supports.
3. Shop primed or galvanized steel and iron Work, and metal items and surfaces of architectural, mechanical and electrical items, if any.
   a. Shop priming or galvanized, and surface preparation and treatment of such items is specified in other Sections of the Specifications.
4. Architectural woodwork and casework, if any.
   a. Surface preparation and shop staining or painting of such items as specified in other Sections of the Specifications.

C. Do not paint the following surfaces unless otherwise shown on the Contract Drawings:

1. Items with factory-applied top coat.
2. Finished metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished metals.
3. Concealed pipes, ducts and conduits.
4. Concealed or inaccessible surfaces.
5. Code required labels such as Underwriters Laboratories, or Factory Mutual.
6. Identification, performance rating, name or nomenclature plates of mechanical or electrical fire equipment.
7. Operating or moving parts of operating units or mechanical and electrical equipment such as: valves, damper operators, linkages, sinkages, sensing devices, motors, shafts and sheaves.

8. Surfaces shown or scheduled on the Contract Drawings to receive sprayed on fire resistive material.

D. Definitions: QC, refers to quality control or a quality control program. This is a methodology employed by the Contractor to ensure compliance with Contract requirements.

## 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

| | American Society for Testing Materials |
|---|---|
| ASTM D 521 | Standard Methods for Chemical Analysis of Zinc Dust |
| ASTM D 523 | Test Method for Specular Gloss |
| ASTM D 562 | Standard Test Method for Consistency of Paints Using the Stormer Viscometer |
| ASTM D 1400 | Standard Test Method for Non-Destructive Measurement of Dry Film Thickness of Non-Conductive Coatings Applied to a Non-Ferrous Metal Base |
| ASTM D 1475 | Standard Test Method for Density of Paint, Varnish, Laquer, and Related Products |
| ASTM D 2092 | Standard Guide for Preparation of Zinc- Coated(Galvanized) Steel Surfaces for Painting |
| ASTM D 2369 | Standard Test Method for Volatile Content of Coatings |
| ASTM D 2371 | Standard Test Method for Pigment Content of Solvent-Reducible Paints |
| ASTM D 2697 | Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings |
| ASTM D 3335 | Standard Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy |
| ASTM D 3359 | Standard Test Method for Measuring Adhesion by Tape Test |
| ASTM D 4138 | Standard Test Method for Measurement of Dry Paint Thickness of Protective Coating Systems by Destructive Means |
| ASTM D 4285 | Standard Test Method for Indicating Oil or Water in Compressed Air |
| ASTM D 4414 | Standard Test Method for Measurement of Wet Film Thickness by Notch Gages |
| ASTM D 4417 | Standard Test Method for Field Measurement of Surface Profile of Blast Cleaned Steel |
| ASTM D 4541 | Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers |

| | |
|---|---|
| ASTM D 4940 | Standard Test Method for Conductimeter Analysis of Water Soluble Ionic Contamination of Blasting Abrasives |
| ASTM E 11 | Test Method for Wire-Cloth Sieves for Testing Purposes |
| | Code of Federal Regulations (CFR) |
| 29 CFR 1926 | Occupational Safety and Health Regulations for the Construction Industry |
| | The Society for Protective Coatings (SSPC) |
| SSPCSP 1 | Solvent Cleaning |
| SSPCSP 2 | Hand Tool Cleaning |
| SSPCSP 3 | Power Tool Cleaning |
| SSPCSP 5 | White Metal Blast Cleaning |
| SSPCSP 6 | Commercial Blast Cleaning |
| SSPCSP 7 | Brush-off Blast Cleaning |
| SSPCSP 10 | Near-White Blast Cleaning |
| SSPCSP 11 | Power Tool Cleaning To Bare Metal |
| SSPC-VIS 1 | Visual Standard for Abrasive Blast Cleaned Steel |

## 1.03 AMBIENT TEMPERATURE AND HUMIDITY REQUIREMENTS

A. Comply with the manufacturer's recommendations as to environmental conditions under which paint and finishes may be applied, and the following:

1. Do not apply paints in rain, snow, fog or mist, or when relative humidity exceeds 85 percent; or to damp or wet surfaces unless otherwise permitted by the manufacturer's printed instructions. Painting may be performed during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by the manufacturer(s) during application and drying periods.

2. Apply solvent base paint only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F and 95 degrees F, unless otherwise permitted by the manufacturer's printed instructions.

3. Apply water-base paint only when temperature of surfaces to be painted and surrounding air temperatures are between 50 degrees F and 90 degrees F, unless otherwise permitted by the manufacturer's printed instructions.

4. Apply paint to ferrous and non-ferrous metal surfaces only when the surface temperature is at least 5 degrees F above the dewpoint.

5. Apply primer to non-metal surfaces only when the moisture content of surfaces are below the following maximums, measured using an electronic moisture meter:

   a. Plaster and gypsum wallboard: 12 percent

   b. Concrete and masonry: 12 percent

c. Wood: 15 percent

B. Do not perform Work of this Section in areas where dust is being generated.

C. When painting and/or blasting operations are performed out of doors, no Work shall be performed when the U.S. Weather Bureau forecasts precipitation which would commence prior to or within two hours after completion of such procedures and application of paint.

D. For Work in the interior of a building or other enclosed space, ventilation in accordance with OSHA requirements shall be maintained during blasting and painting operations and for 48 hours thereafter.

## 1.04 QUALITY ASSURANCE

A. Paint System Compatibility

The paint system including all primers and undercoats shall be produced by the same manufacturer of the topcoat. When this is not possible, such as specialized primers used in the coating of miscellaneous components, the contractor shall review other Sections of the Specifications to determine the primer, surface preparation and treatment provided for various substrates and items which are to be field painted or finished as Work of this Section.

1. Notify the Engineer in writing of compatibility problems associated with the Work of this Section and substrates primed under other Sections of these Specifications.

2. Provide tie coats over incompatible primers, or remove and reprime as directed by the Engineer.

B. Where shown on the Contract Drawings, provide not less than a 100 square foot full-coat finish sample(s) on actual surface(s) for coating material to be applied as Work of the Section, at a location selected by the Engineer. Such sample(s), when approved by the Engineer, may be incorporated into the Work and shall be used to establish the standard for color, texture and workmanship for the remainder of the Work of this Section.

C. Painting of Structural Steel – Shop Requirements

All shop painting of structural steel must be done by firms that are approved by the Engineer. The shop shall have as a minimum the following:

1. Technical Capabilities

a. The shop shall have areas available for specific operations, such as: receiving and lay down for steel to be coated; pre-cleaning of items to be coated; surface preparation; coating application; drying and curing of coated items; storage of coating materials.

b. Blasters and painters must be trained. This training shall consist of at least 4 hours of instruction by a qualified instructor and cover various types of surface preparation equipment, paints and application equipment. Instructor qualifications and training records must be maintained and produced when requested.

c. There shall be procedures or processes in place to record specifications and revisions, and to clarify ambiguous or incomplete specifications.

d. There shall be a procedure for informing quality control and production personnel of job/shop procedures required to meet client specifications.

2. Quality Control

The firm performing shop painting of structural steel shall have a written quality control program. The program shall contain, but not be limited to the following:

a. The qualifications of QC staff, including training records and experience.

b. The authority of QC staff and reporting lines in the firm organization chart.

c. Standards and specifications used by QC staff for inspection purposes.

d. Inspection reports and other records documenting compliance with customer requirements.

e. Inspection equipment and calibration standards used by QC staff and calibration procedures.

f. Procedure for QC staff to advise operation supervisor, in writing, of non-conforming Work.

3. NACE Coating Inspector

a. When required by the Engineer, the Contractor shall provide full time inspection of all surface preparation and painting activities. At least one National Association of Corrosion Engineers (NACE) Certified Coating Inspector, who has successfully completed all three training sessions and the peer review, shall be present for the duration of the project. Additional inspectors required in order to provide full time coverage shall be qualified at a minimum level of NACE Basic. The Contractor's Certified NACE Inspector shall verbally inform the Engineer on a daily basis, of the progress and any corrective actions performed on the coating Work.

b. Daily coating activities shall be recorded in the latest version of the NACE Coating Inspector Logbook and shall commence prior to structural steel shop drawing preparation. The Contractor's Certified NACE Inspector shall stamp the front page of each inspector's log book used during painting operations. The stamped book(s) shall indicate the Inspector's NACE certification number, expiration date and shall also be signed. The log book(s) shall be available to the Engineer.

4. Technical Advisor

The Contractor shall obtain the services of a technical advisor who is employed by the coating manufacturer to assist the Engineer and the shop painting firm during this Work. The technical advisor shall be a qualified representative, approved by the Engineer, and shall be at the Work site prior to the opening of the coating containers. The technical advisor shall provide instruction in the proper mixing of components and application of the materials. He shall remain at the site until the Engineer is satisfied that the shop painting firm's personnel have mastered the proper handling, mixing and application of the materials.

5. Schedule and Authority Approval

a. Submit a schedule for surface preparation and painting at least 30 days prior to beginning Work.

b. At least 10 days prior to painting, notify the Engineer.

c. Steel shall not be painted until inspected by the authority's representative or until approval to proceed is given by the Engineer.

## 1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in the manufacturer's original unopened packages and containers bearing manufacturer's name, label and the following information:

1. Manufacturer's name.
2. Name or title of material.
3. Manufacturer's stock number and date of manufacture.
4. Shelf life.
5. Contract or order number under which the material has been ordered.
6. Lot and batch numbers.
7. Thinning instructions.
8. Application instructions.
9. Color name and number.
10. Handling instructions and precautions.
11. Gross, tare and net weights.

B. Store materials not in actual use in tightly covered containers at a minimum ambient temperature of 45 degrees F in a well-ventilated area. Maintain containers used in storage of coatings in a clean condition, free of foreign materials and residue. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all necessary precautionary measures to ensure that Workmen and Work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of materials.

C. Provide paint ready mixed to approved colors. Construction site tinting is prohibited.

D. Extra Material

Where requirement for extra materials are shown on the Contract Drawings, deliver to the Engineer prior to issuance of the Certificate of Final Completion, not less than one gallon of each type of color of each coating applied as Work of this Section. Container(s) shall be the manufacturer's original, unopened, clearly labeled for product identification an Contract number.

1.06 SUBMITTALS

See Appendix "A" for submittals requirements

## PART 2. PRODUCTS

2.01 MANUFACTURERS

A. Provide paint systems and products of manufacturers in accordance with Appendix"B" to this Section, or approved equal.

B. When materials or products proposed to be used are products of manufacturers other than manufacturers specified in Appendix "B" to this Section, submit product information in accordance with the requirements of Division 1 - GENERAL PROVISIONS.

2.02 MATERIALS

A. Provide colors as shown on the Contract Drawings, or if not shown as required by Appendix "A" of this Section.

2.03 MIXES

A. Mix and prepare painting materials in accordance with the manufacturer's instructions and 1.05 C of this section.

B. Stir materials before application, and as required during application to produce a mixture of uniform density. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

C. Colors

Each undercoat shall be a contrasting color to facilitate identification of each coat where multiple coats are to be applied as shown on the Contract Drawings.

## PART 3. EXECUTION

### 3.01 PREPARATION

A. General

Perform preparation and cleaning procedures in accordance with the paint manufacturer's instructions and as specified in this Section, for each particular substrate condition.

1. Ensure paint system compatibility in accordance with 1.04 B of this Section.
2. Ensure that ambient temperature and humidity conditions conform to requirements of 1.03 A of this Section.
3. Remove hardware, hardware accessories, machined surfaces, lighting fixtures, and similar items in place and not to be painted, or provide surface-applied protection prior to surface preparation and painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
4. For previously painted surfaces and shop painted surfaces requiring field top coating, glossy surfaces (Greater than 50 units @ 600) are to be dulled using a 120 grit or greater (finer) grade sandpaper.
5. Thoroughly clean and remove all dust, oil, grease and other contaminants from surfaces to be painted. Schedule cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.
6. Hot dip galvanizing shall be by the "dry kettle" process. Galvanized items shall not be quenched following galvanizing. Galvanized surfaces shall not be treated with waxes, oils or chromates.

B. Surface Preparation

1. Steel

Remove slag, flux deposits, weld spatter, and surface irregularities. Grind smooth square edges, sharp discontinuities, and flame cut edges in accordance with AWS D1.5 Guidelines.

Clean surfaces to remove oil, grease, soil, and other soluble contaminants in accordance with SSPC-SP1 Solvent Cleaning. Were shown on the Contract Drawings, prepare surface in accordance with one or more of the following: SSPC-SP2, SSPC-SP3, SSPC-SP5, SSPC-SP6, SSPC-SP7, SSPC-SP10, and SSPC-SP11.

a. Steel – Blast Cleaned

Unless otherwise shown on the Contract Drawings, abrasive blasting shall be done in accordance with SSPC-S10 Near White Blast Cleaning using a production line shot and grit blast machine or by air blast. The abrasive Work mix shall be maintained such that the final surface profile is within the required range.

b. Provide expendable or recyclable abrasives that are dry and free of oil, grease, and corrosion producing, or other deleterious contaminants. Do not use silica sand. The abrasive shall be checked at least daily for oil, grease or dirt contamination with the vial test. The test consists of adding a sample of abrasive from the inside of the blast machine to a sealable vial filled with deionized water. The vial is shaken for one minute and allowed to settle for five minutes. If any oil or grease is floating on top of the water, then the abrasive is contaminated. If the water becomes cloudy, then it contains dirt. Contaminated or dirty abrasives shall not be used to blast steel surfaces.

c. Compressed Air Cleanliness

(1) Provide compressed air that is free from moisture and oil contamination.

(2) Use the white blotter test in accordance with ASTM D4285 to verify the cleanliness of the compressed air. Conduct the test at least once per day 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 evidenced, change filters, clean traps, add moisture separators or filters, or make adjustments as necessary to achieve clean, dry air. Reinspect surfaces prepared or coated since the last satisfactory test and repair, at no cost to the Authority, defective Work caused by contaminated air.

d. Surface Profile

The steel surface profile shall be 2-3 mils. Each girder, beam, or diaphragm shall have the surface profile measured at three locations. Special attention shall be given to areas that may have been shielded during blasting. Measure the surface profile using Testex Replica Tape in accordance with ASTM D4417. The impressed tapes shall be filed in the coating inspector's logbook.

2. Galvanized Steel Surfaces

a. Chemical Treatment

Prepare the surface for painting in accordance with ASTM D2092 Zinc Phosphate Treatment (Method A). Follow the manufacturer's instructions for use of the materials. Prior to chemical treatment, remove white rust and other contaminants.

b. Newly Galvanized Surface

Galvanized surfaces may be painted without chemical treatment provided painting is accomplished within 12 hours of galvanizing. Painting must be done in the galvanizer's shop. Prior to painting, the galvanized surface shall be cleaned in accordance with SSPC-SP1 Solvent Cleaning.

3. Aluminum Surfaces

Clean surfaces of oil, grease, dirt, and other foreign substances. Care shall be taken not to damage the aluminum. Use solvent cleaning in accordance with SSPC-SP1.

4. Cementitious Materials

Prepare cementitious surfaces of concrete, concrete block, cement plaster to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.

a. For concrete and other cementitious materials, perform appropriate tests to ensure that the moisture content is sufficiently low for painting and use only materials that are capable of being applied to alkaline surfaces. Do not paint over surfaces where moisture content exceeds that permitted in 1.03A.5 of this Section.

b. Clean concrete floor surfaces shown on the Contract Drawings or scheduled to be painted with a commercial solution of muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid, and allow to dry before painting.

5. Wood

Wipe off dust and grit from miscellaneous wood items and millwork prior to priming, using a solution of tri-sodium phosphate and water. Rinse off surfaces with clean water. Spot coat knots, pitch streaks and sappy sections with sealer. Fill nail holes and cracks after primer has dried and sand with a fine grade sand paper between coats. Back prime interior and exterior woodwork.

a. Where clear finishes are shown on the Contract Drawings, ensure that fillers match wood tint. Work fillers into grain. Wipe excess from the surface.

## 3.02 APPLICATION

A. General

1. Apply paint in accordance with SSPC PA-1 and the manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied. The contractor shall adhere strictly to the manufacturer's recommendations for cure times, temperature and humidity conditions and recoat times as the individual coats of the specified system are applied.

2. Apply each coat at proper consistency.

3. Apply additional coats when undercoats, stains or other conditions show through top coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.

5. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

6. Paint backsides of access panels, and removable or hinged covers to match exposed surfaces.

7. Finish exterior doors on tops, bottoms and side edges the same as exterior faces, unless otherwise shown on the Contract Drawings.

8. Sand lightly between each succeeding enamel or varnish coat.

9. Omit first coat (primer) on metal surfaces which have been shop-primed, unless otherwise shown on the Contract Drawings.

10. Paint primed items and equipment to color shown on the Contract Drawings.

11. Unless otherwise shown on the Contract Drawings, prime and paint to match adjacent surface; exposed insulated and bare pipe and ducts, conduits, boxes, hangers, brackets, and supports, except where items are covered with a prefinished coating.

12. Color code equipment, piping conduit and exposed ductwork as shown on the Contract Drawings.

B. Scheduling Painting

Apply paint to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Coating Thickness

Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as shown on the Contract Drawings or, if not shown, as recommended by coating manufacturer. For metal surfaces, dry film thickness shall be measured in accordance with SSPC-PA2.

D. Completed Work

Match approved samples for color, texture and coverage. Remove, refinish or repair Work not in compliance with the requirements specified in this Section.

E. Field Touch Up

After erection or installation, all adhering rust, scale, dirt, grease, concrete splatter and other foreign material on surfaces including connections, bolts, nuts and around field welds shall be completely removed by solvent cleaning in accordance with SSPC-SP1 followed by hand tool cleaning SSPC-SP2, or power tool cleaning SSPC-SP3. Cleaning shall be performed prior to field touch-up painting.

Bolts, nuts and washers shall receive brush applications of intermediate and topcoat after tensioning. Careful attention shall be given to bolted connections to insure that all bolts, nuts and washers are fully coated.

F. Repair of Damaged & Unacceptable Coatings:

1. Surface Preparation of Localized Areas

   a. Repair localized damage, corrosion, and unacceptable coatings.

   b. Prepare the surface by cleaning in accordance with SSPC-SP 1 Solvent Cleaning followed by SSPC SP-2 Hand Tool Cleaning or SSPC SP-3 Power Tool Cleaning. Use a solvent that is acceptable to the paint manufacturer.

   c. For previously blast-cleaned steel - if the damage exposes the substrate, remove all loose material and prepare the steel in accordance with SSPC SP 11.

2. Surface Preparation of Extensive Areas

   a. Repair extensive areas of damage or unacceptable coating. The Engineer will stipulate the degree of cleaning required, based on the nature of the defect.

   b. For previously blast-cleaned steel - prepare the surface by abrasive blast cleaning in accordance with SSPC-SP7, or better. Surfaces shall be blasted back to original requirements. Use extreme care to avoid damage to the surrounding coating, due to overblast.

3. Feathering of Repair Areas

   a. Feather the existing coatings surrounding each repair location. Feather for a distance of 1 to 2 inches to provide a smooth, tapered transition into the coating.

   b. Verify that the edges of coating around the periphery of the repair areas are tight and intact by probing with a putty knife in accordance with the requirements of SSPC-SP3 Power Tool Cleaning. Roughen the existing coating in the feathered area to assure proper adhesion of the repair coats.

4. Weld Splatter, Sharp Edges and Holes

   a. Remove slag, flux deposits, weld splatter and surface irregularities such as silvers, tears, fins and hackles; all within AWS D1.5 Guidelines. Grind any resulting burrs smooth, including burrs around holes, if any. Do not remove any welding material that will weaken weld strength.

b. Prior to preparation, break sharp edges such as those created by flame cutting and shearing. The rolled edges of angles, channels and wide flange beams do no normally require further rounding, unless specifically required by the Engineer.

G. Coating Application in Repair Areas

1. When the bare substrate is exposed in the repair area, apply all coats of the system to the specified thicknesses.

2. When the damage does not extend to the bare substrate, apply only the affected coats.

3. Maintain the thickness of the system in overlap areas within the specified total thickness tolerances.

H. Clean-up

During progress of Work, remove discarded paint materials, rubbish, cans and rags daily. Upon completion of painting Work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

## 3.03 FIELD TESTS

A. Monitor paint application rate by use of wet film thickness gauge; multiply wet film thickness by the percent of solids by volume of the coating to determine the theoretical dry film thickness.

B. After first coat has dried, visually examine for pinholes, fish eyes, blisters, runs, sags or missed areas. Repair defects and repaint as required.

1. On ferrous substrates, after visual examinations:

a. Measure dry film thicknesses by use of dry film thickness gauge in accordance with use and calibration requirements of SSPC-PA2.

b. Coating shall be applied in a manner which produces a surface that is free of runs, sags, voids and pinholes. For immersion service applications the complete coating system shall be tested using a low voltage (less than 90V) holiday detector and shall be holiday free.

2. Maintain a daily log of inspections and test results. Submit a copy of such log to the Engineer if requested.

C. The Authority reserves the right to conduct tests of the materials at any time, and any number of times during shop or field painting.

1. The Engineer will sample the paint(s) being used. A representative pint or quart sample of each component of paint(s) at the construction site will be transferred to metal containers, identified, sealed and certified in the presence of the Contractor.

2. Tests on paint samples may be conducted by the Port Authority of NY & NJ, Materials Engineering Division, to confirm manufacturer's submittals made under Appendix "A". Any or all of the following tests may be conducted:

   a. Viscosity (Stormer @ 250 C) ku, ASTM D 562

   b. % Total Solids by Weight, ASTM D 2369

   c. Volatile Organic Compounds (VOC), ASTM D 2369

   d. Weight per Gallon, ASTM D 1475

   e. Volume Nonvolatile Matter, ASTM D 2697

   f. Pigment Content, ASTM D 2371

   g. % Metallic Zinc in Primer, ASTM D 521

   h. Specular Gloss of finish coat, ASTM D 523

   i. Infrared Identification - of individual components and of the mixed coatings for 2 component materials. Obtain each spectrum by sandwiching a small quantity (i.e., 1-2 drops) of material between 2 potassium bromide plates and obtaining a transmission infrared spectrum. For the mixed and cured material, use a solid sampling technique.

3. If the laboratory test show that the material being used does not comply with the requirements specified in this Section, the Contractor may be directed to stop painting Work and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; or remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are incompatible.

## 3.04 PROTECTION

Protect other adjacent Work against damage by painting and finishing Work. Correct damage by cleaning, repairing or replacing, and repainting, as approved by the Engineer.

A. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their Work, after completion of painting operations.

B. At completion of Work of other trades, touch-up and restore damaged or defaced painted surfaces.

C. Coated items shall not be shipped until cured. All fully coated and cured items shall be protected from handling and shipping damaged using padded slings, dunnage, separators, and tie downs.

END OF SECTION

# DIVISION 9

# SECTION 09910

# PAINTING

# APPENDIX "A"

## SUBMITTALS

A. Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:

1. Product Data

   Manufacturer's technical information including label and application instructions and technical data sheets for each material.

2. Samples

   On a 12 inch x 12 inch hardboard, two samples of each paint and coating material, with texture to simulate actual conditions. If more than one application method is to be used, submit two samples of each paint and coating material for each application method.

   a. Identify each sample as to manufacturer, color name and number, location and application.

   b. Submit in color(s) shown on the Contract Drawings, or if not shown, in color(s) as selected by the Engineer from manufacturer's color chart submitted prior to preparation of hardboard samples.

B. Submit a copy of the quality control program, as required by 1.04 C.2 of this Section, if requested by the Engineer.

C. Submit instructor qualifications and training records for blasters and painters as required by 1.04 C.1.b of this Section if requested by the Engineer.

D. Submit copy of daily log reports, as required by 3.03 B.2 of this Section if requested by the Engineer.

END OF APPENDIX "A"

# DIVISION 9

# SECTION 09910

# APPENDIX "B"

# PAINT SCHEDULE

A. EXTERIOR

| Surface | System Designation | Primer | Manufacturer's Product | 2nd Coat | Manufacturer's Product | Top Coat | Manufacturer's Product |
|---|---|---|---|---|---|---|---|
| Galvanized & Aluminum (Marine & Bridge) Semi-Gloss | N-2S | Epoxy Primer | Carboline Carboguard 888<br>K&L Kolor-Poxy No. 3200<br>SW B-58 300 Series<br>Tnemec 161 Fascure | | N/A | Aliphatic Polyurethane | Carboline Carbothane 133 HB<br>K&L Acrythane Y-2 Series<br>SW Acrolon Multi Mil<br>Tnemec 73 Endura-Shield |

END OF APPENDIX "B"

# DIVISION 9

# SECTION 09911

# REPAINTING

## PART 1. GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for repainting existing items in the field, where shown on the Contract Drawings.

B. Unless otherwise shown on the Contract Drawings, or specified herein, Work of this Section includes surface preparation and painting of the following items and surfaces:

1. Exterior and interior painting in accordance with Appendix "B" to this Section.
2. Exposed bare and covered pipes and ducts, and conduits including color coding (if any), and hangers and supports.
3. Painted galvanized steel and iron-work, and metal items and surfaces of architectural, mechanical, structural and electrical items, if any.
   a. Shop priming, shop galvanizing, or other surface preparation and treatment of such items, which is done in the shop, is specified in other Sections of the Specifications.

C. Do not paint the following surfaces, unless otherwise shown on the Contract Drawings:

1. Code required labels such as Underwriters Laboratories, or Factory Mutual.
2. Identification, performance rating, name or nomenclature plates of mechanical or electrical fire equipment.
3. Operating or moving parts of operating units or mechanical and electrical equipment such as: valves, damper operators, linkages, sinkages, sensing devices, motors, shafts and sheaves.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

American Society for Testing Materials (ASTM)

| | |
|---|---|
| ASTM D 521 | Standard Method for Chemical Analysis of Zinc Dust (Metallic Zinc Powder) |
| ASTM D 523 | Test Method for Specular Gloss |
| ASTM D 562 | Standard Test Method for Consistency of Paints Using the Stormer Viscometer |

| | |
|---|---|
| ASTM D 1475 | Standard Test Method for Density of Paint, Varnish, Lacquer, and Related Products |
| ASTM D 2369 | Standard Test Method for Volatile Content of Coatings |
| ASTM D 2371 | Standard Test Method for Pigment Content of Solvent-Reducible Paints |
| ASTM D 2697 | Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings |
| ASTM D 3359 | Standard Test Method for Measuring Adhesion by Tape Test |
| ASTM D 4285 | Standard Test Method for Indicating Oil or Water in Compressed Air |
| ASTM D 4414 | Standard Test Method for Measurement of Wet Film Thickness by Notch Gages |
| ASTM D 4541 | Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers |

The Society for Protective Coatings (SSPC)

| | |
|---|---|
| SSPC-PA 2 | Measurement of Dry Paint Thickness with Magnetic Gages |
| SSPC SP 1 | Solvent Cleaning |
| SSPC SP 2 | Hand Tool Cleaning |
| SSPC SP 3 | Power Tool Cleaning |
| SSPC SP 6 | Commercial Blast Cleaning |
| SSPC SP 7 | Brush-off Blast Cleaning |
| SSPC SP 10 | Near-White Blast Cleaning |
| SSPC SP 11 | Power Tool Cleaning To Bare Metal |
| SSPC PA 12/NACE 5 | Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating |
| SSPC - Paint 21 | White or Colored Silicone Alkyd Paint |
| SSPC - Paint 25 | Red Iron Oxide, Zinc Oxide, Raw linseed Oil & Alkyd Primer |
| SSPC - Vis 1 | Visual Standard for Abrasive Blast Cleaned Steel |
| SSPC - Vis 3 | Visual Standard for Hand and Power Tool Cleaned Steel |

## 1.03 AMBIENT TEMPERATURE AND HUMIDITY REQUIREMENTS

A. Comply with the manufacturer's recommendations as to environmental conditions under which paint and finishes may be applied, and the following:

1. Do not apply paints in rain, snow, fog or mist, or when relative humidity exceeds 85 percent; or to damp or wet surfaces unless otherwise permitted by the manufacturer's printed instructions. Painting may be performed during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by the manufacturer(s) during application and drying periods.

2. Apply solvent base paint only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F and 95 degrees F, unless otherwise permitted by the manufacturer's printed instructions.

3. Apply water-base paint only when temperature of surfaces to be painted and surrounding air temperatures are between 50 degrees F and 90 degrees F, unless otherwise permitted by the manufacturer's printed instructions.

4. Apply paint to ferrous and non-ferrous metal surfaces only when the surface temperature is at least 5 degrees F above the dewpoint.

B. Do not perform Work of this Section in areas where dust is being generated.

C. Do not perform surface preparation procedures when the U.S. Weather Bureau forecasts precipitation which would commence prior to completion of such procedures and application of paint.

D. For Work in enclosed spaces, where worker respiratory equipment is not utilized, provide continuous ventilation during preparation and painting operations and for 48 hours thereafter.

## 1.04 QUALITY ASSURANCE

A. Single Source Responsibility

Provide primers or other undercoat materials produced by same manufacturer as topcoat. Use only thinners and surface cleaning materials recommended by paint manufacturers and use within recommended limits.

B. Paint System Compatibility

Review Contract Drawings and other Sections of the Specifications to determine primer and surface preparation requirements and necessary treatment for the various substrates and items which are to be field painted as Work of this Section. Review information on characteristics of such primers, surface preparations and treatments, and furnish information on characteristics of materials provided as Work of this Section when requested by other trades, to ensure compatibility with products applied as Work of this Section.

1. Notify the Engineer in writing of compatibility problems associated with the Work of this Section and existing in-place substrates.

2. Provide tie coats over incompatible coatings, or remove and recoat as directed by the Engineer.

C. Where shown on the Contract Drawings, provide not less than a 100 square foot full-coat finish sample(s) on actual surface(s) for coating material to be applied as Work of the Section, at a location selected by the Engineer. Such sample(s), when approved by the Engineer, may be incorporated into the Work and shall be used to establish the standard for color, texture and workmanship for the remainder of the Work of this Section.

## 1.05 PERFORMANCE REQUIREMENTS

A. When the Contract Drawings show abrasive, wet abrasive, shot blast, water (hydro) blast, or power tool surface preparation methods, provide temporary translucent nylon reinforced laminated polyethylene fire retardant enclosures to prevent contamination of air and adjacent surfaces during surface preparation and paint application. Clean up and remove all fallout and debris prior to removal of enclosures.

B. When the Contract Drawings show removal of existing coating materials that contain lead, hexavalent chromium or other heavy metals, Work of this Section shall conform to the applicable requirements of Division 2 Sections on removal of hazardous materials.

C. Temporary heating units, if used, shall be units that have been tested and labeled by UL, FM or another recognized association related to the type of fuel to be consumed. Notify the Engineer at least one week in advance of use of temporary heating units and provide, for approval, information on fuel to be used and the safety measures to be employed for heater use and fuel storage.

D. Where wet abrasive or water (hydro) blast cleaning is shown on the Contract Drawings, conform with the requirements of SSPC-SP 12 and the following:

1. Provide wet abrasive or water blast equipment capable of providing controlled application of water at minimum pressures of 15,000 p.s.i. for surface preparation and 2,000 p.s.i. for cleaning, measured at the tip, and equipped with pressure gauges to allow the Engineer to verify nozzle pressure at any time.

2. Provide a rust inhibitor approved by the waterblast equipment manufacturer.

E. Remediation of Chloride (where shown on the Contract Drawings:)

1. Develop surface preparation procedures and processes which will remove chloride from the surfaces in addition to removing the paint, rust, and mill scale. Surface that may be contaminated with chloride include, but are not limited to, expansion joints and all areas that are subject to roadway splash or run off such as fascia beams and stringers.

2. Methods of chloride removal may include but are not limited to, steam cleaning or pressure washing and scrubbing before or after initial paint removal, abrasive blast cleaning the steel and allowing it to rust overnight followed by reblasting, 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.

3. Upon completion of surface preparation, use field chloride extraction and test procedures (e.g. silver dichromate) approved by the Engineer, to test representative surfaces which were previously rusted (i.e., pitted steel) for the presence of remaining chlorides. Perform a minimum of 3 tests per 1,000 square feet of surface area, and a minimum of 4 tests. If unacceptable results are found, double the frequency for the retesting after additional cleaning. If acceptable results are continually achieved, reduce the test frequency only upon written approval of the Engineer. Record all test results in a daily log or daily report submitted to the Engineer each seven calendar days.

4. If chlorides are detected at levels greater than 10 ug/cm2 continue to clean the affected areas until acceptable results are achieved.

5. Following chloride testing of less than 10 ug/cm2 abrasive blast and/or power tool clean the surfaces, as applicable, to achieve the required surface preparation criteria. For surfaces that have already been abrasive blast cleaned, SSPC-SP 11 may be used in lieu of SSPC-SP 10 for the localized cleaning of the chloride test areas upon approval of the Engineer.

6. Use SSPC-SP 6, SP 12, or other surface preparation methods, as shown on the Contract Drawings.

## 1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in the manufacturer's original unopened packages and containers bearing manufacturer's name, label and the following information:

1. Manufacturer's name,
2. Name or title of material.
3. Manufacturer's stock number and date of manufacture.
4. Shelf life.
5. Contract or order number under which the material has been ordered.
6. Lot and batch numbers.
7. Thinning instructions.
8. Application instructions,
9. Color name and number.
10. Handling instructions and precautions.
11. Gross, tare and net weights.

B. Store materials not in actual use in tightly covered containers at a minimum ambient temperature of 45 degrees F in a well-ventilated area. Maintain containers used in storage of coatings in a clean condition, free of foreign materials and residue. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all necessary precautionary measures to ensure that workmen and Work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of materials.

C. Provide paint ready mixed to approved colors. Construction site-tinting is prohibited.

D. Extra Material

E. Where requirement for extra materials are shown on the Contract Drawings, deliver to the Engineer prior to issuance of the Certificate of Final Completion, not less than one gallon of each type of color of each coating applied as Work of this Section. Container(s) shall be the manufacturers's original, unopened, clearly labeled for product identification and Contract number.

1.07 SUBMITTALS

See Appendix "A" for submittals requirements.

## PART 2. PRODUCTS

2.01 MANUFACTURERS

A. Provide paint systems and products of manufacturers in accordance with Appendix "B" to this Section, or approved equal.

B. When materials or products proposed to be used are products of manufacturers other than manufacturers specified in Appendix "B" to this Section, submit product information in accordance with the requirements of Division 1 - GENERAL PROVISIONS.

2.02 MATERIALS

A. Provide colors as shown on the Contract Drawings, or if not shown as required by Appendix "B" to this Section.

2.03 MIXES

A. Verify that the paint to be mixed has not exceeded its shelf life.

B. Mix and prepare painting materials in accordance with the manufacturer's instructions and as specified, herein.

C. Stir materials before and, as required, during application to produce a mixture of uniform density. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

D. Mix only complete kits of multi-component materials.

E. Tinting

Tint each under coat a different color to facilitate identification of each coat where multiple coats are to be applied as shown on the Contract Drawings.

2.04 ABRASIVES

A. Provide expendable or recyclable abrasives that are dry and free of oil, grease and corrosion producing, or other deleterious contaminants. Do not use silica sand, unless otherwise shown on the Contract Drawings.

B. For the preparation of steel, steel conduit and utilities that are specified to be blasted, provide abrasives that are sized to produce a sharp, angular, uniform anchor pattern profile height of 2.0 to 4.5 mils, unless the requirements of the coating manufacturer are more restrictive. In this case, comply with profile requirements specified by coating manufacturer.

C. For the preparation of weathered galvanized steel that is specified to be repainted, provide abrasives that will cause minimal damage to the surface and which will create a surface profile height of 1.0 mils, unless the requirements of the coating manufacturer are more restrictive, in which case, comply with profile requirements specified by coating manufacturer.

## 2.05 EQUIPMENT

A. Surface Preparation Equipment

1. Provide brushes, discs, wheels, scrapers, water jetting, blast cleaning, and other surface preparation equipment sized properly to conduct the Work as specified in this Section and shown on the Contract Drawings.

2. When using recyclable abrasives, provide all equipment needed to recover and clean the abrasive for reuse.

B. Paint Application Equipment

1. Provide paint brushes, rollers and spray equipment to conduct the Work as specified in this Section.

2. Provide specialized equipment as required for the painting of difficult-to-paint areas. Specialized equipment may include, but is not limited to:

   a. Pole guns for spray painting.

   b. Mitts, daubers, or other methods to supplement brush application.

C. Containment, Worker, and Environmental Protection

1. Comply with Division 2 Section which specifies the requirements for the installation and use of containment systems, for the protection of Contractor workers, the public, and the environment from harmful levels of dust, lead, and other toxic metals that may be present in the paint during removal, repair, and clean-up activities.

2. Provide containment materials and systems to provide similar levels of protection during all paint application activities, including the control of drips, spills, and overspray.

D. Waste Management

Comply with requirements for handling waste specified in applicable Division 2 Section.

## PART 3. EXECUTION

### 3.01 PREPARATION

A. General

Perform preparation and cleaning procedures as shown on the Contract Drawings or, if not shown, in accordance with the paint manufacturer's printed application instructions and as specified in this Section, for each particular substrate condition.

1. Ensure paint system compatibility in accordance with 1.04 B of this Section.
2. Ensure that ambient temperature and humidity conditions conform to requirements of 1.03 A of this Section.
3. Remove hardware, hardware accessories, machined surfaces, lighting fixtures, and similar items in place and not to be painted, or provide surface-applied protection prior to surface preparation and painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
4. Glossy surfaces are to be dulled by sanding lightly with a medium grit sandpaper.
5. Thoroughly clean and remove all dust, oil, grease and other contaminants from surfaces to be painted. Schedule cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.
6. Remove loose or non-adherent paint or coating. Feather edges of remaining paint or coating, if any, so that the repainted surface shall have a smooth appearance. Remaining paint or coating shall have sufficient adhesion so that it cannot be lifted as a layer when inserting the blade of a sharp knife under the existing materials.
7. Shot Blasting
   a. Maintain clean dry compressed air for abrasive or shot blast preparation and air blow off of residue by the use of adequate traps or separators to prevent contamination by oil or water.
   b. Perform the white blotter test, in accordance with ASTM D 4285, to verify the cleanliness of the compressed air. Conduct the test at least once per shift for each compressor system. Test results of no visible discoloration appearing on the paper indicate that compressor air is sufficiently free of oil and moisture to be used for blasting.

B. Ferrous Metals

Prepare surfaces, in accordance with applicable surface preparation standards of the Society for Protective Coatings (SSPC), as shown on the Contract Drawings and as specified in this Section. A minimum of SSPC SP1 must be used and SSPC SP2, 3, 5, 6, 7, 10, 11, or 12 may also be utilized.

1. SSPC SP1 -- Solvent Cleaning

   Prior to using power tools, remove all visible oil, grease, soil, and other soluble contaminants from bare steel and existing coatings, using methyl ethyl ketone (MEK) or other solvent acceptable to the paint manufacture and the Engineer.

2. SSPC SP3 -- Power Tool Cleaning

Use power tools to thoroughly clean all bare steel, rusted areas, and existing coatings. Remove heavy accumulations of rust and impacted rust with needle guns. Use grinders or sanders equipped with 3M Company clean and strip discs or equivalent non-woven abrasive discs on all surfaces, including existing paint. Comply with the requirements of SSPC SP3, removing all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter. Wipe the prepared surface with a clean, dry cloth.

1. Where SSPC SP2 or SSPC SP3 are shown on the Contract Drawings, SSPC -Vis 3 may be used as an aid in determiining the quality of cleaning.

2. Where abrasive or shot blast cleaning surface preparation is shown ont eh contract Drawings, use SSPC - vis 1, or other visual standard spproved by the Engineer, to evaluate teh cleanig. do not proceed with steam (wash) cleaning, or paint application until the Engineer approves surface preparation.

3. Water blast clean (hydro-blasting) preparation method shall be in accordance with 1.05 D of this Section.

C. Remove weld spatter, if applicable - as detailed in 3.02 F.4.

D. Unpainted (Weathered) Galvanized Steel

Clean surfaces by power washing and/or solvent wiping in accordance with SSPC SP1 to remove oil, grease, dirt, loose materials and other foreign substances. Clean any areas where the galvanizing is damaged or removed by hand or power tool cleaning, in accordance with SSPC SP1 or SSPC SP3. Care shall be taken not to damage or remove galvanizing.

E. Galvanized Steel & Aluminum

Clean surfaces in accordance with SSPC SP1 to remove oil, grease, soil, and other soluble contaminants. Remove all loose materials in accordance with SSPC SP2 or SSPC SP3. For galvanized steel, clean any areas where the galvanizing is damaged or removed by power tool cleaning, in accordance with SSPC SP3. Care shall be taken not to damage or remove galvanizing.

F. Concrete and Concrete Masonry

Clean surfaces by power washing in accordance with SSPC SP1 to remove oil, grease, dirt, loose materials and other foreign substances.

## 3.02 COATING APPLICATION

A. Unless otherwise shown on the Contract Drawings, apply paint in accordance with SSPC PA-1 and the manufacturer's directions. Use applicators and application method best suited for substrate and type of material being applied.

1. Apply each coat at proper consistency.

2. Apply additional coats when undercoats, or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment, if any.

4. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

5. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

6. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise shown on the Contract Drawings.

7. Where shown on the Contract Drawings abraid lightly between succeeding coats.

8. Finish paint to color shown on the Contract Drawings.

9. Unless otherwise shown on the Contract Drawings, paint to match adjacent surface; exposed insulated and bare pipe and ducts, conduits, boxes, hangers, brackets, and supports.

B. Scheduling Painting

Apply paint to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration. Verify that the surface exhibits the specified degree of cleaning immediately prior to painting.

1. For abrasive blasted steel, apply the prime coat on the same day (within 12 hours) that the substrate has been cleaned to bare metal. If the substrate is allowed to remain uncoated for more than 12 hours, or rerusting is evident - reclean the surface prior to painting.

2. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat. Thoroughly clean the surface of each coat prior to application of the next.

C. Coating Thickness

1. Wet Film Thickness - Use wet film thickness gages in accordance with ASTM D 4414 to verify the thickness of each coat at the time of application.

2. Dry Film Thickness

a. Apply each coat at not less than the recommended spreading rate, to establish a dry film thickness as shown on the Contract Drawings or, if not shown, as recommended by coating manufacturer.

b. Give special attention to assure that surfaces such as edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

c. Measure the thickness of each coat using nondestructive dry film thickness gages. Comply with SSPC-PA 2 for the calibration and use of the gages, and the frequency of thickness measurements.

D. Coating Adhesion

1. Apply all coats in such a manner to assure that they are well-adhered to each other and to the substrate. If 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.

2. Conduct adhesion tests in accordance with ASTM D 3359 or ASTM D 4541 as directed by the Engineer, and repair all test areas. The acceptance criteria for the testing will be established by the Engineer and the coating manufacturer. Replace all defective coating that is revealed by the testing.

E. Completed Work

Match approved samples for color, texture and coverage. Remove, refinish or repair Work not in compliance with the requirements specified in this Section.

F. Repair of Damaged & Unacceptable Coatings:

1. Surface Preparation of Localized Areas

a. Repair localized damage, corrosion, and unacceptable coatings.

b. Prepare the surface by cleaning in accordance with SSPC-SP 1 Solvent Cleaning followed by SSPC SP-2 Hand Tool Cleaning or SSPC-SP 3 Power Tool Cleaning. Use a solvent that is acceptable to the paint manufacturer.

c. For previously blast-cleaned steel - if the damage exposes the substrate, remove all loose material and prepare the steel in accordance with SSPC-SP 11.

2. Surface Preparation of Extensive Areas

a. Repair extensive areas of damage or unacceptable coating. The Engineer will stipulate the degree of cleaning required, based on the nature of the defect.

b. For previously blast-cleaned steel - prepare the surface by abrasive blast cleaning in accordance with SSPC-SP 7, or better. Use extreme care to avoid damage to the surrounding coating, due to overblast.

3. Feathering of Repair Areas

a. Feather the existing coatings surrounding each repair location. Feather for a distance of 1 to 2 inches to provide a smooth, tapered transition into the coating.

b. Verify that the edges of coating around the periphery of the repair areas are tight and intact by probing with a putty knife in accordance with the requirements of SSPC-SP 3 Power Tool Cleaning. Roughen the existing coating in the feathered area to assure proper adhesion of the repair coats.

4. Weld Splatter, Sharp Edges and Holes

a. Remove slag, flux deposits, weld splatter and surface irregularities such as silvers, tears, fins and hackles; all within AWS Dl.5 Guidelines. Grind any resulting burrs smooth, including burrs around holes, if any. Do not remove any welding material that will weaken weld strength.

b. Prior to preparation, break sharp edges such as those created by flame cutting and shearing. The rolled edges of angles, channels and wide flange beams do not normally require further rounding, unless specifically required by the Engineer.

G. Coating Application in Repair Areas

1. When the bare substrate is exposed in the repair area, apply all coats of the system to the specified thicknesses.

2. When the damage does not extend to the bare substrate, apply only the affected coats.

3. Maintain the thickness of the system in overlap areas within the specified total thickness tolerances.

H. Clean-up

During progress of Work, remove discarded paint materials, rubbish, cans and rags daily. Upon completion of painting Work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

## 3.03 FIELD TESTS

A. Monitor paint application rate by use of wet film thickness gauge; multiply wet film thickness by the percent of solids by volume of the coating to determine the theoretical dry film thickness.

B. After first coat has dried, visually examine for pinholes, fish eyes, blisters, runs, sags or missed areas. Repair defects and repaint as required.

1. On ferrous substrates, after visual examinations:

a. Measure dry film thickness by use of dry film thickness gauge in accordance with use and calibration requirements of SSPC-PA 2.

b. Ensure that surfaces are free of skips, voids or pinholes in any coat except zinc-rich coatings, by testing with low-voltage (less than 9OV) detector.

2. Maintain a daily log of inspections and test results. Submit a copy of such log to the Engineer if requested.

C. The Authority reserves the right to conduct tests of the materials at any time, and any number of times during painting.

1. The Engineer will sample the paint(s) being used. A representative pint or quart sample of each component of paint(s) at the construction site will be transferred to metal containers, identified, sealed and certified in the presence of the Contractor,

2. Tests on paint samples may be conducted by the Port Authority of NY & NJ, Materials Engineering Division, to confirm manufacturer's submittals made under Appendix "A". Any or all of the following tests may be conducted:

   a. Viscosity (Stormer @ 250 C) ku, ASTM D 562

   b. % Total Solids by Weight, ASTM D 2369

   c. Volatile Organic Compounds (VOC), ASTM D 2369

   d. Weight per Gallon, ASTM D 1475

   e. Volume Nonvolatile Matter, ASTM D 2697

   f. Pigment Content, ASTM D 2371

   g. % Metallic Zinc in Primer, ASTM D 521

   h. Specular Gloss of finish coat, ASTM D 523

   i. Infrared Identification - of individual components and of the mixed coatings for 2 component materials. Obtain each spectrum by sandwiching a small quantity (i.e., 1-2 drops) of material between 2 potassium bromide plates and obtaining a transmission infrared spectrum. For the mixed and cured material, use a potassium bromide pellet technique.

3. If the laboratory tests show that the material being used does not comply with the requirements specified in this Section, the Contractor may be directed to stop painting Work and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; or remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are incompatible.

## 3.04 PROTECTION

Protect other adjacent work against damage by painting and finishing Work. Correct damage by cleaning, repairing or replacing, and repainting, as approved by the Engineer.

A. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their Work, after completion of painting operations.

B. At completion of Work of other trades, touch-up and restore damaged or defaced painted surfaces.

END OF SECTION

# DIVISION 9

# SECTION 09911

# REPAINTING

# APPENDIX "A"

# SUBMITTALS

A. Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 GENERAL PROVISIONS:

1. Product Data

   Manufacturer's technical information including label and application instructions and technical data sheets for each material.

2. Samples

   On a 12 inch x 12 inch metal panels, two samples of each paint and coating material, with texture to simulate actual conditions. If more than one application method is to be used, submit two samples of each paint and coating material for each application method.

   a. Identify each sample as to manufacturer, color name and number, location and application.

   b. Submit in color(s) shown on the Contract Drawings or if not shown in color(s) as selected by the Engineer from manufacturer's color chart submitted prior to preparation of metal samples.

B. Submit to the Engineer one copy of U.S. Department of Labor Material Safety Sheets (MSDS) for hazardous chemicals utilized during the Work of this Section.

C. Submit copy of daily log reports, as required by 3.03 B.2 of this Section if requested by the Engineer.

D. Submit to the Engineer for approval, a detailed description of procedures to be used for Work of this Contract, including but not limited to:

1. Staging, if any, and a detailed schedule indicating starting and completion dates, and beginning and end Work times.

2. When the Contract Drawings show abrasive, wet abrasive, or shot blast, power tool or water (hydro) blast surface preparation, submit details of type of abrasive, rust inhibitor, equipment to be used, and a complete description of the procedures for elimination of air, water and ground contamination and methods of recovery of spent abrasives, waste blast water and paint residues.

3. Indicate method(s) of paint application, number of coats to be applied and wet and dry film thickness of each coat.

4. Where preparation, cleaning or painting is to be performed in enclosed space, submit details of ventilation procedure or worker respiratory equipment to be used.

E. Refer to applicable Section of Division 2 for submittal requirements for the protection of workers from lead and other toxic metals.

F. If temporary heating units are used, submit evidence of heating unit test acceptance by Underwriters Laboratories Inc., Factory Mutual or another recognized testing agency.

END OF APPENDIX "A"

# DIVISION 9

# SECTION 09911

# APPENDIX "B"

# PAINT SCHEDULE

| Surface | System Designation | Primer | Manufacturer's Product | 2nd Coat | Manufacturer's Product | Top Coat | Manufacturer's Product |
|---|---|---|---|---|---|---|---|
| Steel Semi-Gloss | S-1S | Organic Zinc Rich | Carboline 859 | Epoxy | Carboline 888 | Urethane | Carboline 133 HB |
| | | | K&L Kolorane No. 9700 | | K&L Kolor-Poxy No. 3200 | | K&L Acrythane Y-2 Series |
| | | | Ameron 68 HS | | Ameron 385 | | Ameron 450 SA |
| | | | SW Zinc Clad III | | SW Macropoxy 646 | | Acrolon 218 HS |

END OF APPENDIX "B"

# DIVISION 16

# SECTION 16000

# ELECTRICAL GENERAL REQUIREMENTS

## PART 1. GENERAL

### 1.01 SUMMARY

Unless otherwise shown on the Contract Drawings, or unless otherwise specified in other Sections of these Specifications, the general requirements specified in this Section are applicable to all electrical work of this Contract. Additional requirements applicable to individual Sections of these Specifications are specified in those Sections, or are shown on the Contract Drawings.

### 1.02 REFERENCES

The following is a listing of publications referenced in this Section:

| | |
|---|---|
| | American National Standards Institute (ANSI) |
| ANSI C 2 | National Electrical Safety Code |
| | American Society of Testing and Materials (ASTM) |
| ASTM D 178 | Standard Specification for Rubber Insulation Matting |
| | National Fire Protection Association (NFPA) |
| NFPA 70 | National Electrical Code |
| | Occupational Safety and Health Administration (OSHA) |

### 1.03 QUALITY ASSURANCE

A. Any entity performing Work shall have had experience on at least two projects involving quantities and complexities at least equal to those required under this Division or the applicable Section thereof.

B. All workmen performing under this Division shall be skilled workers of the trade involved. Where specialty work, such as splicing or welding are required, submit proof of training, experience and work history for each workman, for review by the Engineer. Only approved workmen shall perform specialty work.

C. All electrical work shall be performed under the supervision of an electrical contractor, licensed in the state (and the city as required) in which the work is to be performed. Submit a copy of the qualifying license for review by the Engineer.

D. All calculations required by this and other various Sections of these Specifications, or as shown on the Contract Drawings, shall be certified and sealed by a Professional Engineer licensed in the state in which the work is to be performed, and shall be submitted to the Engineer for review.

E. Various Sections of these Specifications contain the requirement for the specific material or equipment to be furnished with an experience statement "satisfactorily used for purposes similar to those intended herein" or words of similar intent and a statement that specifies the required experience time. These statements shall mean that the manufacturer of the material or equipment being furnished for the work specified in this Contract shall have manufactured similar material or equipment to that specified, for at least the time specified.

F. In various Sections of this Division there is a statement that refers to the length of required experience that must be satisfied.

G. Polyvinyl Chloride (PVC): PVC conduits, PVC-insulated power wiring, or items containing PVC, except PVC-insulated wiring for communications systems, remote control, signaling, and power limited circuits, shall not be installed in any indoor area. PVC-insulated wiring for communications systems, remote control, signaling, and power-limited circuits shall be furnished and installed in accordance with NFPA 70.

H. Asbestos

Asbestos or items containing asbestos shall not be furnished or installed.

I. Conformance Labels

All electrical materials and equipment for which there is a nationally recognized standard shall bear the conformance labeling of the third party inspection authority, such as Underwriters Laboratories Inc., Factory Mutual, ETL, or approved equal. Where the phrase "where there are established UL standards, shall bear the UL label", or words of similar intent appear in other Sections, the instructions for the conformance label above shall apply.

1.04 CODES AND STANDARDS

A. The electrical installation shall conform to all requirements of ANSI C2, NFPA 70, and the codes and standards specified in other Sections, all local codes and the requirements of OSHA, which would be applicable if the Authority were a private corporation.

B. Standards publications of technical organizations and regulatory agencies are referenced in other Sections, and unless stricter requirements are indicated, materials and equipment so specified shall be manufactured, tested and installed to conform, as a minimum, to the requirements of such reference standards and publications.

C. Installations for aeronautical markers, lighting, guidance signs, and other work as shown on the Contract Drawings, shall comply with the standards of the Federal Aviation Administration (FAA), where applicable.

D. In case of conflict between provisions of codes, laws, and ordinances, the more stringent requirement shall apply.

## 1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver material in manufacturers' original unopened protective packaging.

B. Store materials in original packaging in a manner to prevent soiling, physical damage, wetting or corrosion prior to installation.

C. Handle in a manner to prevent damage to finished surfaces.

D. Where possible maintain protective coverings until installation is complete and remove such covers as part of final cleanup.

E. Touch up any damage to finishes to match adjacent surfaces to the satisfaction of the Engineer.

## 1.06 SUBMITTALS

A. Submit not less than the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of DIVISION 1 - GENERAL PROVISIONS:

1. Catalog cuts to be reviewed and approved by the Engineer.
   - a. Conduit, and fittings
   - b. Wire and cable
   - c. Wiring devices
   - d. Multi-outlet assemblies
   - e. "Standard" outlet and junction boxes
   - f. Medium voltage cable, splicing and termination kits
   - g. Lightning arresters
   - h. Capacitors
   - i. Panel boards and cabinets
   - j. General purpose transformers
   - k. Circuit breakers
   - l. Lighting fixtures
   - m. Pulling devices and end seals
   - n. Special pull and junction boxes
   - o. Supporting devices
2. Shop Drawings
   - a. Substation and high-voltage transformers
   - b. Switchgear
   - c. Switchboards
   - d. Motor control centers
   - e. Emergency lighting battery systems

B. Training, experience and work history for certified splicers and welders.

C. Calculations where required by the Specifications or the Contract Drawings.

D. Working drawings for the installation sequence of medium voltage cables, and other systems where shown on the Contract Drawings, including the reel designations for each leg of the installation. Drawings shall include the calculations for pulling tensions and sidewall pressure of all cable pulls, including identification of manhole locations with splices and manholes that will be "pulled-through" without splicing. Calculations must be certified and sealed by a Professional Engineer licensed in the State in which the work is to be performed.

E. A final copy of the records and certified test reports for all tests, to the Engineer for review, for not less than the following:

1. Primary cable and terminators insulation testing.
2. Insulation testing of 600V (nominal) cables rated 100 amperes (#3 AWG) and above.
3. Ground resistance test of each service ground.
4. Ground fault circuit breaker and receptacle testing.
5. Setting of all adjustable overcurrent devices.
6. Setting or size of all overload elements installed, indicating the following:
   a. Motor designation
   b. Nameplate horsepower, full load current, voltage and phases.
   c. Operating current and voltage.
   d. Overload element size or setting.
7. Emergency power distribution equipment and system test results.

F. One set of prints of Contract Drawings neatly marked up to show any deviations in the actual installation from the conditions shown on the Contract Drawings as issued, and showing the exact location of all equipment and conduit runs, as actually installed.

G. Nameplate designations

H. Operation and maintenance manuals, where required by the Specifications or the Contract Drawings.

## 1.07 SPECIAL TERMS

Throughout this and other Sections of this Division the term "Authority" is used. In PATH contracts, substitute the term "PATH" is deemed substituted for the term "Authority".

## PART 2. PRODUCTS

### 2.01 MATERIAL AND EQUIPMENT TO BE FURNISHED

Equipment and materials furnished shall be new and unused, prior to this installation, first grade commercial quality and shall be essentially the standard cataloged products of a manufacturer regularly engaged in the manufacture of the products. Only those items specifically shown on the Contract Drawings as existing, relocated or Authority furnished shall be reused in this installation. Rebuilt or remanufactured equipment will not be permitted.

### 2.02 IDENTIFICATION

A. All parts of equipment, such as switchboards, panel boards, safety switches, motor starters, circuit breakers, time clocks, contactors and similar items shall be identified by name, function or control with laminated plastic nameplates consisting of two black sheets with one white sheet bonded to and between the two outer sheets and having letters machine engraved in the face sheet to the depth of the white plastic. Nameplates shall not be smaller than 1 inch x 3 inches with characters not less than one-quarter inch. Where letter sizes are not specified, use one-inch high letters for panel boards, switchboards and motor control centers and one quarter inch high elsewhere. Nomenclature shall be according to a schedule approved by the Engineer.

B. All device plates other than lighting switch plates, telephone and 120 volt, single phase, 15 or 20 ampere receptacles, shall have black or white (as directed) silk-screened lettering Helvetica Medium type face (or other type face as directed by the Engineer) designating:

1. System
2. Voltage (where applicable)
3. Number of phases (where applicable)
4. Current rating (where applicable)
5. Frequency (where applicable)

C. Before placing orders for nameplates or silk-screened device plates, submit a typewritten list to the Engineer for review.

D. The outside of the covers of all junction or pull boxes located above hung ceilings and the inside of the covers of all junction or pull boxes exposed shall be labeled with an indelible marker indicating the operating voltage and the system contained therein.

E. All device plates of receptacles connected to a standby or emergency power distribution system shall be labeled with an orange plastic nameplate, engraved with the panel board and circuit number to which the receptacle is connected. Nameplate character engraved shall be not less than one-quarter inch in height.

F. Unless otherwise shown on the Contract Drawings, all panel boards, switchboards, switchgear, circuit breakers, switches and transformers connected to a standby or emergency power distribution system shall be finished Federal Safety Orange in color.

## 2.03 RUBBER MATTING

A. Provide continuous insulated rubber matting not less than 36 inches wide and not less than one quarter inch thick in one piece in front of:

1. Substation Transformers
2. Switchgear
3. Switchboards
4. Motor control centers
5. Panel boards
6. On each side and end of a standby or emergency generator set
7. Other locations as shown on the Contract Drawings

B. Matting shall conform to ASTM D 178, Type 2.

# PART 3. EXECUTION

## 3.01 GENERAL

A. Work of this Division shall include all labor, material and apparatus necessary for the completion of all electrical work as shown on the Contract Drawings and as hereinafter specified, left ready for satisfactory operation.

B. Coordinate with Authority operations and construction by other trades.

1. Coordinate with the Work of all trades as necessary to facilitate timely completion, avoid unnecessary cutting and patching and to insure proper installation and operation of all equipment.
2. Coordinate all components and aspects of the work, in order to minimize power shutdowns to the power distribution systems. Should any part of the Work require an "off-hours" shutdown in excess of 8 hours, supply temporary services or feeders as required to maintain operation of the existing systems and equipment.
3. Furnish to appropriate trades, shop drawings, catalog cuts and instructions necessary for construction of concrete bases, concrete encasement, anchor bolts, and other construction required to accommodate installations under other Sections.
4. Obtain all wiring diagrams and other instructions required for proper electrical connection of equipment installed or furnished under other Divisions of these Specifications and coordinate the installation, wiring and connections for equipment furnished under this Division, or other various Divisions.

C. The arrangement of electrical equipment and conduit runs as shown on the Contract Drawings and described in the Specifications is schematic. Locate and install electrical work in coordination with other trades so that all electrical equipment and material is installed with working clearances in accordance with NFPA 70. Route conduit to avoid interference with existing installation and with work to be performed by other trades.

D. The location of equipment and motors shown on the Contract Drawings shall be subject to minor revisions due to field conditions or coordination with other trades without any increase in Contractor's compensation. Prior to roughing-in, verify the exact location of all electrical connections to equipment and motors from reviewed shop drawings and field verification.

E. Maintain records of all inspections, testing, overload and overcurrent settings throughout the construction and any corrective actions taken, and submit records to the Engineer for review.

F. All electrical work shall be subject to inspection by the Engineer. Correct any deficient work, as required for the approval of the Engineer.

G. Any equipment, materials, wiring or labor that are a necessary part of the electrical work and to its proper performance, although not specifically mentioned herein or shown on the Contract Drawings, shall be furnished and installed as if called for in detail, without additional cost to the Authority.

## 3.02 REMOVALS, RELOCATIONS, RECONNECTIONS, RESTORATIONS

A. Relocate existing equipment and materials as shown on the Contract Drawings.

B. Unless otherwise shown on the Contract Drawings, existing equipment and materials that are to be removed and not required to be relocated under this Contract, will become the property of the Contractor and shall be removed from the property of the Authority, and shall be properly disposed of. Disposal of equipment and materials shall comply with all local, state and Federal laws and regulations as if the Authority was a private corporation.

C. Unless specifically shown on the Contract Drawings, salvaged equipment and materials shall not be reused in the installation.

D. If existing electrical feeders, wiring, conduit, lighting fixtures or equipment interfere with the installation of new construction of any trade, the existing electrical feeder, wiring and conduit shall be rerouted or the equipment relocated in a manner approved by the Engineer to permit installation of the new construction. Where existing circuits or devices, or portions of the existing wiring system are to remain in service, but are interrupted by the construction, continue the existing wiring to maintain the remainder of the wiring system in operation.

E. Notify the Engineer immediately of any damage caused by the Contractor to existing wiring, services or feeders that are to remain in service. Repair the damage in a workmanlike manner to restore to service, at no cost to the Authority.

F. Before shutdown or discontinuation of service on any circuit, system or feeder, coordinate such activities with the Engineer in order to minimize shutdown periods. Provide a minimum of two weeks notice in writing to the Engineer before performing any shutdowns. The minimum period may be reduced with the express written permission of the Engineer.

## 3.03 LOCATION OF EQUIPMENT

A. Unless otherwise shown on the Contract Drawings, the location of outlets or devices, from finished floor to center of plate or device, shall be as follows:

1. Lighting switches: 48 inches.
2. Thermal switches: 48 inches.
3. Receptacles: 16 inches.
4. Telephone outlets: 16 inches.
5. Fire alarm stations: 48 inches.
6. Fire alarm horn/light signals: 7 feet, 6 inches.
7. Clocks: 7 feet, 8 inches.

B. Unless otherwise shown on the Contract Drawings, the location of equipment, from finished floor to top of enclosures shall not exceed 6 feet, 6 inches, and shall not protrude more than 4 inches if higher than 27 inches.

1. In exposed or public locations, panel boards and cabinets shall generally be flush mounted and all covers shall be identical in layout and size, and shall be installed to maintain a level and straight top and bottom alignment.
2. In concealed locations, or in closets or electrical or mechanical rooms, or non-public locations, panel boards and cabinets shall generally be surface mounted and shall be installed to maintain a level and straight top alignment.

## 3.04 DISSIMILAR METALS

A. Dissimilar metals shall mean those metals that are incompatible with one another in the presence of moisture, as determined from their relative positions in the Electrochemical Series, or from test data. Where dissimilar metals come in contact, paint the joint both inside and out with approved coating so as to exclude moisture from the joint, or provide a suitable insulating barrier separating the metals.

B. Transitions in raceways, from one metal to a dissimilar metal shall only be made at boxes or other enclosures, except where shown on the Contract Drawings.

## 3.05 NAMEPLATES

Secure nameplates on equipment or walls with stainless steel or brass screws.

## 3.06 RUBBER MATS

A. Install rubber mats in front of each panelboard, switchboard, motor control center, switchgear and substation transformers, and along each side and the end or each generator set, or as shown on the Contract Drawings.

B. Rubber mats, when installed, shall lay flat without curling.

## 3.07 CUTTING AND PATCHING

A. Perform all cutting and patching of existing construction required for installation of all materials and equipment as specified in this Division.

B. Perform all patching to match existing adjacent construction to the satisfaction of the Engineer and using the best possible workmanship of the various trades involved.

## 3.08 FINAL FIELD TESTS

A. The entire electrical installation shall be inspected prior to final acceptance testing, thoroughly cleaned, and damaged finishes touched up after final completion and prior to final acceptance testing being performed. Not less than 30 days prior to the testing, furnish a test plan, to the Engineer for review, outlining all aspects of the testing, including tests to be performed and the expected results.

B. Perform the following field test in the presence of the Engineer to demonstrate the reliability of the electrical installation. Give the Engineer a minimum of one-week advance notice of such tests.

1. Operate all electrical systems and equipment for a period of 24 hours, unless in the opinion of the Engineer, a different test period is required, to prove the operation and performance of a system and its equipment.

2. Should the foregoing test reveal any defects, promptly correct such defects and re-run the tests until the entire installation conforms to the requirements of these Specifications and the Contract Drawings.

C. Tests requiring certified reports and those requiring factory or field inspection shall be conducted and reported to the Engineer in conformance with standards herein specified.

D. In addition to the tests outlined above, after completion of the electrical system and prior to occupancy:

1. The following equipment and devices, as a minimum, shall be thermographically inspected utilizing a Hughes Aircraft Probeye infrared detector, or approved equal, with videotaping attachment.

a. High voltage cable splices and connections.

b. Switchboard.

c. Transformer.

d. Switchgear.

e. Panelboards.

f. Motor Control Centers.

g. Automatic transfer switch and emergency power system connections.

h. Chiller motor and starter connections.

i. All 600 volt (nominal) cable connections rated 100 amperes (#3 AWG) or greater.

j. Other equipment as shown on the Contract Drawings.

2. The inspection shall be made by an independent inspection company such as Infrared Services, Inc, Montville, N.J., General Electric Apparatus Service Division, or approved equal. The inspection shall be made with all equipment, motors, lighting fixtures, and miscellaneous loads operating and with all equipment covers removed. Inspection reports complete with color photographs of the infrared scan and control photographs indicating the ambient temperature and any hot spots of each item inspected shall be submitted to the Engineer for approval. Any equipment, connections or devices indicated to be operating improperly performing equipment shall be replaced or repaired by the Contractor at no cost to the Authority. The cost of the inspections and necessary repairs shall be included in the Contract.

E. Demonstrate to the Engineer equipment or systems installed or modified in this Contract.

1. After completion of all testing, and prior to placing equipment or systems in operation, demonstrate the features and operation of the equipment or systems to the Engineer, and all other staff or interested parties, as designed by the Engineer, so that operational and maintenance personnel are familiarized with the equipment and systems, as follows:

   a. Switchboards and panelboards.

   b. Transformer.

   c. Switchgear.

   d. Motor control centers.

   e. Fire alarm and smoke detection systems.

   f. Automatic transfer switches

   g. Standby/Emergency generator sets.

   h. Other equipment as shown on the Contract Drawings.

2. Provide the necessary accessories, test equipment, and personnel, for each demonstration.

3. Complete all arrangements for the demonstrations through the Engineer.

4. Upon the completion of each demonstration or instructional session, obtain "sign-off" from the Engineer. The "sign-off" shall state that the demonstration or instructions for use were provided, that they were complete and were given to the designated personnel.

**END OF SECTION**

# DIVISION 16

# SECTION 16110

# RACEWAYS

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for raceways.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

| | |
|---|---|
| | American National Standards Institute (ANSI) |
| ANSI C 80.1 | Rigid Steel Conduit - Zinc Coated |
| ANSI C 80.3 | Electrical Metallic Tubing - Zinc Coated |
| ANSI C 80.5 | Rigid Aluminum Conduit |
| ANSI C 80.6 | Intermediate Metal Conduit - Zinc Coated |
| | National Electrical Manufacturers Association (NEMA) |
| ANSI/NEMA FB 1 | Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies |
| NEMA RN 1 | Polyvinyl – Chloride (PVC) externally coated galvanized rigid steel conduit and intermediate metal conduit |
| NEMA TC-3 | PVC Fittings for use with rigid PVC Conduit and Tubing |
| NEMA TC-6 | PVC and ABS plastic utilities duct for underground installation |
| NEMA TC-8 | Extra-strength PVC plastic utilities duct for underground installation |
| NEMA TC-14 | Filament – Wound Reinforced Thermosetting Resin Conduit and Fittings |
| | National Fire Protection Association (NFPA) |
| NFPA 70 | National Electric Code |
| | Underwriters Laboratories Inc. (UL) |
| ANSI/UL 1 | Flexible Metal Conduit |
| ANSI/UL 5 | Surface Metal Raceways and Fittings |
| ANSI/UL 6 | Rigid Metal Conduit |
| ANSI/UL 209 | Cellular Metal Floor Raceways and Fittings |
| ANSI/UL 360 | Electrical Liquid-tight Flexible Steel Conduit |
| ANSI/UL 514B | Fittings for Conduit and Outlet Boxes |
| ANSI/UL 651 | Schedule 40 and 80 Rigid PVC Conduit |
| ANSI/UL 651A | Type EB and A Rigid PVC Conduit and HDPE Conduit |
| ANSI/UL 797 | Electrical Metallic Tubing |

| | |
|---|---|
| ANSI/UL 870 | Wireways, Auxiliary Gutters, and Associated Fittings |
| ANSI/UL 884 | Underfloor Raceways and Fittings |
| ANSI/UL 1242 | Intermediate Metal Conduit |
| ANSI/UL 1479 | Fire Tests of Through-Penetration Firestops |

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver material in manufacturer's original, unopened, protective packaging. Protective caps shall be removed only upon installation of conduit.

B. Store materials in a clean, dry space and protect them from weather.

C. Handle in a manner to prevent damage to finished surfaces.

1.04 SUBMITTALS

See Appendix "A" for submittal requirements.

## PART 2. PRODUCTS

2.01 MATERIALS

A. General

1. Locations, types and sizes of raceways are shown on the Contract Drawings.
2. Minimum size of conduit shall be 3/4 inch.
3. Conduit shall be supplied in a minimum of 10-foot lengths and accordance with UL 6.

B. Rigid Metal Conduit

1. RGS - Rigid galvanized steel conduit (Heavy-wall) hot dipped galvanized inside and out, with hot dipped galvanized threads, conduit shall conform to UL 6 and ANSI C80.1.
2. RGS/PVC - PVC coated, rigid galvanized steel conduit (Heavy-wall) hot dipped galvanized inside and out with hot dipped galvanized threads. The interior of the conduit shall have a thermoplastic or thermosetting coating of a nominal thickness of .007 (7 mils) and shall conform to NEMA TC-14. All PVC coated conduit shall conform to NEMA RN-1.
3. IMC - Intermediate metal conduit, galvanized steel (medium-wall) conduit, threads shall be galvanized and shall conform to ANSI/UL 1242 and ANSI C80.6.
4. ALC - Aluminum conduit shall conform to UL 6 and ANSI C 80.5.
5. All preformed elbows shall be the same in construction to and of a type designed for use with the appropriate conduit and shall conform to UL 6.
6. All fittings shall be threaded and shall conform to NEMA FB-1.
7. If threads are cut after the zinc coating has been applied, the threads shall be treated with protective coating of zinc equivalent to hot-dipped process and conform to NEMA RN-1.

C. Electrical Metallic Tubing

1. EMT - Electrical metallic tubing (thin-wall) shall be galvanized steel and shall conform to ANSI/UL 797 and ANSI C 80.3.

2. All fittings shall be indenter or compression type made of malleable or pressed steel and shall conform to ANSI/NEMA FB 1.

D. Cellular Metal Floor Raceway

Cellular Metal Floor Raceway and Fittings shall conform to NFPA 70 and ANSI/UL 209.

E. Flexible Metal Conduit

1. FSC - Flexible steel (galvanized) conduit shall conform to ANSI/UL 1.

2. LSC - Liquid-tight flexible metal conduit shall conform to ANSI/UL 360.

3. Fittings shall be of a type designed for use with the respective conduit and shall conform to ANSI/UL 514B.

F. Surface Metal Raceways

1. Surface raceways shall conform to ANSI/UL 5.

2. Surface metal raceways shall come complete with all necessary accessories for installation.

G. Underfloor Raceways

1. Duct, fittings, and accessories shall be suitable for encasement in concrete and shall conform to NFPA 70 and ANSI/UL 884.

2. Underfloor raceways shall come complete with all necessary accessories for installation.

H. Rigid Nonmetallic Conduit

1. PVC Type 40 Standard Wall polyvinyl chloride (PVC) conduit shall conform to ANSI/UL 651 and NEMA TC-3.

2. PVC Type 80 Heavy wall polyvinyl chloride (PVC) conduit shall conform to ANSI/UL 651.

3. PVC Type "A" Light wall polyvinyl chloride (PVC) conduit shall conform to ANSI/UL 651A

4. PVC Type EB Light wall polyvinyl chloride (PVC) conduit shall conform to ANSI/UL 651A and NEMA TC-8.

5. PVC Type DB Light wall polyvinyl chloride (PVC) conduit shall conform to ANSI/UL 651A and NEMA TC-8.

6. HDPE Type 40 Standard wall High-Density Polyethylene (HDPE) Conduit shall conform to ANSI/UL 651A and NEMA TC-6.

7. FRE - Fiberglass Reinforced Epoxy (FRE) conduit shall conform to ANSI/NEMA TC-14.

I. Fire stops, Through Penetrations of Conduits

1. Where raceways penetrate wall or floor, fire stops with a fire rating equal or greater than the rating of the penetrated wall or floor shall be provided.

2. All fire stops shall conform to the UL 1479.

J. Wireways

1. Wireways shall be seamless galvanized steel construction, cover to be locked with captive screws and shall conform to ANSI/UL 870.

2. Wireways shall come complete with all necessary accessories for installation.

K. Fastening Devices

Provide inserts, clamps, bolts and washers, or any other type of fastening devices conforming to the requirements of the Section entitled "SUPPORTING DEVICES", required to secure conduits to walls or above hung ceilings. Unless otherwise shown on the Contract Drawings, all fasteners shall be hot dipped galvanized and of sizes and types recommended by the equipment manufacturer.

## PART 3. EXECUTION

### 3.01 INSTALLATION

A. General

1. All conduit bends shall be accomplished with a trade approved bending tool and in accordance with the manufacturer's recommendations and NFPA 70.

2. Ream conduit ends free from burrs prior to installation, and draw joints up tight.

3. Make transitions in conduit from one metal to a dissimilar metal only at boxes or other enclosures, unless otherwise shown on the Contract Drawings.

4. Install concealed conduits or tubing in as direct a line as possible.

5. Install exposed raceways, located above hung or accessible ceilings, parallel with or at right angles to the lines of buildings and as close to the ceiling as possible, unless otherwise shown on the Contract Drawings.

6. Install expansion fittings in all conduits that cross expansion joints, where conduits attach to independent structures, or where exposed to large temperature changes.

7. Securely fasten threaded conduits entering enclosures, other than threaded cast boxes, by means of two lock-nuts, one on each side of the enclosure. Terminate the conduits in insulated bushings.

8. Cap all free ends of empty conduit to prevent water entrance.

9. Conduit through roofs and external walls of buildings, manholes and other structures shall be watertight. Contractor shall submit detailed shop drawings for the Engineer's approval.

10. Where portions of an interior raceway system are exposed to widely different temperatures, make provisions to prevent circulation of air from a warmer to a colder section through the raceways.

11. Apply zinc rich paint to all exposed threads after joints have been made up clean and tight.

12. Support all conduits as required in these Specifications under Section entitled "SUPPORTING DEVICES".

13. All conduit runs shall leave or enter structures perpendicularly.

14. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or mono-filament plastic line having not less than 200-lb tensile strength. Leave not less than 12 inches of slack at each end of the pull wire.

B. Rigid Metal Conduit

1. RGS shall be used where Fire Alarm Systems are installed.

2. RGS/PVC shall not be used indoors.

3. IMC may not be used in wet locations, or high corrosive area, otherwise NFPA 70 Article 345 fully applies.

C. Electrical Metallic Tubing

EMT used for power feeder or branch circuits, shall not exceed 2-inch trade size. EMT used for control circuits and communications systems shall not exceed 4-inch trade size.

D. Cellular Metal Floor Raceway

Installation limits shall be defined by NFPA 70.

E. Flexible Metal Conduit

1. Install FSC for motor connections and for other equipment connections where subject to movement and vibration. Conduit shall be installed to permit maximum flexibility, without crushing or permanent deformation, and shall not exceed 18 inches in length, without approval of the Engineer.

2. Use LSC for the same installation conditions as FSC above, and where also subjected to one or more of the following conditions:

   a. Exterior locations;

   b. Condensating, moist, wet or humid conditions;

   c. Corrosive atmospheres;

   d. Water spray;

   e. Dripping oil, grease or water.

3. Install FSC and LSC with a separate, insulated copper, code-sized, equipment-grounding conductor, installed inside the flexible conduit.

F. Surface Metal Raceways

1. Only metallic surface metal raceways will be permitted, unless otherwise shown on the Contract Drawings. Installation shall be in accordance with manufacturer's written recommendations and instructions accompanying the raceways.

2. Provide surface raceway system with means for assuring a continuous ground path throughout.

3. Use fittings without sharp edges introduced into any part of the raceway system.

G. Underfloor Raceways

Install underfloor raceways in accordance with the Contract Drawings NFPA 70, ANSI/UL 884 and the recommendations and requirements of the manufacturer.

H. Polyvinyl Chloride (PVC) Conduit

1. PVC Conduit shall not be used indoors.

2. PVC Conduits Types 40 and 80 conform to NFPA 70 Article 347 except it shall not be used indoors.

3. PVC Conduits Types 40, A and EB shall be used for concrete encasement.

4. PVC Conduit Type DB shall be used for direct burial, sand encased.

I. High-Density Polyethylene (HDPE) Conduit

1. HDPE conduit shall not be used indoors.

2. HDPE Type 40 shall be used for direct burial or encased in concrete.

J. Fiberglass Reinforced Epoxy (FRE) Conduit

1. Shall be installed as described in NFPA 70.

2. All sweeps, bends, or changes in direction shall be done with fittings only.

3. Elbows and fittings shall be manufactured from the same resin/hardener/glass system as the conduit.

K. Dissimilar Metals

1. "Dissimilar metals" shall mean those metals which are incompatible with one another in the presence of moisture, as determined from their relative positions in the Electrochemical Series, or from test data.

2. Where dissimilar metals come in contact, paint the joint both inside and out with approved coating to exclude moisture from the joint, or provide a suitable insulating barrier separating the metals.

## 3.02 FIELD TESTS

A. Conduit Cleaning and Testing

1. After installation of conduits and accessories and completion of all concreting operations, if any, carefully clean and clear all conduit runs of all obstructions and foreign matter to the satisfaction of the Engineer.

2. Test conduits, in the presence of the Engineer, by pulling through each conduit a flexible cylindrical mandrel having an outside diameter not more than 1/4 inch smaller than the inside diameter of the conduit, but nominally 85 percent of the trade diameter, whichever is larger. Only nylon cable of adequate strength shall be used to pull the mandrel through the conduit system. The use of rope will not be permitted.

B. Connections to Existing Conduits

1. Where conduits installed under this Contract are connected to existing conduits, or conduits installed by others, test the entire run to the nearest box, manhole, handhole, or equipment enclosure as specified in 3.02 A.2 above.

2. Report immediately to the Engineer any defect or stoppage found in portions of the conduit system not installed under this Contract. Do not attempt to rectify any defect or stoppage found in conduit not installed under this Contract unless specifically instructed to do so by the Engineer. The Contractor's compensation for the rectifying of such defects or stoppages at the direction of the Engineer will be determined in accordance with the Clause of the Contract providing compensation for Extra Work.

3. The Engineer shall be the sole judge as to whether a defect or stoppage exists. Perform all tests required by the Engineer to enable him to make his decision.

**END OF SECTION**

## SECTION 16110

## RACEWAYS

## APPENDIX A

## SUBMITTAL REQUIREMENTS

A. Submit the following in accordance the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:

1. Catalog Cuts

   a. Conduit and Tubing

END OF APPENDIX "A"

# DIVISION 16

# SECTION 16115

# UNDERGROUND CONDUIT SYSTEMS

## PART 1. GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for underground conduits, manholes, handholes, vaults and accessories.

B. Definitions

1. Conduit: A single enclosed raceway for wires or cables; duct.
2. Ductbank: A structure containing one or more ducts or conduits.
3. Conduit System: A combination of conduit, conduits, manholes, handholes, and vaults joined to form an integrated whole.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

| | |
|---|---|
| | American National Standards Institute (ANSI) |
| ANSI C 2 | National Electrical Safety Code |
| ANSI C 80.1 | Rigid Steel Conduit - Zinc Coated |
| | American Society for Testing and Materials (ASTM) |
| ASTM A 185 | Steel Welded Wire Fabric, Plain, for Concrete Reinforcement |
| | Institute of Electrical and Electronics Engineers, Inc. (IEEE) |
| IEEE 837 | Standard for Qualifying Permanent Connections Used in Substation Grounding |
| | National Electrical Manufacturers Association (NEMA) |
| NEMA RN 1 | Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit |
| NEMA TC 2 | Electric Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80) |
| NEMA TC 14 | Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings |
| | National Fire Protection Association (NFPA) |
| NFPA 70 | National Electrical Code |
| OSHA | Occupation Safety and Health Administration |

Underwriters Laboratories Inc. (UL)

| | |
|---|---|
| UL 6 | Rigid Metal Conduit |
| UL 514B | Fittings for Conduits and Outlet Boxes |
| UL 467 | Electrical Grounding and Bonding Equipment |
| UL 651 | Schedule 40 and 80 Rigid PVC Conduit |
| UL 651A | Type EB and A Rigid PVC Conduit and HDPE Conduit |

1.03 DESIGN AND PERFORMANCE REQUIREMENTS

The underground conduit system shall be furnished and installed in accordance with this section and as specified on the Contract Drawings.

A. Components of the underground conduit system manufactured, supplied, and installed shall comply with the requirements of NFPA 70, all local codes, and the requirements of OSHA.

1.04 QUALITY ASSURANCE

A. The manufacturer shall have had a minimum of three years experience within the last five years in manufacturing the products of the type(s) and size(s) described in this Section. Those products shall have been satisfactorily used for purposes similar to those intended herein. The Contractor shall provide a list of installations and contracts for which the manufacturer has produced such materials.

B. All electrical materials and equipment for which there is a nationally recognized standard, shall bear the conformance label of the nationally recognized third party inspection authority, such as Underwriters Laboratories Inc. (UL), Factory Mutual (FM), or ETL.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened, protective packaging. Protective caps shall be removed immediately prior to installation of conduit.

B. Store materials in a clean, dry space and protect them from weather.

C. Handle in a manner to prevent damage to finished surfaces.

1.06 SUBMITTALS

For submittal requirements see Appendix "A".

## PART 2. PRODUCTS

### 2.01 MATERIALS

A. General

1. Location, types and sizes of conduits and conduit systems are shown on the Contract Drawings.
2. Conduits shall be supplied in standard lengths in accordance with applicable UL standards.
3. Unless otherwise shown on the Contract Drawings, conduit or duct shall be type RGS as specified in this Section.

B. Rigid Metal Conduit

1. RGS - Galvanized steel conduit (heavy-wall) shall be hot dipped galvanized after cutting and threading and shall conform to UL 6 and ANSI C 80.1.
2. RGS-PV - PVC coated, galvanized steel conduit (heavy-wall) shall be hot dipped galvanized after cutting and threading, shall be coated with 40 mils of PVC and shall conform to NEMA RN 1, Type A 40.
3. All preformed elbows shall be similar in construction to and of a type designed for use with the appropriate conduit and shall conform to UL 6.
4. All fittings shall be threaded.

C. Rigid Nonmetallic Conduit

1. PVC-T - Schedule 20 (thin-wall) polyvinyl chloride (PVC) conduit shall conform to UL 651A.
2. PVC-H - Schedule 40 (standard-wall) polyvinyl chloride (PVC) conduit shall conform to UL 651.
3. PVC-80 - Schedule 80 (extra heavy-wall) polyvinyl chloride (PVC) conduit and elbows shall conform to NEMA TC 2 and UL 651.
4. Fiberglass reinforced epoxy conduit shall be glass filament wound, embedded in ultra-violet resistant epoxy. Conduit fittings and elbows shall conform to NEMA TC 14 and the following:
   a. FGS-T - Standard-wall conduit, wall thickness shall be not less than 70 mils for all sizes. Type FGS-T conduit shall be used only where encased in concrete.
   b. FGS-S - Heavy wall conduit, UL listed, with a wall thickness not less than 70 mils for conduits less than 4 inch trade size, not less than 90 mils for conduits 4 inch trade size and not less than 110 mils for conduits larger than 4 inch trade size. Type FGS-H shall be used where direct buried, encased in concrete, or where conduit risers extend to above grade, in accordance with the requirements of the UL listing.
   c. FGS-E - Extra-heavy wall conduit, with a wall thickness not less than one-quarter inch. Type FGS-E conduit shall be used for exposed exterior conduit runs on bridges and elevated structures.

5. Elbows, fittings, offsets, etc. shall be preformed and similar in materials and construction to the conduit.

6. Couplings shall be of a type to provide a watertight installation of the conduit system.

D. Manholes, Handholes, and Vaults

1. Precast manholes, handholes, and vaults shall be as shown on the Contract Drawings. Concrete shall be in accordance with the requirements of the Section entitled "CONCRETE" of these Specifications.

2. Cast-in-place manholes, handholes, and vaults conforming in size and strength to the precast manholes, handholes, and vaults shown on the Contract Drawings may be substituted, subject to the approval of the Engineer.

3. Continuous inserts shown on the Contract Drawings shall be hot-dipped galvanized steel, and shall be supplied complete with end caps and waxed cardboard closure strips. All metallic parts shall have a hot-dipped galvanized finish.

4. Racking assemblies shall be capable of being mounted on the continuous inserts supplied in manhole, handhole, and vault walls, without modification, utilizing hot-dipped galvanized spring nuts and bolts.

   a. The racking assemblies shall, at a minimum, include supports on each wall of the manhole, handhole, or vault, with arms on each support for each cable or arc-proofed cable group. Each arm shall have insulators to support each cable or cable group. Provide additional arms and insulators as shown on the Contract Drawings.

   b. Racking assembly arms and insulators, for installation on existing supports, shall match the existing supports without modification.

5. Manhole, handhole, and vault frames and covers shall be as shown on the Contract Drawings.

6. Provide pulling hooks shall be Hubbard Co. No. 9119, or approved equal.

E. Grounding Assemblies

1. Grounding bushings shall be plated malleable iron body, insulated type, rated 150 degrees C.

2. Ground rods shall be minimum 3/4-inch diameter, copper-clad steel. Unless otherwise shown on the Contract Drawings, ground rods shall be 10 feet long.

3. Unless otherwise shown on the Contract Drawings, conductors for grounding assemblies within manholes, handholes, or vaults shall be copper, minimum #4 AWG.

4. Ground rod connections shall be either exothermic welds, or high-strength compression-crimp system conforming to the requirements of IEEE 837 and UL 467, or approved equal.

5. Ground cable clamps shall be split-bolt, high strength, copper alloy connectors.

## PART 3. EXECUTION

### 3.01 EXAMINATION

A. Inspect all conduit, equipment and accessories prior to installation. Replace any damaged items.

### 3.02 PREPARATION

A. The Contractor shall be responsible for field verification of dimensions and existing underground utilities.

### 3.03 INSTALLATION

A. General

Underground conduit systems shall be installed in accordance with the requirements of ANSI C 2, NFPA 70 and as shown on the Contract Drawings.

B. Excavation and Backfill

Excavation and backfill for underground conduits, handholes, manholes and shall be in accordance with the applicable requirements of the Section entitled "EXCAVATION, BACKFILLING AND FILLING" of these Specifications.

C. Concrete Encased Conduit

1. Concrete encasement of conduit shall conform to the details shown on the Contract Drawings and the requirements of the Section entitled "CONCRETE" of these Specifications.
2. The dead-ending of conduit shall be accomplished as shown on the Contract Drawings.
3. No variation from a straight line of greater than 1/2 inch in fifty feet will be permitted when installing a concrete encased conduit.
4. Reinforce junctions with existing concrete encased conduit, or existing systems, with W8 x W4 - 10 x 10 welded wire fabric, conforming to ASTM A 185, encased in four inches additional thickness of concrete around each set of conduits. The additional encasement shall extend at least four feet in each direction from the junction.
5. Where the placing of concrete is interrupted for one hour or more, reinforce the concrete encasement at the point of interruption with W4 x W4 - 10 x 10 welded wire fabric, conforming to ASTM A 185.
6. Preformed or precast conduit may be substituted for the field-encased type, subject to the approval of the Engineer. All precast conduit shall meet the same requirements specified herein or shown on the Contract Drawings.
7. All conduits shall leave or enter structures perpendicularly.
8. Changes in direction of conduits shall be made by bends having a minimum radius of 15 feet. Elbows or sweeps to equipment or foundations shall have a radius not less than 10 times the trade diameter of the conduit.

9. Conduits shall be installed in true alignment and shall be sloped for drainage toward manholes or handholes. All free ends of empty conduits shall be sealed to prevent water entrance.

10. Openings for conduits in manhole construction shall be sealed and made watertight in an approved manner.

11. Transitions between conduits of different materials shall be made using the manufacturer's standard adapters.

12. Terminations of rigid nonmetallic conduits in manholes, handholes, and other concrete structures, shall be made with end bells, set flush with the inside face of the concrete.

13. Terminations of rigid metal conduits in manholes, handholes, vaults and other concrete structures, shall be made with insulated grounding bushings, projecting 2 inches beyond the inside face of the concrete.

D. Direct-Buried, Rigid Nonmetallic Conduit (PVC-H or FRE)

1. Direct-buried conduits shall be laid on firmly tamped and graded stone-free sand not less than 2 inches deep. Backfill in contact with the conduits shall be sand to a minimum of 3 inches above the conduits and the remainder of the backfill shall be unfrozen, stone-free earth. Buried depth shall be as shown on the Contract Drawings.

2. Conduit entering or exiting manholes, handholes, vaults, and other concrete structures shall be a 10-foot length of rigid metal conduit protected with two coats of asphaltic paint.

3. Terminations of conduits in manholes, handholes, vaults, and other concrete structures shall be made with insulated grounding bushings projecting 2 inches beyond the inside face of the concrete.

E. Manholes, Handholes, and Vaults

1. Set precast manholes, handholes, and vaults so that they are firmly and fully bedded at required grades.

2. Set frames and covers using mortar and masonry as required. Radially laid concrete brick shall have 1/4-inch thick vertical joints at inside perimeter. Lay all concrete brick in a full bed of mortar and completely fill all joints. Where more than one course of concrete brick is required, stagger vertical joints.

3. Set racking assemblies as required so that the unsupported length of wires or cables shall not exceed 30 inches.

F. Vertical Adjustment of Existing Manholes, Handholes, and Vaults

1. Adjust the top elevation of existing structures to suit new finished grades in accordance with the details shown on the Contract Drawings.

2. Existing frames and covers shall be carefully removed, cleaned of all mortar fragments to the satisfaction of the Engineer and reset at the required elevation in accordance with the requirements shown on the Contract Drawings.

G. Grounding

1. Install a complete grounding system in each manhole or vault, and in selected handholes shown on the Contract Drawings. Electrically bond all arm supports, insulated grounding bushings, and ground rods together.

2. After installation, coat all bare surfaces or connections in the grounding system with asphaltic paint.

H. TESTING

1. Test conduits, in the presence of the Engineer, by pulling through each conduit a flexible cylindrical mandrel having an outside diameter not more than 1/4 inch smaller than the inside diameter of the conduit, but nominally 85 percent of the trade diameter, whichever is larger. Only nylon cable of adequate strength shall be used to pull the mandrel through the conduit system. The use of rope will not be permitted.

I. Connections to Existing Conduits

1. Where conduits installed under this Contract are connected to existing conduits, test the entire run to the nearest box, manhole, handhole, vault or equipment enclosure, including all existing conduits installed by others, that will be used under this Contract.

2. Where any work shall be performed in conduits emanating from a manhole, handhole, vault or equipment enclosure, all existing spare conduits (conduits containing no electric wire or cable) shall be tested to the nearest manhole, handhole, vault or equipment and a pull line shall be left in place in each such conduit.

3. Report immediately to the Engineer any defect or stoppage found in portions of the conduit system not installed under this Contract. Do not attempt to rectify any defect or stoppage found in conduit not installed under this Contract unless specifically instructed to do so by the Engineer. The Contractor's compensation for the rectifying of such defects or stoppages at the direction of the Engineer will be determined in accordance with the clause of the Contract providing compensation for Extra Work.

4. The Engineer shall be the sole judge as to whether a defect or stoppage exists. Perform all tests required by the Engineer to enable him to make his decision.

3.04 ADJUSTMENTS

A. Conduit Cleaning

After installation of conduits, manholes, handholes, vaults, accessories and completion of all concreting operations, if any, carefully clean and clear all conduits of all obstructions and foreign matter to the satisfaction of the Engineer.

**END OF SECTION**

# SECTION 16115

# UNDERGROUND CONDUIT SYSTEMS

## APPENDIX A

## SUBMITTAL REQUIREMENTS

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:

A. Shop Drawings

1. Handholes
2. Frames and covers

B. Catalog Cuts

1. Conduit
2. Racking assemblies
3. Grounding assemblies
4. Continuous inserts

END OF APPENDIX "A"

# DIVISION 16

# SECTION 16120
# WIRES, CABLES, SPLICES, TERMINATIONS
# (600 VOLTS OR LESS)

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for wires, cables, splices, terminations, and appurtenances for electrical systems of 600 volts or less.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

American Society for Testing and Materials (ASTM)

| | |
|---|---|
| ASTM B 1 | Hard-Drawn Copper Wire |
| ASTM B 2 | Medium-Hard-Drawn Copper Wire |
| ASTM B 3 | Soft or Annealed Copper Wire |
| ASTM B 8 | Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft |
| ASTM B 33 | Tinned Soft or Annealed Copper Wire for Electrical Purposes |
| ASTM B 174 | Bunch-Stranded Copper Conductors for Electrical Conductors |
| ASTM B 189 | Lead-Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes |
| ASTM D 2802 | Ozone-Resistant Ethylene-Propylene-Rubber Insulation for Wire and Cable |
| ASTM D 3005 | Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape |
| ASTM E 662 | Standard Test Method for specific Optical Density of Smoke Generated by Solid Materials |

Federal Specifications (FS)

| | |
|---|---|
| HH-I-553 | Insulation Tape, Electrical (Rubber, Natural and Synthetic) |

Insulated Cable Engineers Association (ICEA)

| | |
|---|---|
| ICEA S-19-81 | Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (NEMA WC 3) |
| ICEA S-61-402 | Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (NEMA WC 5) |
| ICEA S-66-524 | Cross-Linked-Thermosetting-Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (NEMA WC 7) |
| ICEA S-68-516 | Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (NEMA WC 8) |
| ICEA T-33-655 | Guide for Low Smoke, Halogen-Free (LSHF) Polymeric Cable Jackets |

Institute of Electrical and Electronics Engineers (IEEE)

| | |
|---|---|
| IEEE 383 | Type Test of Class 1E Electric Cables, Field Splices and Connections for Nuclear Power Generating Stations |
| IEEE 837 | Standard for Qualifying Permanent Connections Used in Substation Grounding |

Military Specifications

| | |
|---|---|
| MIL C-24643 | Electrical Cable and Cord for Shipboard Use, Testing for Low Smoke and Halogens |

National Fire Protection Association (NFPA)

| | |
|---|---|
| NFPA 70 | National Electrical Code |

Naval Engineering Standards

| | |
|---|---|
| NES 713 | Determination of Toxicity Index of Products of Combustion From Small Specimens of Materials |

Underwriters Laboratories Inc. (UL)

| | |
|---|---|
| UL 44 | Rubber-Insulated Wires and Cables |
| UL 62 | Flexible Cord and Fixture Wire |
| UL 83 | Thermoplastic-Insulated Wires and Cables |
| UL 467 | Grounding and Bonding Equipment |
| UL 510 | Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape |
| UL 854 | Service-Entrance Cables |
| UL 1581 | Reference Standard for Electrical Wires, Cables, and Flexible Cords |
| UL 1685 | Standards for Safety Vertical Tray Fire Propagation and Smoke Release Test for Electrical and Optical Fiber Cables |

1.03 QUALITY ASSURANCE

A. Wires and cables which have been manufactured more than two years prior to installation shall not be used in the Work of this Section.

B. Tapes for splices or terminations shall be dated by the tape manufacturer to indicate that they have been manufactured no longer than six months prior to use in the Work of this Section.

C. Polyvinyl Chloride (PVC): PVC-insulated power wiring and items containing PVC, except PVC-insulated wiring for communications systems, remote control, signaling, and power-limited circuits, shall not be installed in indoor area. PVC-insulated wiring for communications systems, remote control, signaling, and power-limited circuits shall be furnished and installed in accordance with NFPA 70.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Single conductor wire or cable sizes #4/0 AWG and larger that are to be installed in the same raceway shall be paralleled by the cable manufacturer prior to shipment. Cable assembly overall diameter shall be kept to a minimum.

B. Wire and cable sizes #4/0 AWG and larger shall be provided with fctory-applied caps unless otherwise shown on the Contract Drawings. End seals shall be heat-shrink, irradiated, modified polyolefin, and shall be sized for individual wires and cables.

C. Store material in a clean, dry space and protect it from the weather.

1.05 SUBMITTALS

See Appendix "A" for submittals requirements.

## PART 2. PRODUCTS

2.01 MANUFACTURERS

Subject to compliance with requirements of this Section, provide wires, cables, wire and cable splicing, terminating and arcproofing materials of manufacturers as shown on the Contract Drawings.

## 2.02 WIRES AND CABLES

A. General

1. Definitions

   a. Wire shall be defined as a solid or stranded conductor smaller than No. 6 AWG with or without insulation.

   b. Cable shall be defined as a single conductor No. 6 AWG or larger, or two or more conductors of any size wire under a common covering.

2. Locations, types, sizes and numbers of wires and cables are shown on the Contract Drawings. Where not indicated, provide proper wire and cable selection to comply with this section and NFPA 70 Standards.

3. Unless otherwise shown on the Contract Drawings, solid conductors shall be soft or annealed copper, conforming to ASTM B 33 (tinned), ASTM B 189 (lead-coated or lead-alloy coated), or ASTM B 3 (uncoated). Unless otherwise specified in this Section or unless otherwise shown on the Contract Drawings, stranded copper conductors shall be concentric stranding conforming to ASTM B 8.

4. Unless otherwise shown on the Contract Drawings, cable jackets for interior use shall be low smoke, low toxicity, non-halogen, flame retardant type and shall meet the following performance characteristics:

   a. Cables shall pass the flame propagatory and smoke release criteria according to the test method of UL 1685.

   b. The halogen content of cable jackets shall not exceed 0.2 percent according to the test method of MIL-C-24643. The Authority classifies 0.2 percent or less halogen content as "non-halogen".

   c. The toxicity index of cable jackets shall not exceed 4.0 according to the test method of NES 713.

   d. The cable jackets shall comply with ICEA T-33-655 for smoke generation.

   e. The acid gas content of cable jackets shall not exceed a maximum of 3.0 percent according to the test method of MIL-C-24643.

5. Use the additional performance characteristics for wires and cables which will be installed in subway areas, substations, tunnels, etc. where stringent flame retardency, low smoke, low toxicity, zero halogen and good circuit integrity during a fire are required.

   a. Wires shall pass the flame propagatory criteria according to the test method of VW-1.

   b. The halogen content of both the wire and cable insulation and cable jacket(s) shall not exceed 0.2 percent according to the test method of MIL-C-24643. The Authority classifies 0.2 percent or less halogen content as "non-halogen".

   c. The toxicity index of both the wire and cable insulation and cable jacket(s) shall not exceed 2.0 according to the test method of NES 713.

   d. The acid gas content of both wire and cable insulation and cable jacket(s) shall not exceed a maximum of 2.0 percent according to the test method of MIL-C-24643.

e. The wire and cable insulation materials shall pass the smoke generation test in accordance with ASTM E 662. Wire and cable insulation when tested on a specimen of 80 mils thick slab shall not exceed the following values:

| | |
|---|---|
| Flaming Avg. Ds (4 minutes) | 100 |
| Flaming Avg. Dm (20 Minutes) | 200 |
| Non-Flaming Avg. Ds (4 minutes) | 100 |
| Non-Flaming Avg. Dm (20 minutes) | 350 |

f. The cable jacket materials shall pass the smoke generation test in accordance with ASTM E 662. Wire and cable jacket when tested on a specimen of 80 mils thick slab shall not exceed the following values:

| | |
|---|---|
| Flaming Avg. Ds (4 minutes) | 50 |
| Flaming Avg. Dm (20 minutes) | 150 |
| Non-Flaming Avg. Ds (4 minutes) | 50 |
| Non-Flaming Avg. Dm (20 minutes) | 250 |

6. Color-Coding for Power and Lighting Conductors

a. Insulation or covering of wires and cables shall be actory color-coded by the use of colored compounds or coatings. The color-code shall be followed cnsistently throughout the performance of the Work.

b. Upon written request of the Contractor, the Engineer may permit the use of the following methods in lieu of the wire or cable manufacturer's color-coding, when limited quantities of wire and cable are involved, for sizes #8 AWG and larger.

(1) For dry locations only, spiral application of 3/4 inch wide, colored pressure sensitive plastic tape, half lapped for a distance of not less than six inches may be used. To prevent unwinding, the last two wraps of tape shall be applied with no tension.

(2) For wet or dry locations, application of three, 3/16 inch wide, colored, fungus-inert, self-extinguishing, self-locking, nylon cable ties spaced 3 inches apart may be used. The ties shall be snugly applied with a special tool or pliers, and any excess removed.

(3) Each wire and cable shall be color-coded at all terminal points, in all manholes, boxes, or other similar enclosures.

(4) Color markings shall be applied so as not to obliterate the manufacturer's identification markings.

c. Color code chart shall be as follows:

| | System Voltage | |
|---|---|---|
| Conductor | 208Y/120V | 480Y/277V |
| Phase A | Black | Brown |
| Phase B | Red | Orange |
| Phase C | Blue | Yellow |
| Neutral | White | Gray |
| Ground | Green | Green |

7. All wires, cables, splices and terminations, for which there are established UL standards, shall bear the UL label.

B. General-Purpose Wires and Cables

Unless otherwise shown on the Contract Drawings, general purpose wires and cables shall be as follows:

1. General-purpose wires and cables shall be single conductor, ASTMB8, Class B stranded for sizes #8 AWG and larger, and solid for sizes #10 AWG and smaller.

2. Select from the following list of UL wire and cable types:

a. Type XHHW: Flame retarding, Cross-linked-polyolifin insulation, conforming to UL 44, for dry locations only.

b. Type XHHW-2: Flame retardant, Cross-linked-polyolifin insulation, conforming to UL 44.

c. Type THWN: Flame retardant, moisture and heat resistant thermoplastic insulation with a nylon jacket or equivalent; Double rated THHN-THWN gasoline-oil resistant II; conforming to UL 83.

The use of this cable shall be in accordance with the requirements of paragraph 1.03C of this Section.

d. Type USE: Heat and moisture resistant ethylene- propylene-rubber insulation with heavy duty thermosetting chlrosulphanated polyethylene or heavy- duty neoprene jacket; multiple rated "USE-RHH-RHW"; conforming to ASTM D 2802, ICEA S-68-516, UL 44 and UL 854. Unless otherwise indicated, Type USE shall be the only wire and cable used for underground installations.

C. Overhead Service Cables

Unless otherwise shown on the Contract Drawings, overhead service cables shall be two or more type SE, ASTM B 8, Class B or Class C stranded, hard-drawn copper conductors, ethylene-propylene-rubber insulation, with heavy duty neoprene or heavy duty thermosetting chloro-sulphonated polyethylene jacketed, marked "sunlight resistant", conforming to ASTM D 2802, UL 44 and UL 854. Cable shall be factory assembled with copper-clad messenger conforming to ICEA S-68-516.

D. Portable Cords

Unless otherwise shown on the Contract Drawings, portable cords shall be as follows:

1. Type S shall be 60 degrees C rated, with heavy-duty thermosetting insulation and jacket, conforming to UL 62, 600-volt rated.
2. Type SO shall be oil resistant, 60 degrees C rated, with heavy-duty thermosetting insulation and jacket, conforming to UL 62, 600-volt rated.
3. Type G or Type W shall be 90 degrees C rated, with ethylene-propylene-rubber insulation and Hypalon jacket, 600-volt rated.
4. Special types shall be used only where shown on the Contract Drawings.

E. Lighting Fixture Wires

Unless otherwise shown on the Contract Drawings, lighting fixture wires shall be stranded only, and shall be Type SF-2, silicone rubber insulated conforming to UL 62.

F. Grounding Wires and Cables

Unless otherwise shown on the Contract Drawings, grounding wires and Cables shall be as follows:

1. Insulated
   a. Solid for sizes #8 AWG and smaller; ASTM B 8, Class B stranded for sizes #6 AWG and larger; and of the same insulation type as the power conductors.
   b. Covering shall be a continuous green color and conform to ASTM B 33 and UL 44.
2. Uninsulated
   a. General

      Solid for sizes #8 AWG and smaller; ASTM B8, Class B stranded for sizes #6 AWG and larger.
   b. In raceways

      Soft-drawn and conforming to ASTM B 3.
   c. Direct buried or encased in concrete

      Soft-drawn, medium-hard-drawn, or hard-drawn and conforming to ASTM B 1, B 2 or B 3, respectively.

G. Control Wires and Cables

Unless otherwise shown on the Contract Drawings, control wires and cables shall be as follows:

1. Single conductor wires and cables shall be ASTM B 8, Class B stranded, type XHHW or XHHW-2 flame retardent, cross-linked-polyolifin insulation. Both shall conform to UL44 and ICEA S-66-524.

2. Multiconductor cables shall be ASTM B 8, Class B or Class C stranded, Control Cable Type B, conforming to ICEA S-61-402. Color-coded as per ICEA S-61-402, Method No. 1 for NFPA 70 applications (with white and green) or ICEA S-19-81, for paired conductor cables. Select from the following list of cable types.

   a. Individual ethylene-propylene rubberinsulation with overall flame retardent, cross-linked-polyolifin jacket; conforming to ICEA S-68-516, UL 44, and UL 1581.

   b. Individual ethylene-propylene-rubber insulation with individual and overall flame-retardent, cross-linked polyolifin jackets; conforming to ICEA S-68-516 and UL 44.

   c. Individual flame retardent, cross-linked-polyolifin insulation with and overall flame retardent, cross-linked-polyolifin jacket; conforming to ICEA S-66-524.

   d. Individual cross-linked-polyolifin insulation with overall polyvinyl chloride jacket conforming to ICEA S-66-524.

   e. Individual polyolifin insulation with individual and overall polyvinyl chloride jackets conforming to ICEA S-61-402.

H. Switchboard Wires and Cables

Unless otherwise shown on the Contract Drawings, switchboard wires and and cables shall be as follows:

1. Switchboard wires and cables shall be single conductor, ASTM B 8, Class B stranded, except that for wires and cables crossing hinged joints and swinging panels, and where "Extra Flexible" wire or cable is shown on the Contract Drawings, conductors shall be ASTM B 174, Class K stranded.

2. Wires and cables shall be Type SIS, cross-linked-thermosetting-polyethylene insulation, conforming to ICEA S-61-402, IEEE383 and UL 44.

I. Cable Tags

1. Dry Locations

   a. Fiberglass tags, 1/16 inch thick and 3/4 inch wide, indented with letters and numbers 5/16 inch high, with #14 AWG copper or nylon, weather-resistant cable ties.

   b. Lighting branch circuit wiring and single conductor signal and control wiring may be identified with "Quiklables" manufactured by W. H. Brady Company, or approved equal.

2. Wet Locations

Stainless steel metal tags, No. 28 gauge and 3/4 inch wide, embossed with letters and numbers 5/16 inch high, with #14 AWG copper or nylon, weather-resistant cable ties, or stainless steel cable ties.

## 2.03 SPLICING, TERMINATING AND ARCPROOFING MATERIALS

A. General

1. All splicing, terminating and arcproofing materials shall be compatible so that no one material will adversely affect the physical or electrical properties of any other, or of the wire or cable itself.

2. All materials for making splices and terminations shall be specifically designed for use with the type of wire or cable, insulation and installation and operating conditions of the specific application.

B. Connectors

Subject to compliance with requirements of this Section, provide connectors of the following types:

1. Solderless, uninsulated, high conductivity, corrosion resistant, compression connectors conforming to UL 467 and IEEE 837;

2. Insulated, indenter type compression butt connectors;

3. Insulated, integral self-locking flexible shell, expandable spring connectors;

4. Uninsulated, indenter type compression pigtail connectors;

5. Welded type connectors.

C. Terminals

Subject to compliance with requirements of this Section, provide terminals of the following types:

1. Solderless, uninsulated, high conductivity, corrosion resistant, compression terminals conforming to UL 467 and IEEE 837;

2. Insulated, compression terminals;

3. Solderless, high conductivity, corrosion resistant, hex screw type, bolted terminals;

4. Welded type terminals.

D. Shrinkable Tubing

Subject to compliance with requirements of this Section, provide shrinkable tubing of the following types:

1. Either irradiated modified polyvinyl chloride or irradiated modified polyolefin heat shrinkable tubing;

2. Cold shrinkable tubing.

E. Tapes and Sealers

1. Vinyl Tapes

Flame-retardent, cold and weather-resistant, 3/4 inch or 11/2 inches wide, as required, and conforming to UL 510 and ASTM D 3005.

a. For interior, dry locations, provide 7 mils, conforming to ASTM D 3005 (Type I); Scotch (3M) No. 33, or approved equal.

b. For exterior or damp and wet locations, provide 8.5 mils, conforming to ASTM D 3005 (Type II); Scotch (3M) No. 88, or approved equal.

2. Rubber Tapes

Ethylene-propylene, rubber-based, 30-mil splicing tape, rated for 130 degrees C operation; 3/4inch and wider (1, 1 1/2, 2 inches) as shown on the Contract Drawings or approved by the Engineer, conforming to Federal Specification HH-I-553 (Grade A); Scotch (3M) No. 130C, or approved equal.

3. Insulating Putty

Rubber-based, 125-mil elastic filler putty; 1 1/2 inches wide; Scotch (3M) Scotchfil, or approved equal.

4. Silicone Rubber Tapes

Inorganic silicone rubber, 12-mil, 130 degrees C rated, anti-tracking, self-fusing tape; 1 inch wide; Scotch (3M) No. 70, or approved equal.

5. Sealer

Liquid applied, fast-drying sealant; Scotch (3M) Scotchkote, or approved equal.

F. Resin Filled Splices

1. Epoxy Molded Type

Two-piece, snap-together molded bodies, sized for wire or cable, with two-part low viscosity polyurethane insulating and sealing compound, rated for 600 volts, using crimp-type wire connector; Scotch (3M) No. 82-A1, 82-A2 or 82-A3 compound, or approved equal.

2. Re-Enterable Type

Transparent, molded bodies clamped with stainless steel strain-relief bar and shield continuity connectors, sized for wire or cable, with loosely woven polyester spacer web and jelly-like urethane formulation for permanent re-entry capability; Scotch (3M) No. 78-R1 thru 78-R5, with No. 2114 compound, or approved equal.

G. Arcproofing Materials

1. Fire resistant tapes shall be Scotch (3M) No. 77, or approved equal.

2. Glass cloth binding tapes shall be Scotch (3M) No. 69, or approved equal.

H. Special splicing materials and methods shall be as shown on the Contract Drawings.

## 2.04 SHOP TESTS

A. For quantities as shown on the Contract Drawings, regular dielectric-withstand and insulation-resistance in water tests for wires and cables shall be performed in accordance with UL44.

B. Flame tests for wires and cables shall be performed in accordance with IEEE 383.

C. The test results shall be certified for each reel/coil/box of wire or cable.

D. Factory inspection and witnessing of tests by the Engineer shall be required for all wires and cables furnished under this Contract. The Engineer reserves the right to require additional testing, or to waive factory inspection or witnessing of tests. The Contractor shall notify the Engineer 14 days in advance of the scheduling of such factory tests.

# PART 3. EXECUTION

## 3.01 PREPARATION

A. Prior to pulling wires and cables, clean raceway systems of all foreign matter and perform all operations necessary so as not to cause damage to wires and cables while pulling.

B. Prior to pulling wires and cables into underground conduit systems, place a feeding tube approved by the Engineer at the entrance end of such systems.

## 3.02 INSTALLATION

A. Wire and Cable Installation

1. General

a. Keep wires and cables dry at all times.

b. Seal wire and cable ends with watertight end seals if splicing or terminating does not follow at once.

c. Before splicing or terminating wires and cables, make a thorough inspection to determine that water has not entered the wires and cables or that the wires and cables have not been damaged.

d. Use adequate lubrication when installing cables in conduits or raceways. Any pulling compounds shall be compatible with the finish of the wires and cables furnished.

2. General Purpose Wires and Cables

a. Minimum wire or cable size shall be #12 AWG for light and power service.

b. Wires or cables shall be at least #10 AWG for the entire length of branch circuits, where distances to first outlets are as follows:

(1) 100 feet or more on 480Y/277 Volt systems.

(2) 70 feet or more on 208Y/120 Volt systems.

3. Lighting Fixture Wires

a. For wiring within lighting fixtures only, where sizes #14 AWG or smaller are required, use Type SF-2 fixture hookup wire. Type SF-2 wire shall not be used for wiring end-to-end connected fluorescent fixtures.

b. For connecting lighting fixtures to branch circuit conductors, use either Type RHH-VW-1, XHHW or USE, up to 90 degrees C, in dry locations.

4. Grounding Wires and Cables

a. Use bare, uninsulated wire and cable only where shown on the Contract Drawings or where approved by the Engineer.

b. Insulated grounding cable shall be of the type specified in this Section or as shown on the Contract Drawings.

5. Control Wires and Cables

Control wires and cables shall not be smaller than #14 AWG unless otherwise shown on the Contract Drawings.

B. Splicing and Terminating

1. General

Splicing and terminating shall be as specified in this Section. Details of special splicing and terminating shall be as shown on the Contract Drawings. Any splicing or terminating methods other than those specified below, for which the components are in accordance with the requirements of this Section, shall be submitted to the Engineer for approval.

2. General Purpose Wires and Cables

a. Splices in dry locations for sizes #10 AWG and smaller

Splicing shall be completed using one of the following:

(1) Insulated, integral, self-locking flexible shell, expandable spring connectors shall be applied to the twisted conductors. Two, half-lapped layers of vinyl tape, extending to a distance of not less than one inch from the connector, shall be applied.

(2) Compression type, insulated butt connectors shall be applied to the butted conductors by means of an appropriate crimping tool, providing controlled indentation. Two, half-lapped layers of vinyl tape, extending to a distance of not less than one inch from the connector, shall be applied.

(3) Compression type, pigtail connectors shall be applied to the conductors by means of an appropriate crimping tool, providing controlled indentation. The connector shall be covered with a polyamide cap and two, half-lapped layers of vinyl tape, extending to a distance of not less than one inch from the connector, shall be applied.

b. Splices in dry locations for sizes #8 AWG and larger

Splicing shall be completed using all of the following:

(1) Connectors shall be split sleeve solderless type or solderless compression type.

(2) Fill indents of connectors with Scotchfil insulation putty.

(3) Apply rubber splicing tape equal to the original insulation rating.

(4) Apply two, half-lapped layers of vinyl tape, or a shrinkable tubing.

c. Splices in wet locations

(1) Same as dry locations specified in 3.02B.2.a and 2.b, except that after vinyl tape is applied, cover with two coats of sealer or shrinkable tubing.

(2) Resin-filled splice shall be covered with two, half-lapped layers of vinyl tape and two coats of sealer or shrinkable tubing.

d. Terminations in dry locations for sizes #10 AWG and smaller

Terminations shall be compression terminals, insulated or uninsulated.

e. Terminations in dry locations for sizes #8 AWG through #3/0 AWG

(1) Ring tongue terminals shall be solderless, uninsulated compression crimp type.

(2) Ring tongue lugs shall be bolted hex screw type.

f. Terminations in dry locations for sizes #4/0 AWG and larger.

Ring tongue terminals shall be solderless, uninsulated compression crimp type.

g. Terminations in wet locations

In addition to the dry location terminations specified in 3.02 B.2.d, 2.e and 2.f, cover the entire termination area with two, half-lapped layers of vinyl tape and apply two coats of sealer over the tape.

3. Overhead Service Cables

Splices and terminations in overhead service cables shall be the same as specified in 3.02 B.2.c and 2.g, respectively, appropriate for overhead service.

4. Portable Cords

a. Splices shall not be made in portable cords.

b. Terminations shall be made only at apparatus to be served or at branch circuit connection by means of any of the following:

(1) Insulated, integral, self-locking flexible shell, expandable spring, or crimp type connectors;

(2) Insulated, crimp type, compression connectors;

(3) Uninsulated, ring tongue terminals for connection to wire terminal strip block.

5. Lighting Fixture Wires

Connections to branch circuit and to fixture wiring shall be made by either insulated, integral, self-locking flexible shell, expandable spring, or crimp type connectors.

6. Grounding Wires and Cables

a. Splices and terminations shall be installed in accordance with the manufacturer's recommendations.

b. In hazardous or classified locations, splices and terminations shall be solderless high conductivity, corrosion resistant, compression type connectors and terminations shall be clamp type pressure connectors, suitable for such use.

c. All underground connections shall be covered with two coats of asphalt base paint.

7. Control Wires and Cables

a. Splices shall be made in accordance with the requirements specified in 3.02 B.2.c and shall be enclosed in a re-enterable splicing case. Where shielded cable is shown on the Contract Drawings, the shielding shall be continued through the splice. Shields shall be grounded at one location only unless otherwise shown on the Contract Drawings.

b. Terminations shall be insulated, indenter type ring tongue terminals.

8. Switchboard Wires

a. No splices are permitted.

b. Terminations shall be insulated, indenter type ring tongue terminals.

C. Arcproofing

1. Arcproofing shall be applied where shown on the Contract Drawings.

2. Arcproofing, which has been disturbed for any reason, shall be reinstalled as soon as possible after the disturbance.

3. Arcproofing shall be installed as follows:

a. Wires and cables shall be grouped by circuit and arcproofing applied over the group of wires and cables comprising one circuit. Splices shall be arcproofed individually and the taping shall join with and be overlapped by the group taping.

b. Arcproofing shall be applied in two wrappings of half-lapped tape, bound with glass cloth tape applied at the ends of the fire resistant tape, and at intervals not to exceed 24 inches along the entire length of the cables. The two wrappings shall be applied with opposing-lays.

c. Arcproofing shall be extended into the conduit opening or end bell of the raceway entering a handhole, manhole or box.

d. Arcproofing tape shall be 1 1/2 inches wide where the diameter of the individual cable, or of the circumscribed circle for the circuit group, is less than 1 3/4 inches. For larger diameters, the tape shall be 3 inches wide.

D. Identification of Wires and Cables

1. Each wire and cable shall be identified by its circuit in all cabinets, boxes, manholes, handholes, wireways and other enclosures and access locations, and at all terminal points.

2. The circuit designations shall be as shown on the Contract Drawings. Tags shall be attached to wires and cables in such a manner as to be readily visible.

3. The tag ties shall be wrapped around all conductors comprising the circuit or feeder to be identified.

4. Wires and cables which are arcproofed shall also be identified outside the applied arcproofing.

3.03 FIELD TESTS

Test all wires and cables up to equipment installed under this Contract with a 1000-volt Megohmmeter. Furnish the Engineer with a copy of the "Megger" readings together with an outline of the method used. If, in the opinion of the Engineer, any reading is lower than that required by applicable codes, promptly replace the materials involved, at the Contractor's expense, and retest.

END OF SECTION

## SECTION 16120

## WIRE, CABLES, SPLICES, TERMINATIONS

## (600 VOLTS OR LESS)

## APPENDIX A

## SUBMITTAL REQUIREMENTS

A. Submit Catalog Cuts for the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:

1. Wires and cables for each type and size;
2. Splice kit materials and installation procedures.

END OF APPENDIX "A"

# DIVISION 16

# SECTION 16135

# BOXES AND FITTINGS

## PART 1. GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for electrical boxes and fittings.

B. Types of electrical boxes and fittings specified in this Section are:

1. Outlet Boxes
2. Device Boxes
3. Pull Boxes
4. Junction Boxes
5. Conduit Bodies
6. Fittings

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

| | |
|---|---|
| | National Electrical Manufacturers Association (NEMA) |
| NEMA OS1 | Sheet-Steel Outlet Boxes, Device Boxes, Covers and Box Supports |
| NEMA OS2 | Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports |
| NEMA 250 | Enclosures for Electrical Equipment (1000 Volts Maximum) |
| | National Fire Protection Association (NFPA) |
| NFPA 70 | National Electrical Code |
| | Underwriters Laboratories Inc. (UL) |
| UL 50 | Cabinets and Boxes |
| UL 514A | Metallic Outlet Boxes |
| UL 514B | Fittings for Conduit and Outlet Boxes |
| UL 514C | Nonmetallic Outlet Boxes, Flush Device Boxes, and Covers |
| UL 886 | Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations |

### 1.03 QUALITY ASSURANCE

Boxes and fittings, of types and sizes required, shall have been satisfactorily used for purposes similar to those intended herein for not less than three years. A list of acceptable manufacturers is shown on Contract Drawing.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver material in manufacturer's original, unopened, protective packaging.

B. Store materials in a clean, dry space and protect them from weather.

C. Handle in a manner to prevent damage to finished surfaces.

D. Where possible, maintain protective coverings until installation is complete and remove such coverings as part of final cleanup.

E. Touch up any damage to finishes to match adjacent surfaces.

1.05 SUBMITTALS

"Submittal Requirements" shall be in accordance with APPENDIX A.

## PART 2. PRODUCTS

2.01 MATERIALS

A. General

1. Locations, types and sizes of boxes and fittings are shown on the Contract Drawings.

2. Boxes and fittings shall be metallic, unless otherwise shown on the Contract Drawings, and shall conform to NEMA 0S1, NEMA 250, UL 50, UL 514A, UL 514B, and NFPA 70.

3. Nonmetallic boxes and fittings, shown on the Contract Drawings, shall conform to NEMA 0S2, NEMA 250, UL 50, UL 514C, and NFPA 70.

4. Boxes and fittings to be located in hazardous (classified) areas, as shown by "area plans" on the Contract Drawings shall conform to UL 886 & NFPA 70.

5. All electrical materials and equipment, for which there are established UL standards, shall bear the UL label.

6. Where the sizes or dimensions of a box are not shown on the Contract Drawings, all boxes, whether for use on power, communications, signaling, control, telephone, or other purposes, shall be sized as follows:

a. In straight pulls, the length of the box shall not be less than 8 times the trade diameter (nominal inside diameter) of the largest raceway.

b. Where angle or "U" pulls are made, the distance between each raceway entry inside the box and the opposite wall of the box shall not be less than 6 times the trade diameter of the largest raceway. The distance shall be increased for additional entries by the amount of the sum of the diameters of all other raceway entries in any row on the same wall of the box. The distance between raceway entries enclosing the same conductor shall not be less than 6 times the trade diameter of the larger raceway.

c. Where a conduit entry is in the wall of a box opposite a removable cover, the minimum distance between the entry and the cover shall be as follows:

| Conduit Size | Distance Between Entry and Cover |
|---|---|
| Up to 1-1/4" | 4" |
| 1-1/4" and 1-1/2" | 6" |
| 2" and 2-1/2" | 8" |
| 3" and larger | 12" |

d. The minimum depth of a box shall be not less than two times the trade diameter of the conduit entries in a single row and not less than 1-1/2 times the sum of the trade diameter of the largest raceway in each row for multiple rows.

7. Weatherproof cast boxes shall be used for exterior or damp locations. Weatherproof boxes shall be hot-dipped galvanized cast-steel or cast-aluminum. Cast boxes shall be threaded conduit entrance type provided with mounting lugs. Materials shall match the type of conduit i.e., galvanized steel or aluminum, used in the conduit run.

8. Covers for boxes located in public spaces or where shown on the Contract Drawings shall be furnished with tamper-resistant hardware.

9. Cover plates for outlet boxes are specified in the Section 16140 entitled "WIRING DEVICES".

B. Interior Outlet and Device Boxes

1. Provide galvanized, flat-rolled, sheet-steel interior outlet wiring boxes, of types, shapes and sizes, including box depths, to suit each respective location and installation; construct boxes with stamped knockouts in back and sides, and with threaded screw holes with corrosion-resistant screws for securing box covers and wiring devices.

2. Outlet boxes shall be of proper sizes and shapes for conduits and wires entering them, and equipped with plaster ring or cover as necessary for the wiring devices to be installed.

3. Boxes for switches and receptacles shall be 4-inch square, minimum 2 1/8-inch deep, for up to two devices; solid, ganged boxes for over two devices; and installed so that device covers shall be tight and plumb with wall finish.

4. Provide suitable barrier in boxes where two or more 277-volt switches are to be installed, to isolate each on its own phase.

5. Boxes for lighting fixture installation shall be 4-inch square, minimum 2 1/8-inch deep, and provided with 3/8-inch studs.

6. Boxes to be installed in ceilings, plenums, or spaces used for supply or return of environmental air shall be UL listed for such use, without holes, openings or penetrations, and complete with gasketed cover plates.

7. Provide all sheet-steel boxes with suitable knockouts.

C. Exterior Outlet and Device Boxes

1. Provide corrosion-resistant, cast metal, weatherproof outlet wiring boxes, of types, shapes and sizes, including box depths, to suit each respective location and installation.

2. For outlet boxes to be installed flush or recessed in exterior walls, provide galvanized, sheet-steel boxes, with suitable depth and tile, plaster or masonry rings for the wall construction.

3. Provide cast-metal faceplates with spring-hinged, waterproof caps suitably configured for each application, including faceplate gaskets and stainless steel or brass screws or fasteners. Faceplate material shall match the type of box i.e., galvanized steel or aluminum.

D. Junction and Pull Boxes

1. General

a. Unless otherwise shown on the Contract Drawings, provide galvanized, code-gauge, sheet-steel junction and pull boxes and covers for interior locations and cast-metal boxes and covers for exterior locations of types, shapes and sizes to suit each respective location and installation, and equipped with stainless steel hinges, nuts, bolts, screws and washers.

b. Junction or pull boxes having any dimension larger than 36 inches shall contain racks or supports for all cables or conductors.

c. Provide pull boxes with suitable insulating barriers where shown on the Contract Drawings or required by code. Vertical-offset pull boxes shall contain cable supports at turns to prevent cables from resting on corners.

d. Where shown on the Contract Drawings, provide boxes with provisions for padlocking.

e. Special boxes shall be as shown on the Contract Drawings.

f. Where shown on the Contract Drawings, catches or vault handles shall be lockable. Locks shall be keyed alike for the same service, such as power, communications, signal or telephone. Each service type shall be keyed differently.

g. All covers in exposed exterior locations, or other areas as shown on the Contract Drawings, shall be gasketed.

h. For covers heavier than 20 pounds or more than 24 inches in any dimension, provide two replaceable studs, located on each side of the box flange, to support the cover during installation.

i. Boxes containing, or designated for, conductors operating at greater than 600 volts (phase-to-phase) shall be constructed of minimum 12-gauge steel.

2. Interior Junction and Pull Boxes

a. Finished Areas

(1) Junction and pull boxes, located in finished areas and having any dimension larger than 12 inches, shall be furnished with flush-mounting, lockable, hinged covers, similar to adjacent panelboard cabinets. Locks shall be keyed alike for the same service, such as power, communications, signal or telephone. Each service type shall be keyed differently. Hinged covers shall contain catches to keep covers closed. Covers having any dimension larger than 36 inches and all multiple-section doors shall contain 3-point vault handles. Covers shall be furnished shop-primed for field painting, and shall be finished with a color as selected by the Engineer.

(2) Boxes having any cover dimension 12 inches or less shall be furnished with flush-mounting, screw-on covers, unless otherwise shown on the Contract Drawings.

b. Unfinished Areas

Junction and pull boxes, located in electrical or telephone closets or rooms, in mechanical equipment rooms, in areas above hung or accessible ceilings or in areas shown on the Contract Drawings as "unfinished," shall be furnished with screw-on covers for boxes having any cover dimension 24 inches or less, and with either single or multiple-section hinged covers for boxes having any cover dimension larger than 24 inches.

3. Exterior Junction and Pull Boxes

a. Junction and pull boxes, located in sidewalks, decks and in areas shown on the Contract Drawings as "finished", shall be furnished with flush-mounting, screw-on covers.

(1) Boxes having any cover dimension 24 inches or less shall be cast-steel. Boxes shall be furnished with asphaltic paint finish on surfaces to be embedded in earth or concrete.

(2) Covers having any dimension larger than 24 inches shall be cast-steel "sidewalk" frames and covers, suitable for installation on a concrete box or handhole.

b. Unfinished Areas

Junction and pull boxes, located in areas shown on the Contract Drawings as "unfinished", shall be furnished with screw-on covers for boxes having any cover dimension 24 inches or less, and with hinged, bolt-on covers for boxes having any cover dimension larger than 24 inches.

E. Floor Boxes

Provide cast-steel, waterproof, adjustable floor boxes with threaded-conduit entrance hubs, and vertical adjusting rings, gaskets, brass floor plates and flush, screw-on covers. All unused conduit openings shall be closed with appropriate plugs.

F. Conduit Bodies

Provide galvanized, cast-metal, conduit bodies, of types, shapes and sizes to suit each respective location and installation; construct with threaded-conduit entrance hubs, removable covers, and stainless steel or brass screws.

G. Bushings, Locknuts and Knockout Closures

Provide corrosion-resistant knockout closures and conduit locknuts, and insulated, malleable-iron, conduit bushings and offset connectors, of types and sizes to suit each respective use and installation.

H. Supporting Devices

Provide inserts, expansion shield lugs, bolts with nuts and washers, shims or any other type of fastening devices required to secure boxes, in accordance with the Section 16190 entitled "SUPPORTING DEVICES". Unless otherwise shown on the Contract Drawings, all fasteners shall be hot-dipped galvanized and of sizes and types recommended by the equipment manufacturer and as approved by the Engineer.

## PART 3. EXECUTION

### 3.01 INSTALLATION

A. Install boxes and conduit bodies at the locations shown on the Contract Drawings and as required by NFPA 70 at any other location where they are required to facilitate the pulling, supporting or connection of wires and cables.

B. Securely mount all boxes in a manner approved by the Engineer and support the boxes independently of conduits entering them.

C. Install boxes and conduit bodies in classified (hazardous) locations in accordance with their listing or label requirements. Conduit seal fittings shall be packed and filled only after proper operation of equipment and systems has been demonstrated and approved by the Engineer.

D. Paint exteriors of boxes exposed in mechanical equipment rooms or in electrical rooms or closets or spaces shown as "unfinished" on the Contract Drawings, and the exteriors of boxes installed above hung or accessible ceilings, as follows:

1. Emergency: Orange
2. Fire Alarm: Red
3. High Voltage: Red with 1-inch, white block letters reading "HIGH VOLTAGE" on each exposed face and cover.

E. All installations shall conform to NFPA 70.

F. Dissimilar Metals

1. "Dissimilar metals" shall mean those metals which are incompatible with one another in the presence of moisture, as determined from their relative positions in the Electrochemical Series, or from test data.

2. Where dissimilar metals come in contact, paint the joint both inside and out with approved coating to exclude moisture from the joint, or provide a suitable insulating barrier separating the metals.

END OF SECTION

## SECTION 16135

## BOXES AND FITTINGS

## APPENDIX A

## SUBMITTAL REQUIREMENTS

Submit the following, for approval in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:

A. Catalog Cuts

1. All boxes and fittings.

END OF APPENDIX "A"

# DIVISION 16

# SECTION 16190

# SUPPORTING DEVICES

## PART 1. GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for hangers and supports, sleeves and fasteners used to support electrical raceways and equipment, except as specified in B below.

B. Supporting devices, furnished as part of factory-fabricated equipment, are specified as part of equipment assembly in other Sections of the Specifications.

### 1.02 REFERENCE

The supporting devices, specified in this Section shall be constructed, installed and tested in accordance with requirements of the following publications:

| | |
|---|---|
| | American Institute of Steel Construction Inc. (AISC) |
| AISC | Manual of Steel Construction |
| | American Iron and Steel Institute (AISI) |
| AISI | Specifications for the Design of Cold-Formed Steel Structural Members |
| | American Society for Testing and Materials (ASTM) |
| ASTM A 36 | Structural Steel |
| | American Welding Society (AWS) |
| AWS D1.1 | Structural Welding Code, Steel |
| | National Electrical Contractors Association (NECA) |
| NECA 5055 | Standard of Installation |
| | National Fire Protection Association (NFPA) |
| NFPA 70 | National Electrical Code |

### 1.03 QUALITY ASSURANCE

Supporting devices, of types and sizes required, shall have been satisfactory used for purposes similar to those intended herein for not less than three years.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened, protective packaging.

B. Store materials in a clean, dry space and protect them from weather.

C. Handle in a manner to prevent damage to finished surfaces.

D. Where possible, maintain protective coverings until installation is complete and remove such coverings as part of final cleanup.

E. Touch up damage to finishes to match adjacent surfaces, including re-coating of galvanized or plated surfaces where damaged, cut or drilled.

1.05 SUBMITTALS

See Appendix "A" For Submittal Requirements.

## PART 2. PRODUCTS

2.01 MANUFACTURERS

Subject to compliance with requirements of this Section, provide supporting devices of the acceptable manufacturers as shown on Contract Drawings.

2.02 HANGERS AND SUPPORTS

A. General

1. Unless otherwise shown on the Contract Drawings, provide hangers and supports as specified below.

2. Where more than one type of hanger or support is suitable for the intended use, selection is at the Contractor's option, subject to approval by the Engineer.

3. Hangers and supports, for which there are established Underwriters Laboratories Inc. (UL) standards, shall bear the UL label.

B. Raceway Support

1. Clevis Hangers

For supporting horizontal conduit; galvanized steel; with hole for treaded steel rod.

2. Riser Clamps

For supporting vertical conduits; galvanized steel; with two or three bolts and nuts, and 4-inch ears.

3. Reducing Couplings

Steel rod reducing coupling; size as required; galvanized or plated steel

4. C-Clamps

   Black malleable iron or galvanized or plated steel; with hole for threaded rod.

5. I-Beam Clamps

   Galvanized or plated steel, 1-1/4-inch x 3/16-inch stock; 3/8-inch cross bolt; 2-inch flange width

6. Right Angle or Parallel beam Clamps

   Galvanized steel clamps for supporting or fastening conduit up to 2-inch trade size

7. One-Hole Conduit Straps

   For supporting up to 1-inch conduit or electrical metallic tubing (EMT); galvanized steel

8. Two-Hole Conduit straps

   For supporting conduit or EMT larger than 1-inch galvanized steel; 3/4" strap width.

9. Hexagon Nuts: galvanized steel

10. Round Steel Rod: galvanized or plated steel; threaded

11. Trapeze Hangers: Same as Specified in 2.02 C below

12. The following types of hangers and supports shall not be used:

    a. Perforated metal strapping;

    b. Slotted, perforated angles;

    c. Spring pressure or torsion clips, hangers or supports.

C. Equipment Supports

1. U-channel strut system shall be 12-gauge, hot-dipped galvanized steel. Provide with drilled or slotted holes as required for the application and with the following fittings which mate and match with U-channel:

   a. Fixture hangers

   b. Channel hangers

   c. End caps

   d. Beam clamps

   e. Wiring stud

   f. Thin wall conduit clamps

   g. Rigid conduit clamps

   h. Conduit hangers

   i. U-bolts

D. Supporting Steel Sections and Channels

Supporting steel sections and channels shall be fabricated of ASTM A 36 steel in accordance with the appropriate requirements of the AISC, AISI, and AWS publications specified in 1.02, and shall be hot-dipped galvanized after fabrication.

E. Cable Supports

1. Provide cable supports with insulating wedging plug for non-armored type electrical cables in risers. Assembly shall include body of galvanized malleable iron with insulating wedging plug.

2. Provide cable supports for armored type electrical cables in risers. Assembly shall include body and pressure plates of galvanized steel.

## 2.03 SLEEVES AND SEALS

A. General

1. Unless otherwise shown on the Contract Drawings, provide sleeves and seals as specified below.

2. Where more than one type of sleeve or seal is suitable for the intended use, selection is at the Contractor's option, subject to approval by the Engineer.

3. Sleeves and seals, for which there are established, UL standard, shall bear the UL label.

B. Pipe Sleeves

1. Provide pipe sleeves for conduits penetrating concrete or masonry floor and walls, as follows:

a. Steel Pipe

Fabricate from schedule 40, galvanized steel pipe; remove burrs.

b. Iron Pipe

Fabricate from cast iron or ductile iron pipe; remove burrs.

c. Plastic Pipe

Fabricate from either fiberglass or Schedule 40, PVC plastic pipe; remove burrs. Fiberglass sleeves may be utilized for interior or exterior usages, but PVC sleeves shall be utilized for exterior usage only.

2. Sleeves shall have a minimum inside diameter as shown below, based on the installed raceway diameter.

| Raceway Diameter (inches) | Sleeve Inside Diameter (inches) |
|---|---|
| 1 or less | 2 |
| 1-1/4 to 2 | 3 |
| 2-1/2 to 3 | 4 |
| 3-1/2 to 4 | 5 |
| 5 | 6 |
| 6 | 7 |

3. Where a sleeve encloses only one conductor, phase or polarity, or a ground wire or cable, the sleeve shall be non-ferrous.

C. Interlocking Modular Seals

Provide interlocking modular type seals for conduit access located in exterior foundation and pit walls. The seals shall be multi-link, stainless steel bolted connection, high-temperature fittings.

D. Sealing Bushings

Provide sealing bushings for conduit access core-drilled through foundation walls or floors. The bushings shall be molded, one-piece neoprene sealing rings with PVC coated steel or uncoated aluminum pressure plates, stainless steel hex socket head cap screws and flat washers.

E. Fire Seals

Provide UL listed, 3 hour rating, silicone based foam, fire resistive, waterproof joint sealing system to prevent the passage of hot gases and fire.

F. Wall and Floor Seals

Provide watertight and pressure-tight wall and floor seals suitable for sealing around conduit passing through exterior concrete floors and walls. Assembly shall include steel sleeves, galvanized malleable iron body, neoprene sealing grommets and rings, metal pressure rings, membrane clamp were required by foundation design and pressure clamps with type 316 stainless steel hex head cap screws. Seal sizes shall be maximum published size for conduit to be installed therein.

## 2.04 FASTENERS

A. General

1. Unless otherwise shown on the Contract Drawings, provide fasteners as specified below.
2. Where more than one type of fasteners is suitable for the intended use, selection is at the Contractor's option, subject to approval by the Engineer.

B. Toggle Bolts

Toggle bolts shall be spring head, galvanized or plated steel, 1/4-inch to 1/2-inch sizes, length as required.

C. Expansion Anchors

Expansion anchors shall be metallic expansion anchors or shields, including drop-in anchors, wedge and sleeve anchors, and two-piece and three-piece shields for lag screws or machine screws or bolts.

D. Powder activated Fasteners

Powder activated fasteners shall be steel, pin or stud type, selected for proper length and penetration for the equipment, clamp or strap to be installed, and the base material.

E. Bolts, Nuts, Lockwashers and Washers

1. All hardware shall be galvanized or plated steel, unless otherwise shown on the Contract Drawings.
2. Bolts and nuts, 1/4-inch trade size and larger, shall be hex head or hex socket type, standard American sizes.
3. Lockwashers shall match the finish of the furnished bolts and nuts, and generally be installed one-per-bolt, at the nut end of the assembly.
4. Washers shall be standard or fender type, as required, and sized to match the installed bolts or screws.

F. The following types of fasteners shall not be used:

1. Lead anchors or studs;
2. Wooden plugs or anchors;
3. Plastic anchors;
4. "Nail-in" anchors, either of plastic or metal type.

## PART 3. EXECUTION

### 3.01 EXAMINATION

A. Verify that electrical installations, structural, mechanical and other related Work satisfy the requirements for performance of the Work of this Section in accordance with the Contract Documents.

B. Report immediately to the Engineer any electrical, structural or related construction defects in areas where supporting devices are to be installed, and do not attempt to rectify any defect unless specifically instructed to do so by the Engineer.

### 3.02 PREPARATION

Before installation the supporting devices, the Contractor shall investigate the site condition to determine, what preparatory work, if any, will be needed.

## 3.03 INSTALLATION

A. General

1. Install hangers and supports, sleeves and fasteners in accordance with approved printed manufacturer's installation procedures, and as specified.

2. Coordinate all affected trades and all aspects of the electrical work, including installation of raceways and wiring as necessary to interface installation of supporting devices with other work.

3. Install hangers and supports, and attachments to properly support raceways, equipment and accessories from building structure. Arrange for grouping of parallel runs of horizontal conduits to be supported together on trapeze hangers where possible. Install hangers and supports with maximum spacing not to exceed that permitted by NFPA 70 and NECA 5055, as applicable, unless otherwise shown on the Contract Drawings.

4. Secure threaded rod couplings, trapeze hangers or supports or similar horizontal elements, using lock washers and jam nuts to prevent loosening.

B. Conduit and Raceway supports

1. Do not support raceways from hung ceiling supports or members, or metal roof deck.

2. Do not support raceways from mechanical ductwork, ductwork supports, piping or piping supports.

3. Threaded rod for the support of conduits, raceways or trapeze hangers of the given size, shall be not less than the following:

| Conduit, Raceway, Hanger Size (inches) | Threaded Rod Size (inches) |
|---|---|
| 2 or less | 3/8 |
| 2-1/2 to 3-1/2 | 1/2 |
| 4 to 5 | 5/8 |
| 6 | 3/4 |

4. Where trapeze hangers are used, bolt or clamp the raceways in place to at least every third hanger and to the first hanger on each side of a bend, fitting, junction or pull box or change in direction.

C. Sleeves

1. Unless otherwise shown on the Contract Drawings, extend sleeves for raceways and risers one inch beyond top of finished floor, curb or building element being penetrated.

2. Install sleeves level and plumb, accurately located and positioned to conform to the requirements of the equipment and in accordance with the approved layout drawings.

3. Install interlocking modular seals in tandem, one at the interior and one at the exterior face of the pipe sleeve.

4. Tighten sleeve seal nuts until sealing grommets have expanded to form watertight seal.

D. Fasteners

1. Wood screws, lag screws, carriage bolts or machine screws shall be utilized for wood or materials of similar fibrous nature.

2. Welded or blazed threaded studs, bolts or machine screws or clamps shall be utilized for structural and miscellaneous steel, iron or other metals.

3. Metallic expansion shields, wedge anchors or drop-in anchors, with lag screws, bolts or machine screws shall be utilized for solid masonry or concrete.

4. Sleeve anchors, drop-in anchors or toggle bolts shall be utilized for concrete masonry units (CMU). Do not use powder-activated fasteners in CMU.

E. Dissimilar Metals

1. "Dissimilar metals" shall mean those metals which are incompatible with one another in the presence of moisture, as determined from their relative positions in the Electrochemical Series, or from test data.

2. Where dissimilar metals come in contact, paint the joint both inside and out with approved coating to exclude moisture from the joint, or provide a suitable insulating barrier separating the metals.

**END OF SECTION**

# SECTION 16190

# SUPPORTING DEVICES

## APPENDIX A

## SUBMITTAL REQUIREMENTS

Submit for approval the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:

A. Catalog Cuts

1. Hangers and supports
2. Sleeves
3. Fasteners

END OF APPENDIX "A"

# DIVISION 16

# SECTION 16450

# GROUNDING

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for grounding.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

| | |
|---|---|
| | Administrative Code |
| | Electrical Code of the City of New York |
| | American National Standards Institute (ANSI) |
| ANSI C 2 | National Electrical Safety Code |
| | Institute of Electrical and Electronics Engineers (IEEE) |
| IEEE Std 142-1991 | Recommended Practice for Grounding of Industrial and Commercial Power Systems |
| IEEE Std 1100-1992 | Recommended Practice for Powering and Grounding Sensitive Electronic Equipment |
| | National Fire Protection Agency (NFPA) |
| NFPA 70 | National Electrical Code |
| | Underwriters Laboratories Inc. (UL) |
| UL 467 | Grounding and Bonding Equipment |

### 1.03 QUALITY ASSURANCE

A. Components and installation shall comply with NFPA 70, "National Electric Code."

B. Provide products specified in this Section that are listed and labeled. The terms "listed" and "labeled" shall be defined as they are in NFPA 70 Article 100.

### 1.04 SUBMITTALS

See Appendix A for Submittal Requirements.

## PART 2. PRODUCTS

### 2.01 GENERAL

Furnish grounding elements for switchgear, transformers, cabinets panelboards, starters, and miscellaneous electrical equipment, for all non-current-carrying metallic portions of the entire electrical system and for exposed non-electrical systems located in electrical substations or switchgear rooms as required by ANSI C 2, NFPA 70, and building codes which would be applicable, if the Authority were a private corporation.

### 2.02 MANUFACTURERS

Subject to compliance with the requirements of this Section, provide grounding products of manufacturers as shown on the Contract Drawings.

### 2.03 GROUND RODS

Ground rods shall be copper clad steel. Unless otherwise shown on the Contract Drawings, the rods shall be 3/4-inch diameter by 10 feet long.

### 2.04 GROUNDING CONDUCTORS

A. Provide grounding conductors in accordance with the requirements of NFPA 70, Sections entitled "WIRES, CABLES, SPLICES, TERMINATIONS (600 VOLTS OR LESS)," "WIRES, CABLES, SPLICES, TERMINATIONS (MEDIUM VOLTAGE)," and "TAXIWAY/RUNWAY WIRES AND CABLES," as applicable, and as specified on the Contract Drawings.

B. Equipment grounding conductors shall be green insulated.

C. Isolated grounding conductors shall be green insulated with yellow striping.

### 2.05 ABOVE GRADE CONNECTIONS

Connectors to piping, fencing, and conduit systems shall be listed and labeled as grounding connectors for the materials used.

### 2.06 BELOW GRADE CONNECTIONS

Buried Cable and ground rod connections shall be exothermic welds. Welded connections shall be provided in kit form and selected for the specific types, sizes, and combinations of conductors shown on the Contract Drawings.

### 2.07 GROUNDING BUSHINGS

Grounding Bushing shall be insulated type.

### 2.08 LIGHTNING PROTECTION COMPONENTS

Lightning protection components shall be provided as specified in Section entitled "LIGHTNING PROTECTION SYSTEM."

## PART 3. EXECUTION

### 3.01 INSTALLATION

A. General

Install grounding elements for switchgear, transformers, cabinets, panelboards, starters, and miscellaneous electrical equipment, for all metallic non-current carrying portions of the entire electrical system and for exposed non-electrical systems located in electrical substations or switchgear rooms as required by ANSI C 2, NFPA 70 and building codes which would be applicable, if the Authority were a private corporation.

B. Install grounding as shown on the Contract Drawings.

C. Grounding and bonding equipment for use in connection with interior wiring systems shall conform to UL 467.

D. Install separate insulated equipment grounding conductors with circuit conductors to maintain grounding system at equipotential. Raceway system shall not be utilized as the equipment ground.

E. Connect exposed metallic piping or ductwork of any non-electrical system that is located in an electric substation or switchgear room, to ground in the room. Where the run through the room exceeds 15 feet in length, make ground connections at both the entering and leaving points of the piping or ductwork.

F. Ground all non-current-carrying metallic enclosures of electrical conductors, or exposed non-current-carrying metallic parts of electrical equipment, or of power apparatus.

G. Connections:

1. General

   Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

2. Use electroplated or hot-tin-coated materials to assure high conductivity and make contact points closer in order of galvanic series.

3. Make connections with clean bare metal at points of contact.

4. Make all connections of grounding connector cables to ground rods by exothermic welding method. Welds that are puffed up, or that show convex surfaces indicating improper cleaning are not acceptable.

5. Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically non-continuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.

6. Tighten grounding and bonding conductors and terminals, including screws and bolts, in accordance with manufacturer's published torque-tightening values for connectors and bolts.

7. Where insulated grounding conductors are connected to ground rods, or ground buses, insulate the entire area of the connection and seal against moisture penetration of the insulation and cable.

H. All sensitive electronic equipment including computers and other components specified on the Contract Drawings, shall be connected to an isolated grounding system. The isolated grounding system shall be installed as specified on the Contract Drawings. The isolated grounding system and the electrical power equipment grounding system must be connected together at a single point, as shown on the Contract Drawings and in accordance with the requirements of NFPA 70, and all applicable local codes. Utilization of a grounding electrode separate from, and not connected to, the electrical power equipment grounding system is not acceptable

I. All ground rods in grounding loops shall have less than 5 ohms resistance to ground. All individual or isolated ground rods shall have a maximum of 25 ohms resistance to ground. The maximum overall grounding system resistance to ground shall be as shown on the Contract Drawings.

## 3.02 FIELD TESTS

Make ground resistance tests at all ground rods to verify that grounding system is at equipotential and to ensure compliance with the requirements specified in 3.01 I above, in the presence of the Engineer, and prepare all test results in tabulated form indicating location and time of each test and soil resistivity measured. If ground resistance on a grounding resistance test is higher than the value specified in 3.01 I, either increase the length of the rod or add more rods to the grounding system until the required ground resistance is achieved.

END OF SECTION

## SECTION 16450

## GROUNDING

## APPENDIX "A"

## SUBMITTAL REQUIREMENTS

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:

A. Catalog Cuts for ground rods, connectors and connection materials, and grounding fittings.

B. Ground Resistance Test Results.

END OF APPENDIX "A"

# DIVISION 16

# SECTION 16475

# OVERCURRENT PROTECTIVE DEVICES (600 VOLTS OR LESS)

## PART 1. GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for overcurrent protective devices.

B. The types of overcurrent protective devices specified in this Section are:

1. Low Voltage Power Air Circuit Breakers
2. Molded Case Circuit Breakers
3. Safety Switches
4. Fuses

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

| | |
|---|---|
| | American National Standards Institute (ANSI) |
| ANSI C 37.13 | Low Voltage AC Power Circuit Breakers used in enclosures |
| ANSI C 37.16 | Related Requirements and application recommendation for Low Voltage Power Circuit Breakers |
| ANSI C 37.50 | Test Procedures for Low Voltage AC Power Circuit Breakers |
| ANSI C 97.1 | Low Voltage Cartridge Fuses 600 Volts or Less |
| | National Electrical Manufacturers Association (NEMA) |
| NEMA AB-1 | Molded Case Circuit Breakers and Molded Case Switches |
| NEMA KS-1 | Enclosed Switches |
| | National Fire Protection Association (NFPA) |
| NFPA 70 | National Electrical Code |
| | Underwriters Laboratories Inc. (UL) |
| UL 98 | Enclosed and Dead Front Switches |
| UL 198 | Safety Standard for Fuses |
| UL 489 | Molded Case Circuit Breakers and Circuit Breaker Enclosures |
| UL 943 | Standard for Ground Fault Circuit Interrupters |

Federal Specifications (FS)

| | |
|---|---|
| W-C-375B/Gen | Circuit Breakers, Molded Case; Branch Circuit and Service |
| FSW –S-865 | Covers Surface-mounted, Air-break, Box or Enclosed Switches for Ratings through 500 Volts, 1200 Amperes and 50 Horsepower |

1.03 DESIGN AND PERFORMANCE REQUIREMENTS

The overcurrent protective devices and associated materials shall conform to all applicable standards, and shall also conform to the requirements specified herein and shown on the Contract Drawings.

1.04 QUALITY ASSURANCE

Overcurrent protective devices of types and ratings required, shall have been satisfactorily used for purposes similar to those intended herein for not less than three years.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Overcurrent protective devices to be installed in an assembly, as shown on the Contract Drawings, shall be mounted in the assembly and delivered in accordance with the manufacturer's specifications for such assembly.

B. Overcurrent protective devices to be installed in their own enclosures, as shown on the Contract Drawings, shall conform to the following requirements:

1. Enclosures shall be packaged with material to prevent damage to components due to vibration, jarring and the like during transportation and handling.

2. Enclosures shall be delivered in the manufacturer's original, unopened, protective packaging and shall be identified with suitable non-corrosive tags.

C. Where possible, maintain protective coverings until installation is complete and remove such coverings as part of the final cleanup.

1.06 SUBMITTALS

See Appendix "A" for Submittal Requirements.

1.07 SPARE PARTS

Furnish a minimum of three but not less than 10% spare fuses of each type and rating required and shown on the Contract Drawings.

## PART 2. PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with the requirements of this Section, provide low voltage power circuit breakers, molded case circuit breakers, safety switches and fuses of one of the manufacturers specified on the Contract Drawings.

## 2.02 MATERIALS

A. General

1. Location, types, sizes, ratings and enclosures for overcurrent protective devices are shown on the Contract Drawings.

2. Overcurrent protective devices mounted in their own enclosures as shown on the Contract Drawings shall conform to the requirements of NEMA, UL, and NFPA. Enclosures shall be as specified in the Section of these Specifications entitled "PANELBOARDS ".

3. Overcurrent protective devices, to be installed as part of an assembly unit, shall be installed in accordance with the manufacturer's requirements for the specified assembly or as shown on the Contract Drawings.

4. Overcurrent protective devices and enclosures for which there are established UL standards, shall bear the UL label.

B. Low Voltage Power Air Circuit Breakers

1. General

a. All circuit breakers shall be 3 pole, single throw, 600V AC class, 60 Hz, trip free, with stored energy closing. Controls shall be as shown on the Contract Drawings.

b. Circuit breakers shall be of the draw-out type with self-aligning fingers to engage the line and load primary terminals.

c. The draw-out mechanism shall firmly support the breaker from the fully connected to the fully disconnected positions and shall be so designed as to permit racking the breaker without opening the door in all three positions: connected, test, and disconnected.

d. Interlocks shall be provided to prevent racking the breaker from the connected position to the test or disconnected position, or moving the breaker into the connected position while the breaker is closed.

e. Required circuit breaker sizes and ratings shall be as shown on the Contract Drawings.

f. In addition to all contract requirements to achieve the operation indicated on the Contract Drawings and specifications, provide the following spare contacts rated 125 VDC, 20 amperes continuous.

(1) A minimum of two normally open and two normally closed contacts, which shall operate when the breaker is in the fully connected position.

(2) A minimum of one normally open and one normally closed contacts, which shall operate when the breaker is withdrawn from the fully connected position. Contacts shall be rated 125V DC, 20 amperes continuous.

g. Provide a position indicator visible from the front of the switchgear for each breaker to indicate whether the breaker is open, tripped or closed.

h. Tripping shall be through integrally mounted solid state overcurrent and short circuit trip units with adjustable settings for long time, short time and instantaneous trip unless otherwise shown on the Contract Drawings.

2. Manually Operated Breakers

a. Provide manually operated circuit breakers with a front mounted handle to manually charge the stored energy closing mechanism.

b. Breakers shall be mechanically trip free and shall be furnished with provisions for the future addition of a control solenoid for remote closing.

c. Provide a mechanical trip and close button on the front of each breaker.

d. Provide a maintenance handle for slow closing during contact adjustment.

3. Electrically Operated Breakers

a. Provide electrically operated breakers with a motor- operated, stored-energy, closing mechanism. Motor voltage shall be as shown on the Contract Drawings.

b. Breakers shall be electrically and mechanically trip-free and each shall be provided with an electrically operated spring release to close the breaker.

c. Provide a mechanical trip button on the front of each breaker.

d. Provided an electrical close button or control switch on the front of each breaker.

e. Provide a maintenance handle for slow closing during contact adjustment.

f. Provide breakers with a shunt trip device for remote operation, arranged for both local and remote control of the closing and tripping functions.

4. Fused Circuit Breakers

a. Where shown on the Contract Drawings, fused circuit breakers shall be provided.

b. The fuses shall be current limiting type and shall be integrally or separately mounted units coordinated with overcurrent trip devices so as to avoid unnecessary blowing of the fuses.

c. Fused breakers shall have a blown fuse indicator and lockout device. The lockout device shall trip all phases upon blowing and prevent the breaker from being closed with any fuse element blown. Operation of the breaker shall not be permitted by this device until the fuse is replaced and the lockout reset.

d. The blown fuse indicator shall be visible from the front of the breaker and shall indicate which fuse has blown.

e. When a Protective Device Coordination Study is performed, the fuse rating shall be in accordance with the requirements of the protective study.

C. Molded Case Circuit Breakers

1. General

a. Molded case circuit breakers for panel or individual mounting shall be molded-case type, quick-make and quick-break on manual or automatic operation. The handle mechanism shall be trip-free to prevent holding contacts closed on a fault. Tripping shall be indicated by the handle automatically assuming a position between the manual "off" and "on" positions.

b. Molded case circuit breaker contacts shall be of the high-pressure type and shall be made of a silver composition material. Arc shields shall be provided to confine, cool, and quench the arc drawn at interruption.

c. Continuous ampere ratings and number of poles shall be as shown on the Contract Drawings.

d. Molded case circuit breakers shall be bolt-on type. Unless otherwise shown on the Contract Drawings or as required by the system interrupting rating, all 120V or 208V circuit breakers shall have a minimum short circuit interrupting rating of not less than 10,000 amperes (RMS symmetrical) and all 277V or 480V breakers shall have a minimum short circuit interrupting rating of not less than 18,000 amperes (RMS symmetrical).

e. All molded case circuit breakers feeding 120V or 277V lighting circuits that are not controlled by local wall switches shall be UL approved type "SWD" circuit breakers.

f. Each molded case circuit breaker shall be suitable for the circuit on which it is applied and the load that it controls.

g. Accessories including, but not limited to, auxiliary switches, shunt trips, undervoltage trips, ground fault sensing and tripping shall be as shown on the Contract Drawings.

2. Thermal-Magnetic Circuit Breakers

a. Circuit breakers up to, but not including 400 amperes shall be thermal magnetic trip. Electronic trip circuit breakers rated 100 amperes or higher may be provided in lieu of thermal magnetic type.

b. Automatic operation of the molded case circuit breaker shall be obtained by means of calibrated thermal and magnetic tripping devices for each pole of the breaker. The thermal device shall provide time-delay tripping on overloads, and the magnetic device shall provide instantaneous tripping on short circuits. The instantaneous magnetic trip shall be adjustable and accessible from the front of the breaker on frame sizes above 100 amperes.

3. Electronic Trip Circuit Breakers

a. Circuit breakers rated 400 amperes and higher shall be electronic trip.

b. The integral trip system shall be independent of any external power source and shall contain industrial grade electronic components as a minimum.

c. Circuit breakers shall be equipped with back-up thermal magnetic trip system unless otherwise indicated on the Contract Drawings.

d. Circuit breaker trip system shall be a microprocessor based true rms sensing design.

e. The sensor size rating plug and adjustment positions shall be clearly marked on the face of the circuit breaker.

f. The following time/current adjustments shall be provided. Each adjustment shall have discrete settings and shall be independent of all other adjustments.

Long time pick up
Long time delay
Short time pick up
Short time delay
Instantaneous pick up
Ground fault pick up
Ground fault delay

g. A means to seal the trip unit adjustments in accordance with NEC shall be provided.

h. Local visual trip indication for overload short circuit and ground fault trip occurrences shall be provided.

D. Safety Switches

1. Safety switches shall conform to NEMA KS-1, UL 98 and FSW-S-865.

2. Safety switches shall conform to the NEMA classification and shall be rated, as shown on the Contract Drawings.

3. Safety switches utilized for service entrance shall include a groundable insulated neutral.

4. Safety switches shall be of the quick-make, quick-break type with terminals suitable for copper conductors, shall be padlockable in the "off" position and shall be equipped with defeatable door interlocks.

E. Fuses

1. Fuses shall be of the class, size and ratings (current, voltage, interrupting capacity, type, NEMA class) as shown on the Contract Drawings.

2. Fuses shall conform to UL 198 and ANSI C97.1 for low voltage fuses.

3. Unless otherwise shown on the Contract Drawings, fuses used in conjunction with motor protection shall be current limiting, dual element, time-delay type.

## PART 3. EXECUTION

### 3.01 INSTALLATION

A. General

Unless otherwise shown on the Contract Drawings, overcurrent protective devices shall be installed in conformance with NFPA 70, and UL 98, in accordance with the manufacturer's instructions and in accordance with the requirements of this Section.

B. Fuses

1. All fuses rendered inoperative during the Work shall be replaced before the issuance of the Certificate of Final Completion.

2. All replacement fuses shall be provided in addition to the spare fuses specified in 1.07 herein.

END OF SECTION

## SECTION 16475

## OVERCURRENT PROTECTIVE DEVICES

## APPENDIX "A"

## SUBMITTAL REQUIREMENTS

Submit for approval the following in accordance with the requirements of "Shop Drawings, Catalog Cuts and Samples" of Division 1 - General Provisions:

A. Catalog Cuts

1. Safety Switches
2. Fuses

END OF APPENDIX "A"

# DIVISION 16

# SECTION 16510

# LIGHTING SYSTEMS

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for Lighting Systems.

### 1.02 REFERENCES

| | |
|---|---|
| | American National Standards Institute (ANSI) |
| ANSI C 78.379 | Electric Lamps - Incandescent and High-Intensity Discharge Reflector Lamps - Classification of Beam Patterns |
| ANSI C 82.1 | Ballasts for Fluorescent Lamps – Specifications |
| ANSI C 82.4 | Ballasts for High-Intensity Discharge and Low Pressure Sodium Lamps |
| | Illuminating Engineering Society of North America (IESNA) |
| | National Equipment Manufacturers Association (NEMA) |
| NEMA WD6 | Wiring Devices - Dimensional Requirements |
| | National Fire Protection Association (NFPA) |
| NFPA 70 | National Electrical Code |
| NFPA 101 | Life Safety Code |
| | Administrative Code |
| NYCEC | Electrical Code of the City of New York |
| | Underwriters Laboratories (UL) |
| UL 57 | Electric Lighting Fixtures |
| UL 844 | Electric Lighting Fixtures for Use in Hazardous (Classified) Locations |
| UL 924 | Emergency Lighting and Power Equipment |
| UL 935 | Fluorescent Lamp Ballasts |
| UL 1029 | High-Intensity-Discharge Lamp Ballasts |
| UL 1570 | Fluorescent Lighting Fixtures |
| UL 1571 | Incandescent Lighting Fixtures |
| UL 1572 | High Intensity Discharge Lighting Fixtures |
| | OSHA Occupation Safety and Health Administration |

The Energy Policy Act of 1992

Lamp Efficiency Labeling and Standards

## 1.03 DESIGN AND PERFORMANCE REQUIREMENTS

A. Lighting System shall be furnished, supplied, installed and adjusted in accordance with this Section and as specified on the Contract Documents.

B. Components of the Lighting System manufactured, supplied, and installed shall comply with the requirements of NFPA 70, NFPA 101, all local codes, and the requirements of OSHA.

## 1.04 QUALITY ASSURANCE

A. Entities manufacturing lighting fixtures, equipment, and components specified herein, and as shown on the Contract Drawings, shall have a minimum of five years of manufacturing experience and shall demonstrate prior experience on at least two projects involving complexities similar to those required under this Contract.

B. Lighting equipment for which there is a nationally recognized standard shall be safety tested and bear the conformance labeling of the third party inspection authority, such as Underwriters Laboratories Inc. (UL), ETL, Factory Mutual, or approved equal, certifying that the lighting fixtures and equipment are listed as suitable for the purpose specified and shown on the Contract Drawings.

C. Lighting equipment shall be manufactured and installed in compliance with applicable articles of NFPA 70, NFPA 101 and NYCEC.

## 1.05 DELIVERY, STORAGE AND HANDLING

A. Lighting fixtures shall be wrapped for protection during delivery, storage, and handling. Wet or damp wrapping shall be removed, and disposed of, to prevent staining finish.

B. Deliver materials in manufacturer's original, unopened, protective packaging.

C. Store materials in original packaging in a manner to prevent soiling and physical damage, prior to installation.

D. Handle in a manner to prevent damage to finished surfaces.

E. Where possible, maintain protective covering until installation is complete and remove such coverings as part of final cleanup.

## 1.06 SPARE PARTS

A. Unless otherwise noted on the Contract Document, provide 10% (or minimum of 12) replacement lamps for each type of lamp installed.

B. Unless otherwise noted on the Contract Document, provide 5% (or minimum of 2) replacement ballasts for each type of ballast installed.

## 1.07 SUBMITTALS

See Appendix "A" for submittal requirements.

## PART 2. PRODUCTS

### 2.01 MANUFACTURERS

A. General

All components of the lighting system shall be manufactured by the companies shown on the Contract Drawings.

### 2.02 MATERIALS

A. General

The location, number, size, and type of all lighting fixtures and accessories to be installed shall be as shown on the Contract Drawings.

B. Lighting Fixtures

Lighting fixtures shall be furnished with lamps, which comply with the requirements of this Section, and as shown on the Contract Drawings. All fluorescent and high intensity discharge lighting fixtures supplied shall come with factory installed ballasts, which comply with the requirements of this Section, and as specified on the Contract Drawings.

Unless otherwise shown on the Contract Drawings lighting fixtures shall comply with the following requirements:

1. Housing

   a. Lighting fixtures shall be of rigid construction and built in accordance with NEMA WD6.

   b. Ferrous components shall be protected from corrosion by plating or finished with white baked enamel unless another color is shown on the Contract Drawings. All paint shall be spray-applied and baked at 350°F, for at least 20 minutes. Interior surfaces of all fluorescent fixtures shall be white enamel of minimum 87% reflectance.

   c. Exposed parts of the lighting fixture housing shall be free from spinning lines, ripples, or other visible marks and manufacturer's stickers.

   d. Outdoor lighting fixture housings shall be constructed of copper-free cast aluminum (copper content less than 0.4%, Alloy 360.4) or stainless steel. Housings shall be properly gasketed to be watertight. All hardware shall be stainless steel.

   e. Recessed lighting fixture housings shall be constructed of a minimum 20-gauge cold-rolled steel and painted with a white, baked enamel finish.

   f. Pendant and surface-mounted, continuous lighting fixture housings shall be constructed of extruded aluminum and treated with the finish specified on the Contract Drawings.

   g. Ballast compartment shall be so designed that ballast temperature shall not exceed the UL limit of 105°C at 40°C ambient temperature.

2. Optical System

a. Reflectors

(1) Unless otherwise shown on the Contract Drawings, fluorescent, parabolic louvers shall be constructed of non-iridescent, semi-specular aluminum with a minimum reflectance of 85%.

(2) Diffuser reflectors shall be finished with high-reflectance, baked white enamel with a non-yellowing binder.

(3) Clear reflector inserts for fluorescent lighting fixtures shall be fabricated of aluminum or steel backing with a silver film laminate which shall be guaranteed by the entity manufacturing the lighting fixtures against separation and peeling for a minimum of five years. Minimum reflectance shall be 92%.

(4) The visible clear Alzak reflectors shall be of non-iridescent finish with a minimum reflectance of 90%.

b. Lenses, Diffusers, and Shielding Devices

(1) Lenses, diffusers, and shielding devices shall be properly and securely mounted within the lighting fixture housing. Lay-in lenses, diffusers, or shielding devices shall not be acceptable.

(2) Glass lenses or diffusers shall be constructed of tempered, borosilicate glass.

(3) Plastic lenses or diffusers shall be white opal or clear, prismatic, 100% ultraviolet-stabilized acrylic or high-impact polycarbonate. Plastic lenses shall be installed with the smooth side out.

(4) The shielding and optical materials shall be tightly fitted with no loose parts and shall show no visible leaks of unintentional light.

3. Exit Signs

a. Furnish single and double face Exit Signs with hardware suitable for wall or ceiling mounting as shown on the Contract Drawings.

b. Exit Signs shall be guaranteed by the manufacturer for a minimum of five years.

c. Surface mounted Exit Signs shall be of die-cast aluminum construction with aluminum faceplates and invisible universal arrows and mounting knockouts for field adjustment. Finish of the housing and faceplates shall be as shown on the Contract Drawings. Exit Signs shall be single or double face, and shall be suitable for ceiling, back, or end mounting.

d. Edge-lit Exit Signs shall be of UV stabilized acrylic construction with inbeded, laminated legend and arrows.

e. Exit Signs shall be energized from either 120 VAC or 277 VAC. Exit Signs shall operate on Light Emitting Diode (LED) light sources and shall consume a maximum of six watts per Sign face.

f. Average luminance of the legend "EXIT" shall be no less than 15 cd/m$^2$ (5 Fl) with uniformity ratio (max/min) no greater than 3/1.

4. Emergency Battery Operated Lights

a. Emergency Battery Operated Lights specified herein shall be:

(1) Fluorescent Fixture with internal or external battery pack

(2) Battery Operated Exit Sign

(3) Incandescent Emergency Lighting Fixture

b. Emergency Battery Operated Lights shall automatically switch "ON" when normal or emergency power supply fails and provide a minimum of 90 minutes of reduced illumination.

c. The fluorescent batteries of fixtures used for both, normal and emergency lighting, shall be of the nickel-cadmium or the lead-calcium type and shall have sufficient electrical capacity to energize the connected lamps at a minimum of 50% of normal light output. The battery shall be guaranteed by the manufacturer for a minimum of five years.

d. The battery charger shall be the dual-rated type and shall have sufficient capacity to recharge the discharged battery to full charge within twelve hours, maximum.

e. Emergency Battery Operated Lights shall be equipped with a test switch and an LED lamp indicating AC power is on.

C. Lamps

1. General

Lamps shall comply with the requirements of the Energy Policy Act of 1992 or it's latest editions.

2. Fluorescent Lamps

Unless otherwise shown on the Contract Document, lamps shall comply with the following requirements:

a. Tubular Type

(1) Lamp tube diameter shall be T8, T10, or T12

(2) Lamps shall have triphosphor coating with a minimum Color Rendering Index (CRI) of 70

(3) Minimum average lamp life at 3 hours per start shall be 20,000 hours

(4) Minimum efficiency shall be 80 lm/W (lumens per Watt).

(5) Maximum lamp lumen depreciation at the end of rated life shall be 20%

b. High Output (HO) and Slimline Type

(1) Lamp tube diameter shall be T8 or T12

(2) Lamps shall have triphosphor coating with a minimum Color Rendering Index (CRI) of 70

(3) Minimum average lamp life at 3 hours per start shall be 12,000 hours

(4) Maximum lamp lumen depreciation at the end of rated life shall be 20%

c. Compact Fluorescent Lamps

(1) Minimum average lamp life at 3 hours per start shall be 10,000 hours

(2) Lamp shall have a triphosphor coating with a minimum Color Rendering Index (CRI) of 82

(3) Minimum efficiency shall be 65 lm/W

(4) Maximum lamp lumen depreciation at the end of rated life shall be 15%

3. Incandescent and Tungsten Halogen Lamps

Unless otherwise shown on the Contract Document, lamps shall comply with the following requirements:

a. Incandescent and tungsten halogen lamps shall have a minimum average lamp life of 2500 hours.

b. Incandescent reflector type lamps shall have beam patterns as shown on the Contract Drawings and conforming to ANSI C 78.379.

4. High Intensity Discharge Lamps

Unless otherwise shown on the Contract Documents, lamps shall comply with the following requirements:

a. High Pressure Sodium (HPS) Lamps

(1) Minimum average lamp life at 10 hours per start: 24,000 hours

(2) Minimum efficiency: 75 lm/W

(3) Maximum lamp lumen depreciation at the end of rated life: 20%

(4) Maximum color shift: ±250 degrees Kelvin

b. Metal Halide (MH) Lamps

(1) MH lamp fixtures shall be connected only to circuits that are turned off for at least 15 minutes a week. Use of MH lamps in uninterrupted 24-hour operation circuits is not permitted.

(2) Minimum average lamp life at 10 hours per start shall be 15,000 hours for lamp burning in a vertical position. For lamps burning in a horizontal position, as follows:

| | |
|---|---|
| Lamps < 400 W: | 10,000 hours |
| 400 W lamps: | 20,000 hours |
| 1000 W lamps: | 12,000 hours |
| 1500 W lamps: | 6,000 hours |

(3) Minimum efficiency: 75 lm/W

(4) Maximum lamp lumen depreciation at the end of rated life: 30%

(5) Maximum color shift: ±250 degrees Kelvin.

(6) Minimum Color Rendering Index (CRI): 65

c. Mercury Vapor (MV) Lamps

Unless otherwise shown on the Contract Drawings, MV lamps shall not be permitted for general illumination purposes.

D. Ballasts

1. Fluorescent Lamp Ballasts

a. Fluorescent lamp ballasts shall comply with ANSI C 82.1 and shall be Class 'A' sound rated Class 'P' listed by ETL and UL.

b. Fluorescent lamp ballasts shall be certified for the appropriate for the application minimum starting temperature.

c. Unless otherwise shown on the Contract Drawings, fluorescent lamp ballasts for indoor applications shall be high-frequency, electronic type, suitable for operation in rapid start circuitry and comply with the following requirements:

(1) Minimum Power Factor: 0.950

(2) Total Harmonic Distortion: less than 20%

(3) Lamp Current Crest Factor: less than 1.7

(4) Lamp Current Frequency: greater than 20 kHz

(5) In-rush current: less than 20x normal current

d. Fluorescent lamp ballasts shall be wired and grounded in accordance with NFPA 70 and the manufacturer's written instructions.

2. High Intensity Discharge (HID) Ballasts

a. HID lamp ballasts shall comply with ANSI C 82.4, and shall be the high-power factor, constant wattage auto-transformer (CWA), or similar, type of automatic wattage regulation.

b. The power loss of HID lamp ballasts, as a percentage of lamp wattage, shall not exceed 20%.

c. HID lamp ballasts for indoor applications in public spaces shall be encased and potted for the purpose of noise reduction.

d. HID lamp ballasts shall be wired and grounded in accordance with NFPA 70 and the manufacturer's written instructions.

e. Remote HID lamp ballasts shall be installed in accordance the manufacturer's written instructions.

f. Unless otherwise noted on the Contract Drawings all HPS ballasts, which are not used in 24 hours operations, shall be furnished with automatic protective starters. An automatic protective starter shall apply pulses for no more than 15 minutes and then deactivate if a lamp arc cannot be initiated.

E. Fuses

Fuses and fuse assemblies shall be as shown on the Contract Drawings.

F. Lighting Control

1. Lighting Management System

a. The lighting management system shall automatically switch lights on and off according to a time clock schedule, amount of daylight present, and in accordance with the requirements of this section and as shown on the Contract Documents.

b. A factory-trained field service engineer shall be to functionally test each hardware and software component in lighting management system after installation, and to provide on-site training for Authority personnel. The minimum of 16 hours training session shall consist of the following parts:

(1) general description of the system and operational functions of it's components

(2) hands on training for each of the hardware components (performance, maintenance, repair, parts replacement)

(3) hands on software training (programming, operation, modem connection)

At least two representatives from the facility where the system is being installed, two representatives from the electrical maintenance group and two representatives from the Authority engineering department shall be present for the training.

Manufacturer shall provide a minimum of 6 complete operation manuals.

c. Remote Power Switching Panelboards

(1) The remote power switching lighting panelboards shall be mounted in electrical closets and shall comply with Section 16470 of these Specifications and as specified on the Contract Documents.

(2) The remote power switching panelboards shall consist of a microprocessor-based control module, interface module, control busses, remote-controlled breakers, and Class 2 barriers.

(3) The remote power switching panelboards shall meet or exceed the following capabilities:

(a.) Individual control for up to 42 remotely controllable circuit breakers.

(b.) Eight dry-contact inputs for connection to either 2-wire maintained or 3-wire momentary external control devices.

(c.) Zone creation and control of individual circuit breakers or zones.

(d.) Run/Halt/Hold/All-On operational modes.

(e.) Individual circuit breaker and zone manual override.

(f.) Circuit breaker status monitoring.

(g.) Security access codes.

(h.) Telephone override.

(i.) Diagnostic testing of memory, keyboard, screen, com ports, and circuit breaker.

(j.) Expansion port to connect additional inputs via expansion cabinet.

(k.) RS-232 port for connection to personal computer.

(l.) Non-violable EEPROM memory.

(4) All electronic modules and circuit breakers in the panelboards shall be mounted in the positions and control the loads as indicated on the panel wiring schedules indicated on the Contract Drawings.

(5) Emergency panelboards shall respond to the loss of normal power in the associated normal panel by automatically switching on all emergency circuits.

d. Addressable Relay Panels

(1) Addressable relays shall provide inputs and outputs directly compatible with the existing remote power switching panelboard system.

(2) Each remotely controlled relay panel shall be furnished with at least one manual on/off override.

(3) The addressable relay panels shall meet or exceed the following capabilities:

(a.) Protocol shall be based on a modified ANSI 3.28.

(b.) Run length without repeaters shall be 10,000 feet at 9,600 Baud, full duplex.

(c.) Up to 16 analog inputs and digital inputs. These inputs shall except directly, occupancy sensors and variable output ambient light sensors.

(d.) All information shall be stored internally in register locations and be readable/writeable from any device on the high-speed network.

(e.) Addressable in the range of up to 32 panels.

2. Photoelectric Control Devices

a. The location, number, size, and type of all ambient light sensors, timers, and occupancy sensors to be installed shall be as shown on the Contract Drawings.

b. The ambient light sensor shall have a cadmium sulphide, hermetically sealed photocell, shall be fully temperature-compensated, and shall provide for a time delay of at least 15 seconds to prevent false switching. The ambient light sensors shall be remotely mounted where shown on the Contract Drawings.

c. The ambient light sensor shall meet or exceed the following capabilities:

(1) There shall be different lighting sensors for different tasks (i.e. atrium, skylight and outdoor).

(2) Separately mounted resolution enhancement adjustment.

(3) The photoelectric device shall be a class 2, low voltage type.

(4) Output shall be directly proportional to light measured.

(5) Fully adjustable response in the range between 0 and 10,000 foot-candles with +/-1% accuracy at 21C.

(6) The housing shall be constructed from flame-retardant material, and meet UL984 HB standards.

(7) Outputs shall be 4-20mA or 0-10Volt.

(8) Power supplies shall be available in a range of voltages.

d. The time switch shall function to prevent lighting from being energized at pre-set periods each day. The time switch shall permit different "ON-OFF" settings for each day of the week, with provision for omitting selected days. The time switch shall have at least 4 inputs. Unit shall be capable of retaining memory for no less than 90 days. When permitted by the time switch, photoelectric controls shall operate to energize lighting whenever natural lighting falls below 2,5 lux (25 FC).

3. Occupancy sensors

a. The occupancy (motion) sensors shall be designed to control lighting automatically based on the presence or absence of people.

b. The ultrasonic occupancy sensors shall produce a low intensity, inaudible sound (above 22KHz) and detect changes in the acoustic waves caused by motion. The sensors shall not respond to audible sound. If the sensors detect motion, the internal or external relays shall close the contacts and turn on the connected lighting loads. If no motion occurs within a pre-set period of time, the lights shall be automatically turned off.

c. Ultrasonic detectors shall be precision crystal-controlled. Sensors shall not interfere with each other when two or more sensors are placed in the same room.

d. The passive infrared occupancy sensors shall maintain a detection when the person of average size and weight moves within a maximum distance of 8 inches at the speed of 12 inches per second.

e. The occupancy sensors shall be equipped with LED walk indicator, which shall be visible from any area in the room.

f. The occupancy sensors shall be furnished with an adjustable timer for delayed turn-off. The time delay shall be adjustable from 30 seconds to 15 minutes.

g. The occupancy sensors shall be furnished with adjustable sensitivity control. Although, sensitivity shall be high, false triggering by random noises or motions other than human movement shall not be permitted.

h. The occupancy sensors shall be furnished with manual override switch that will enable a bypass of the sensor in the event of failure.

i. The sensors shall be connected to power modules. The power module consumption shall not exceed 2VA in any mode of operation. The power modules shall combine a Class 2 (120V/277V) transformer and heavy duty relay with form A isolated contacts in a single housing. The relay shall be rated for 20A operation.

j. The sensors shall be suitable for ceiling-mounted installation and shall not protrude more than 1-1/2 inches from the ceiling surface.

k. All sensors or equipment supplied shall be accompanied by electronic circuit diagram, component layout, circuit description and installation instructions.

l. All devices shall have a minimum three-year factory warranty for materials and labor.

m. All sensors shall be properly masked and adjusted for required sensitivity and time delay. Coordinate adjustments with manufacturer.

4. Dimmers

a. Wallbox dimmers shall be of linear sliding type and shall be rated for operation with the specified connected load. Dimmer shall be designed to smoothly change light output of the lamps without visible flicker. Rotary type dimmers are not permitted.

b. Wallbox dimmers shall be equipped with built in on/off switch and preset control button.

c. Furnish an appropriate wallbox dimmer for each individual type of load:

(1) Incandescent

(2) Electronic low voltage

(3) Magnetic low voltage

(4) Fluorescent

d. Preset dimming control system shall be as shown on Contract Drawings and shall meet or exceed the following capabilities:

(1) System shall have four preset scenes and off for up to 8 control zones.

(2) System shall be mountable in a standard 2, 3 or 4 gang metal wallbox. Wallbox shall be as specified in Section 16135 of this Specification.

(3) One raise/lower switch with visual display shall be available for each zone.

(4) A temporary master raise/lower switch shall move all light levels up or down.

(5) System shall have smooth fade mode. Switching time between scenes shall be adjustable from 1 second to 90 minutes.

(6) A temporary zone override shall be provided.

(7) Multiple controls and remote wallstations shall be capable of activating each of the preset scenes and shall not interfere with each other.

G. Contactors

1. Contactors shall be of the single coil, electrically operated, mechanically held type. Positive locking shall be obtained without the use of hooks, latches, or semi-permanent magnets. Contactors shall be required to make, but not break, the operating coil current.

2. The contactor's main contacts shall be the double break, silver-to-silver type protected by arcing contacts. Contacts shall be self-aligning and renewable from the front of the panel.

3. The contactor's control connections shall be clearly marked "L" for line wire, "C" for closing wire, and "O" for opening wire. A manual operating lever shall be included with the contactor.

4. Each contactor shall be equipped with a control line fuse, a coverplate to conceal contacts, and one normally open auxiliary contact.

5. Unless otherwise shown on the Contract Drawings, contactors shall be mounted separately in a sheet steel, NEMA 12 enclosure. Grouped contactors shall be installed in a common sheet steel, NEMA 12 enclosure.

6. Unless otherwise shown on the Contract Drawings, relays for two-wire control shall be provided, where required, for the operation specified on the Contract Drawings.

## PART 3. EXECUTION

### 3.01 EXAMINATION

A. Inspect all lighting fixtures, equipment, and accessories prior to installation. Replace any damaged items.

### 3.02 PREPARATION

A. The Contractor shall be responsible for field verification of dimensions and coordination of conduit entry and all other mounting conditions with the entity manufacturing lighting fixtures.

B. Unless otherwise shown on the Contract Drawings, all lighting outlets shall have lighting fixtures. In instances where a specific lighting fixture has not been assigned to a lighting outlet, furnish and install a complete lighting fixture of the type and wattage designated for outlets of similar function and/or type as directed by the Engineer.

C. Unless otherwise shown on the Contract Drawings, lighting fixtures and/or fixture outlet boxes shall be provided with hangers to adequately support the complete weight of the lighting fixture. The design of hangers and the method of fastening other than what is shown on the Contract Drawings, or herein specified, shall be submitted to the Engineer for approval.

### 3.03 INSTALLATION

A. Install all lighting equipment and accessories, as well as all lighting fixtures, complete with lamps, in the locations shown on the Contract Drawings in accordance with the manufacturer's written instructions. All lighting fixtures shall be properly secured to structural elements.

B. Lighting fixtures shall be carefully supported and aligned with necessary hangers, supporting members, and plaster frames for proper installation, all as shown in the Contract Drawings and the Specifications, and as approved by the Engineer. No rivets, springs, or other hardware shall be visible after installation.

C. Lighting fixtures shall be supported to satisfy seismic requirements described in applicable local codes.

D. All lighting fixtures shall be properly wired and connected to branch circuits, tested, and left ready for operation. Bond all lighting fixtures and metal accessories to the branch circuit-grounding conductor.

E. Where a continuous string of lighting fixture is specified to be installed, the lighting equipment shall be installed so as to produce a continuous, straight, unbroken band of light, free of visual imperfections, socket shadows, light gaps, etc.

F. All pendant-mounted lighting fixtures within the same room or area shall be installed plumb, and at a uniform height from the finished floor. Adjustment of a height shall be made during the installation. Unless otherwise shown on the Contract Drawings, stems and canopies shall be matched to the associated lighting fixtures.

G. Install recessed lighting fixtures to permit removal from below. Use accessories and firestopping materials to meet regulatory requirements for fire rating.

## 3.04 ADJUSTMENTS

A. Prior to final inspection, relamp all fixtures which have failed lamps, or lamps where visible color shift has occurred, and leave all lighting fixtures, equipment, and accessories in good, uniform operating condition. The Contractor shall replace any burned-out lamp during the first 100 days after the completion of the Contract.

B. Aim and adjust all lighting fixtures as shown on the Contract Drawings.

C. Adjust exit sign arrows as shown on the Contract Drawings.

D. Cleaning

1. Clean all components of the lighting system to remove conductive and deleterious materials.
2. Remove dirt and debris from all enclosures.
3. Clean finishes and touch up damage.

**END OF SECTION**

## SECTION 16510

## LIGHTING SYSTEMS

## APPENDIX A

## SUBMITTAL REQUIREMENTS

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:

A. Shop Drawings

1. For each lighting fixture type: Clearly illustrate assembly methods, detailed dimensions, mounting details, materials, finishes, electrical components, and light sources.

2. For each lighting fixture type: Submit independent testing laboratory photometric report, and performance data in IESNA format

   a. Luminaire, ballast and lamp description and manufacturer's complete catalog number

   b. Luminaire drawing with basic dimensions

3. For each ballast type: Submit manufacturer's data with ballast description, catalog number, lamp type, input voltage, in-rush current, line current, input wattage, ballast factor, power factor, crest factor, minimum starting temperature, total harmonic distortion and wiring diagram.

B. Samples

For items indicated on the Contract Drawings submit working samples for review and approval upon request by the Engineer. Install and energize samples as shown on the Contract Drawings or as directed by the Engineer.

END OF APPENDIX "A"

# DIVISION 16

# SECTION 16550

# ROADWAY LIGHTING

## PART 1. GENERAL

### 1.01 SUMMARY

This Section specifies requirements for Roadway Lighting.

### 1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

| | |
|---|---|
| | American Association of State Highway and Transportation Officials (AASHTO) |
| AASHTO LTS-2 | Structural Support for Highway Signs, Luminaires, and Traffic Signals |
| | American Society for Testing and Materials (ASTM) |
| ASTM A 153 | Zinc Coating (Hot-Dip) on Iron and Steel Hardware |
| ASTM B 108 | Aluminum - Alloy Permanent Mold Casting |
| ASTM B 117 | Method of Salt Spray (Fog) Testing |
| ASTM B 136 | Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum |
| ASTM B 137 | Method for Measurement of Weight of Coating on Anodically Coated Aluminum |
| ASTM B 221 | Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes |
| ASTM B 244 | Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basic Metals with Eddy-Current Instruments |
| | Underwriters Laboratories (UL) |
| UL 57 | Electric Lighting Fixtures |
| UL 1029 | High-Intensity-Discharge Lamp Ballasts |
| UL 1572 | High Intensity Discharge Lighting Fixtures |
| | The Energy Policy Act of 1992 |
| | Lamp Efficiency Labeling and Standards |
| | Illuminating Engineering Society of North America (IESNA) |
| ANSI/IES RP8-1983 | American National Standard Practice for Roadway Lighting |

## 1.03 DESIGN AND PERFORMANCE REQUIREMENTS

A. The roadway lighting system shall provide safe and uniform illumination levels on roadway and parking lot pavements. The lighting levels shall be as specified or as produced by the lighting systems shown on the Contract Drawings. In no case the lighting levels shall be lower than recommended by the ANSI/IES RP8-1983 or it's latest editions.

B. The complete roadway lighting standard including shafts, luminaires, appurtenances and accessories shown on the Contract Drawings, including but not limited to: mast arms, traffic signals, pedestrian signals, fixed signs, arms, bases and anchor bolts shall be designed to support the weight of the equipment and withstand a maximum wind force of 90 mph (unless otherwise shown on the Contract Drawings) without sustaining permanent deformation, rupture or structural failure.

C. The roadway light standards and accessories shall be designed in accordance with AASHTO LTS-2. Maximum deflection shall be limited to 5 percent of shaft length under static load test.

D. Design calculations shall be certified by a Professional Engineer licensed in the State where the installation will take place.

E. Where a manufacturer's model number is shown on the Contract Drawings, it shall establish the standards of quality and performance, accessories, including the construction features, lighting and electrical performance, finish and other physical and technical properties of the equipment.

F. Roadway lighting fixtures shall be furnished with an optical assembly which complies with IESNA light distribution classification and as specified on the Contract Drawings.

G. Install and adjust roadway lighting as specified in this Section and on the Contract Drawings.

## 1.04 QUALITY ASSURANCE

Entities performing the Work of this Section shall have experience on at least two projects involving complexities similar to those required under this Contract.

## 1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened, protective packaging.

B. Materials shall be wrapped for protection during delivery, storage, and handling. Wet or damp wrapping shall be removed, and disposed of, to prevent staining shaft finish.

C. Store materials in original packaging in a manner to prevent soiling and physical damage, prior to installation.

D. Handle in a manner to prevent damage to finished surfaces.

E. Where possible, maintain protective coverings until installation is complete and remove such coverings as part of final cleanup.

1.06 SUBMITTALS

See Appendix "A" for submittal requirements.

## PART 2. PRODUCTS

2.01 MATERIALS

Unless otherwise noted on the Contract Drawings, materials for roadway lighting standards and assemblies shall be as specified below, or approved equal:

A. Shafts, Mast Arms, Pole Caps - ASTM B 221, Aluminum alloy 6063 heat-treated to produce a T6 temper.

B. Anchor Bases (including Bolt Covers) and Transformer Bases - ASTM B 108, Aluminum alloy 356 heat-treated to produce a T6 temper.

C. Anchor Studs, Lockwashers, Flatwashers, Screws, Nuts, Bolts, and Hardware -Stainless Steel

D. Anchor Rods - Hot-rolled steel; galvanized in accordance with ASTM A 153 for thread exposure, plus 3 inches minimum toward "hook" end.

E. Anchor Couplings - Hot-rolled steel; galvanized in accordance with ASTM A 153.

F. Luminaire Housings - Low copper content (less than 0.4%) aluminum alloy 360.4 heat-treated to produce a T6 temper.

2.02 CONSTRUCTION FEATURES

A. General

1. Components and sizes (lengths and diameters) of roadway lighting standards and assemblies shall be as shown on the Contract Drawings.

2. Electrical equipment for which there is a nationally recognized standard shall be safety tested and bear the conformance labeling of the third party inspection authority, such as Underwriters Laboratories Inc. (UL), ETL, Factory Mutual, or approved equal, certifying that the lighting fixtures and electrical equipment are listed as suitable for the purpose specified and shown on the Contract Drawings.

B. Luminaires

1. General

a. Roadway luminaires described in this specifications are of three general types:

(1) Highway luminaires-pole mounted luminaires for open roadways.

(2) Underpass luminaires-ceiling or wall mounted luminaires for covered portions of roadways.

(3) Sign luminaires-sign mounted luminaires for traffic signs.

b. Supply and install roadway luminaires in accordance with Section 16510, this Section of specifications and lighting fixture descriptions and manufacturer's model number as shown on the Contract Drawings.

c. Unless otherwise noted on the Contract Drawings, roadway luminaires shall be constructed of a metal housing, optical assembly, and a lens door. All mounting hardware shall be constructed of corrosion resistant material.

d. Optical assembly shall consist of specular aluminum reflector and borosilicate glass refractor or flat lens. Polycarbonate, Acrylic or other plastic refractors and lenses are not permitted. Optical assembly shall be self-leveling and sealed with a breathing and filtering gasket to prevent entrance of airborne contaminates. Gasket shall be cemented full perimeter with no metallic clips or fasteners.

e. The hinge mounted lens door shall be fully gasketed and accessible for tool-less or single tool relamping.

f. Ballast shall be mounted on a removable tray and shall have quick disconnect electrical terminals for easy maintenance.

g. Unless otherwise noted on the Contract Drawings, roadway luminaires shall have an electrostatically deposited, thermally set, grey polyester powder coat finish.

h. There shall be optional factory prewired no-tool photoelectric control receptacle. Photocontrol receptacles shall be provided with a stop to prevent rotation beyond 350°.

i. The photometric light distribution of the roadway luminaires shall be classified by IESNA as a one of the following Types:

(1) Type I

(2) Type II (Type II four-way)

(3) Type III

(4) Type IV

(5) Type V

2. Highway luminaires:

a. Unless otherwise noted on the Contract Drawings, highway luminaires shall be a high-pressure Sodium (HPS) type with Type I, Type II or Type III photometric distribution.

b. Highway luminaires shall be furnished with cutoff, semi-cutoff or non-cutoff optics as specified on the Contract Drawings.

c. The highway luminaires shall be equipped with a latched and hinged power door for easy luminaire access.

d. The internal slipfitter shall be furnished with one-piece pipe clamp capable of adapting 1-1/4 through 2-inch pipe without rearrangement of clamp or bolts, and shall be adjustable at least $\pm$ 5° from horizontal.

3. Underpass luminaires:

   a. Underpass luminaires shall be supplied for direct ceiling mounting, direct wall mounting, or for use with surface conduits and boxes. Mounting boxes shall comply with the requirements specified in Section 16135 of this specification.

   b. Unless otherwise noted on the Contract Drawings ceiling mounted underpass luminaires shall be a HPS type with Type I or Type V photometric distribution.

4. Sign Lighting luminaires:

   a. Unless otherwise noted on the Contract Drawings ceiling sign luminaires shall be a Metal Halide (MH) type with wide photometric distribution.

   b. Sign luminaires shall be furnished with integral light shields to minimize back and side glare.

C. Lamps

1. A lamp shall be furnished for each lamp holder of each luminaire. Luminaires and lamps shall be of the type and wattage as shown on the Contract Drawings and as specified in this Section and in Section 16510 of these specifications.

2. Mercury Vapor lamps are not permitted for roadway lighting.

D. Ballasts

1. Unless otherwise noted on the Contract Documents ballasts shall be a Constant Wattage Auto transformer (CWA) type and shall comply with requirements of Section 16510 of these specifications.

2. HPS ballasts, which are not used in a 24-hour operation, shall be furnished with automatic protective starters. An automatic protective starter shall apply pulses for no more than 15 minutes and then deactivate if a lamp arc cannot be initiated.

E. Fuse Assemblies

Fuse assemblies shall be complete with 5 amperes, 600-volt fuses, with 18-inch long leads of No.10 Standard type XHHW or USE wire.

F. Shafts

1. Unless otherwise noted on the Contract Drawings, shaft shall be spun tapered, or octagonal tapered, seamless tubing. Shaft may be drilled to manufacturer's specification for mounting luminaires. Removable aluminum pole cap shall be provided for the top of each shaft.

2. Each shaft shall be furnished with a cable support hook mounted inside the top of the shaft.

3. Welding shall be performed on the shaft only at the anchor base. Field welding shall not be permitted.

4. Where design parameters will result in excessive vibration, shafts shall be provided with factory installed vibration dampeners. Vibration dampener size, location and mounting shall be in accordance with the manufacturer's recommendations, and as approved by the Engineer.

G. Mast Arms

The types and sizes of mast arms shall be as shown on the Contract Drawings.

H. Anchor Bases

Anchor bases shall be free from cracks, pits, and blow holes, and shall be provided with a grounding lug. The base shall be supplied with bolt covers and mounting hardware and shall have provision for anchoring to the transformer base.

I. Transformer Bases

1. Transformer bases shall be frangible type and shall be free from cracks, pits and blow holes. Transformer bases shall be breakaway approved and fatigue tested.
2. Each transformer base shall be sized in accordance with the manufacturer's specifications and by pole height, total weight and bolt circle.
3. All transformer bases shall be provided with internal lugs for mounting on anchorage and a tapped hole inside the base for mounting a ground stud.
4. The base shall be furnished with a suitably sized, lockable, hinged door.

J. Pole Foundations

Pole foundation details and concrete for the pole foundations shall be as shown on the Contract Drawings.

K. Finish

Unless otherwise shown on the Contract Drawings, shafts, mast arms and transformer bases shall be satin finished clear anodized. Anodic coatings shall comply with ASTM B 117, 0 136, 0 137, and 0 244.

L. Accessories

Hardware accessories: slip fitters, mounting plates, screws, nuts, washers, bolts and other hardware necessary for assembling the roadway lighting standards shall be provided. The exposed portion of studs, washers, hex nuts and other hardware shall be well greased.

M. Anchor Bolts

Anchor bolts, including anchor rods, anchor couplings, anchor studs, nuts, installation template and flatwashers and lockwashers, shall he furnished for each lighting standard.

## PART 3. EXECUTION

### 3.01 INSTALLATION

A. Install concrete foundations, including conduits and anchor bolts, as shown on the Contract Drawings and in accordance with the manufacturer's anchor bolt template.

B. Install underground conduits as shown on the Contract Drawings and as specified in Section 16115 of this specification.

C. Install conduit bodies and mounting boxes for underpass luminaires as shown on the Contract Drawings and as specified in Section 16135 of this specifications.

D. Install roadway lighting standards, fixtures and appurtenances in accordance with the Contract Drawings, manufacturers' installation procedures and as specified herein.

E. Connect all equipment as required for proper operation and as shown on the Contract Drawings.

F. Set lighting standards plumb with variation off-true-vertical not to exceed 1/8-inch in ten feet. Vertical alignment shall be achieved by shimming, grouting or other approved means. Grout all bases after final alignment has been completed.

G. Set underpass and sign luminaires plumb with variations off-true-horizontal between two adjacent fixtures not to exceed 1/8-inch. Fixture mounting variations from a straight line between the first and the last fixture in a row shall not exceed 1/8-inch.

H. Requirements for mounting heights shall be as shown on the Contract Drawings.

### 3.02 FINISH REPAIR

All abraded or damaged anodized surfaces of roadway lighting standards, fixtures and appurtenances shall be repaired in a manner satisfactory to the Engineer.

END OF SECTION

## SECTION 16550

## LIGHTING SYSTEMS

## APPENDIX A

## SUBMITTAL REQUIREMENTS

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts, and Samples" of Division 1 - GENERAL PROVISIONS:

A. Shop Drawings

1. Manufacturer's established installation procedure manuals for each type of specified roadway lighting standard and fixture.
2. For each roadway lighting standard and fixture type: Clearly illustrate assembly methods, detailed dimensions, anchor bolt templates, mounting details, materials, finishes, electrical components, and light sources.
3. For each lighting fixture type: Submit independent testing laboratory photometric report, and performance data in IESNA format
   a. Luminaire, ballast and lamp and optical assembly description and manufacturer's complete catalog number
   b. Luminaire schematic drawing with basic dimensions
4. For each ballast type: Submit manufacturer's data with ballast description, catalog number, lamp type, input voltage, input wattage, ballast factor, power factor, minimum starting temperature, operating temperature and wiring diagram.

B. Samples

For items indicated on the Contract Drawings submit working samples for review and approval upon request by the Engineer. Install and energize samples as shown on the Contract Drawings or as directed by the Engineer.

END OF APPENDIX "A"

U.S. Department of Homeland Security
United States Coast Guard

Commander
First Coast Guard District

Battery Park Bldg.
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Appendix A

16594/2.0/11.5H/1.5//
Arthur Kill/Kill Van
Kull/NJ//
June 6, 2006

Mr. Matthew Masters
Supv. Permit & Governmental Approvals
Environmental Engineering Unit
Port Authority of New York & New Jersey
Two Gateway Center
Newark, NJ 07102

Dear Mr. Master:

We have reviewed your general plan submitted with your letter dated 23 May 2006, concerning Staten Island Bridges Light Pole and Light Pole Support (Contract AK-179) repair at the Outerbridge Crossing, Goethals and Bayonne Bridges. We have no objection to the work as described in the plans provided that you comply with all the conditions stipulated in enclosure 1 of this letter that apply.
These stipulations are based on the facts presently before us and additional requirements may be imposed if the contractor submits an approach or action not anticipated by this office.

If you have any further questions, please contact me at the above number.

Sincerely,

J.M. Arca
Deputy Chief, Bridge Branch
First Coast Guard District
By direction of the District Commander

Encl: 1) General Construction Requirements

Copy: Commanding Officer,-Sector NY - Waterway Oversight Branch

# U.S. Coast Guard Bridge Administration

## GENERAL CONSTRUCTION REQUIREMENTS

1. All bridge closures, or bridge operating schedule changes, must be requested in writing, 60-days in advance, from the First Coast Guard District Bridge Branch Office. No channel restrictions, or vertical clearance reductions may be made without written approval from the above office. Waterway closures or safety zones must also be requested 60-days in advance.

2. All submissions to the Coast Guard for review and approval must first be approved by the *owner of the bridge or their authorized agent*. All submission of plans, scope of work, and schedules of operation must be sent to the First Coast Guard District, Bridge Branch Office.

3. At least 30-days prior to commencement of any work, we must have for our review, a copy of the construction plans, contractor' schedule, preferably depicted in a time line graphic format, and the contractor's daily hours of operation. The construction plan package must show the following: **(1)** a plan of the entire waterway area in the vicinity of the project. **(2)** The location of work barges and any anchor lines during working and off-hours. **(3)** In addition, a drawing must be included, if applicable, depicting any scaffolding or containment used indicating the location and the total vertical or horizontal channel reduction. All vertical clearance reductions below low steel or concrete under the bridge as a result of the use of scaffolding must be clearly detailed on the drawings shown in total feet. **(4)** Emergency 24 hour telephone numbers for all responsible individuals for this project must be submitted to this office before any phase of construction begins in case of an emergency situation during off-hours.

4. Scaffolding used under ANY span of the bridge must be lighted with constant burning red lights on all corners. The placement of scaffolding must not interfere with the ability of a moveable bridge to open for vessel traffic. Moveable bridges must continue to operate according to their normal schedule unless special drawbridge operation regulation changes have been requested. Warning signs must be posted on both sides of the bridge, visible for a 1-mile range, to warn mariners of the vertical clearance reduction. The signs shall face upstream and downstream so as to draw the mariner's attention to the fact that the clearance has been reduced.

5. All barges placed in the waterway must be lighted with constant burning white lights on all four corners of the barge. The contractor is required to comply with all provisions of the Navigation Rules International-Inland, regarding the use of work barges or floating equipment in the waterway. Copies are available from the U.S. Government Bookstore, Room 110, Federal Building, 26 Federal Plaza, New York, NY 10278. Telephone (212) 264-3825.

6. Placement of construction barges in the navigable channel shall be done so as to provide a minimum horizontal clearance reduction. Only one navigation channel of a swing bridge may be blocked by work equipment at anytime. Barges must be moved out of the navigable channel after working hours unless approved in writing by this office.

7. Barges held in place by anchor lines must be marked by anchor buoys, which should be lighted.

**ENCLOSURE (1)**

8. An as built survey must be taken upon completion of this project, approved by a professional engineer or land surveyor verifying the bridge clearances.

9. The on-scene contractor must have a VHF-FM marine radio set to the bridge communication channels 16/13 or the designated channel for the bridge. Additional marine radios monitoring the above channels must also be maintained at the main control of any floating equipment or barges on station.

10. Preventive measures must be taken to prevent any hot work, debris, or construction material from entering the waterway. This includes sandblasting material, paint, and any concrete work by-products. Welding and burning must cease upon approach of a vessel and shall not start again until the vessel has passed the bridge.

11. The project manager must contact the Coast Guard Sector New York-VTS via marine radio before commencement of any and after completion of any Hot Work. A cell phone back-up may be used to contact the above Coast Guard Unit at (718) 354-4088.

12. If permanent bridge navigational lighting cannot be maintained operational during any phase of this project, temporary battery/power lights must be installed at the same locations. These temporary lights must be visible for a distance of 2,000 yards on 90% of the nights of the year. Generally, a lamp of 20 footcandles will meet these requirements. Plans for temporary lighting shall be submitted to this office for written approval. Deviations from the approved temporary lighting shall be permitted only upon written authorization from this office. **All newly constructed bridge piers must be lighted with red constant burning lights as well as all four corners of any cofferdams used during construction.**

13. Bridge protective fenders shall not be constructed or rebuilt with any metal surfaces on the rubbing face of the fender system. All bolts, spikes, or other metal fastening devices must be countersunk. Metal splicing plates, if used, shall be mounted on back of outer wales.

14. All piles including those previously damaged or broken that are not being used in the new or repaired fender shall be extracted rather than cut off at the mud line. Upon completion of all fender repairs a bottom sweep is required to determine if any piles or debris are present in the waterway. A wire-drag sweep or side-scan sonar is the preferred method.

15. During the progress of work should any debris or equipment enter the waterway and become a hazard to navigation, immediate notice shall be given to the Coast Guard and the object removed as soon as possible. Until removal can be effected, the obstruction shall be properly marked.

16. Spillage of oil and hazardous substances is specifically prohibited by the **Federal Water Pollution Control Act**, as amended. Approved spill containment equipment and absorbent material must be located at the project site in the event of a spill into the waterway or the shoreline. The Coast Guard must be notified immediately at (800) 424-8802.

17. The bridge owner is responsible to ensure that channel depths are not affected by this work. Any material, machinery or equipment lost, dumped, thrown into, or otherwise entering the waterway must be removed immediately. If immediate removal is impractical and the object entering the waterway could possibly obstruct or hazard navigation, the object must be marked immediately to protect navigation and the Coast Guard shall be notified as soon as possible. Upon request of the Coast Guard or Corps of Engineers, the bridge owner/contractor shall provide the necessary equipment and personnel to determine the presence of any suspected obstructions in the waterway.

18. This approval may be revoked and/or civil penalties imposed for failure to ensure that the above listed stipulations are adhered to or if work is determined to hazard or impair navigation.

New York City
Department of Transportation

BOROUGH : MANHATTAN
INSPECT DIST: 32
COMM. BOARD : 4

PERMIT # : M02-2006066-004
RECORDED # : NONE
PREVIOUS # : M02-2006005-184

BUILDING OPERATION PERMIT
PERMIT VALID FROM 03/07/2006 TO 06/06/2006

ALL WORK MUST ADHERE TO THE FOLLOWING STIPULATIONS : 014 037 038 091 103 107 116 101 SCHOOL

SPECIFIC STIPULATIONS : MAINTAIN 4 10' LNS FOR TRAFFIC.
REFURBISH PAVEMENT MARKINGS

| | | |
|---|---|---|
| 014 | OCMC-STREE | MAINTAIN A 5 FOOT CLEAR PEDESTRIAN WALK IN ROADWAY. WALKWAY MUST MEET NYCDOT SPECIFICATIONS |
| 037 | OCMC-STREE | SECTION 24-224 ADMINISTRATIVE CODE VARIANCE GRANTED FOR HOURS AND DAYS STIPULATED HEREIN |
| 038 | OCMC-STREE | WARNING SIGNS AND TRAFFIC SAFETY DEVICES SHALL BE PROVIDED, INSTALLED, MAINTAINED AND REMOVED BY THE PERMITTEE IN ACCORDANCE WITH THE "NEW YORK STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES". |
| 091 | OCMC-STREE | THIS PERMIT ACTIVITY MAY NOT START UNTIL THE PERMITTEE COORDINATES ALL WORK AND RESTORATION REQUIREMENTS WITH THE RESIDENT ENGINEER. |
| 103 | OCMC-STREE | PARKING OF PRIVATE VEHICLES ON THE STREET (ROADWAY AND SIDEWALK) WORK AREAS IS PROHIBITED. |
| 107 | OCMC-STREE | LOADING AND UNLOADING, STANDING OR PARKING IN A LANE ADJACENT TO THE WORK ZONE IN THE ROADWAY IS PROHIBITED. THIS APPLIES TO PERMITTEES AND ALL OF THEIR SUBCONTRACTORS. |
| 116 | OCMC-EXECU | REQUIRES OCMC AND EXECUTIVE REVIEW |
| 101 | OCMC-STREE | THE PERMITTEE IS REQUIRED TO INSTALL, MAINTAIN, AND REMOVE ALL NECESSARY TEMPORARY PARKING AND REGULATORY SIGNS AND PAVEMENT MARKINGS AND RESTORE TO THEIR ORIGINAL CONDITION PER NYCDOT STANDARDS PRIOR TO THE EXPIRATION OF THE PERMIT. PERMITTEE MUST NOTIFY NYPD TRAFFIC MANAGEMENT CENTER (48 HOURS PRIOR TO CHANGING ANY SIGNS/MARKINGS. APPROVED PLANS MUST BE ON SITE. |
| SCHOOL | SCHOOL ZON | NO WORK TO BE PERFORMED WITHIN BLOCK FRONTING SCHOOL INCLUDING INTERSECTIONS FOR ONE HOUR PRIOR TO SCHOOL START TIME THROUGH ONE HOUR AFTER END OF SCHOOL TIME. PERMITTEE MUST NOTIFY SCHOOL PRINCIPAL IN WRITING 48 HOURS PRIOR TO BEGINNING ANY WORK. THIS STIP VOIDS ANY/ ALL OTHER CONFLICTING STIPS ON THIS PERMIT UNLESS ACCOMPANIED WITH VARIANCE STIP VAR001. |

COPY

PERMIT ORIGINALLY PRINTED ON 03/07/2006 AT 09:05 BY ELLEN RACIOPPI 40 WORTH ST



PERMITTEES SHALL COMPLY WITH ALL APPLICABLE LAWS, RULES AND SPECIFICATIONS OF THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION AND WITH THE TERMS AND CONDITIONS OF THE PERMIT. FAILURE TO COMPLY MAY RESULT IN REVOCATION OF THE PERMIT BY THE COMMISSIONER.

_____ COMMISSIONER

PER _____

NYS LAW
Call 1-800-272-4480 before Street Opening Excavations.
New York State Industrial Code Rule 753 mandates 2-10 business days notice prior to digging.

New York City
Department of Transportation

BOROUGH : MANHATTAN
INSPECT DIST: 32
COMM. BOARD : 4

PERMIT # : M02-2006066-003
RECORDED # : NONE
PREVIOUS # : M02-2005287-116

BUILDING OPERATION PERMIT
PERMIT VALID FROM 03/07/2006 TO 06/06/2006

ALL WORK MUST ADHERE TO THE FOLLOWING STIPULATIONS : 014 037 038 091 103 107
SCHOOL

SPECIFIC STIPULATIONS : MAINTAIN 4 10' LNS FOR TRAFFIC 6AM-12AM DAILY

| | | |
|---|---|---|
| 014 | OCMC-STREE | MAINTAIN A 5 FOOT CLEAR PEDESTRIAN WALK IN ROADWAY. WALKWAY MUST MEET NYCDOT SPECIFICATIONS |
| 037 | OCMC-STREE | SECTION 24-224 ADMINISTRATIVE CODE VARIANCE GRANTED FOR HOURS AND DAYS STIPULATED HEREIN |
| 038 | OCMC-STREE | WARNING SIGNS AND TRAFFIC SAFETY DEVICES SHALL BE PROVIDED, INSTALLED, MAINTAINED AND REMOVED BY THE PERMITTEE IN ACCORDANCE WITH THE "NEW YORK STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES". |
| 091 | OCMC-STREE | THIS PERMIT ACTIVITY MAY NOT START UNTIL THE PERMITTEE COORDINATES ALL WORK AND RESTORATION REQUIREMENTS WITH THE RESIDENT ENGINEER. |
| 103 | OCMC-STREE | PARKING OF PRIVATE VEHICLES ON THE STREET (ROADWAY AND SIDEWALK) WORK AREAS IS PROHIBITED. |
| 107 | OCMC-STREE | LOADING AND UNLOADING, STANDING OR PARKING IN A LANE ADJACENT TO THE WORK ZONE IN THE ROADWAY IS PROHIBITED. THIS APPLIES TO PERMITTEES AND ALL OF THEIR SUBCONTRACTORS. |

COPY

| | |
|---|---|
| SCHOOL/SCHOOL ZONE | NO WORK TO BE PERFORMED WITHIN BLOCK FRONTING SCHOOL INCLUDING INTERSECTIONS FOR ONE HOUR PRIOR TO SCHOOL START TIME THROUGH ONE HOUR AFTER END OF SCHOOL TIME. PERMITTEE MUST NOTIFY SCHOOL PRINCIPAL IN WRITING 48 HOURS PRIOR TO BEGINNING ANY WORK. THIS STIP VOIDS ANY & ALL OTHER CONFLICTING STIPS ON THIS PERMIT UNLESS ACCOMPANIED WITH VARIANCE STIP VARO01. |

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PAGE 2 OF 2

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PERMITTEES SHALL COMPLY WITH ALL APPLICABLE LAWS, RULES AND SPECIFICATIONS OF THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION AND WITH THE TERMS AND CONDITIONS OF THE PERMIT. FAILURE TO COMPLY MAY RESULT IN REVOCATION OF THE PERMIT BY THE COMMISSIONER.

COMMISSIONER

PER

NYS LAW
Call 1-800-272-4480 before Street Opening Excavations.
New York State Industrial Code Rule 753 mandates 2-10 business days notice prior to digging.

New York City
Department of Transportation

BOROUGH : MANHATTAN
INSPECT DIST: 32
COMM. BOARD : 4

PERMIT # : M02-2006066-005
RECORDED # : NONE
PREVIOUS # : M02-2006005-177

BUILDING OPERATION PERMIT
PERMIT VALID FROM 03/07/2006 TO 06/06/2006

ALL WORK MUST ADHERE TO THE FOLLOWING STIPULATIONS : 014 037 038 091 103 107
SCHOOL

SPECIFIC STIPULATIONS : MAINTAIN 4 10' LNS FOR TRAFFIC 6AM-12AM DAILY

| | | |
|---|---|---|
| 014 | OCMC-STREE | MAINTAIN A 5 FOOT CLEAR PEDESTRIAN WALK IN ROADWAY. WALKWAY MUST MEET NYCDOT SPECIFICATIONS |
| 037 | OCMC-STREE | SECTION 24-224 ADMINISTRATIVE CODE VARIANCE GRANTED FOR HOURS AND DAYS STIPULATED HEREIN |
| 038 | OCMC-STREE | WARNING SIGNS AND TRAFFIC SAFETY DEVICES SHALL BE PROVIDED, INSTALLED, MAINTAINED AND REMOVED BY THE PERMITTEE IN ACCORDANCE WITH THE "NEW YORK STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES". |
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| SCHOOL | SCHOOL ZONE | NO WORK TO BE PERFORMED WITHIN BLOCK FRONTING SCHOOL INCLUDING INTERSECTIONS FOR ONE HOUR PRIOR TO SCHOOL START TIME THROUGH ONE HOUR AFTER END OF SCHOOL TIME. PERMITTEE MUST NOTIFY SCHOOL PRINCIPAL IN WRITING 48 HOURS PRIOR TO BEGINNING ANY WORK. THIS STIP VOIDS ANY ALL OTHER CONFLICTING STIPS ON THIS PERMIT UNLESS ACCOMPANIED WITH VARIANCE STIP VAR801. |

COPY

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PAGE 2 OF 2

PERMITTEES SHALL COMPLY WITH ALL APPLICABLE LAWS, RULES AND SPECIFICATIONS OF THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION AND WITH THE TERMS AND CONDITIONS OF THE PERMIT. FAILURE TO COMPLY MAY RESULT IN REVOCATION OF THE PERMIT BY THE COMMISSIONER.

_____ COMMISSIONER

PER _____

NYS LAW
Call 1-800-272-4480 before Street Opening Excavations.
New York State Industrial Code Rule 753 mandates 2-10 business days notice prior to digging.

## CONDITIONS

The permit is for the designated purpose only.

The cost of construction work and material will be entirely at the Permittee expense. The Department will not share in any expense what so ever or do any construction work pertaining to project.

All construction work authorized herein will conform with the rules and regulations of the New Jersey Department of Transportation and conditions included herein and on the reverse side of this form.

All work will be done to the satisfaction of the Department.

No changes or alterations may be made at any time without written permission from the N.J.D.O.T.

No work in connection with this permit will be started until it is approved and issued. Notice will be given to the appropriate Region office 24 hours prior to commencing work.

After the construction work under this permit is completed, notification shall be given to the Region office that the work has been completed and is ready for final inspection and approval by the Department.

### DURATION

All construction work under terms of the permit must be completed within one (1) year from the date of issuance, unless otherwise stated, or the permit will automatically expire.

### EXTENSION

When the work under the terms of the permit is started within one (1) year from the date of issuance and cannot be completed in the indicated time limit unless otherwise stated, the permittee must request an extension of time under the same terms and conditions. A request by letter must be submitted to the appropriate Regional office for an extension of time with the required fee in the form of a check or money order. CASH WILL NOT BE ACCEPTED.

### RENEWAL

If the work under the terms of the permit does not commence within one (1) year from the date permit was issued, the permittee may reapply by application under the same terms and conditions of the original permit. The new application and plans must reflect any developments which would necessitate a change in the installation.

### PROTECTION FROM SUITES

The permittee shall defend, indemnify, protect and save harmless the State and its agents, servants, and employees from and against any and all suits, claims, losses, demands, or damages of whatever kind or nature arising out of or claimed to arise out of, any negligent act, error or omission of the permittee, its agents, servants, and employees in the performance of the work covered by this permit.

### PROTECTION OF THE GENERAL PUBLIC

The permittee shall properly safeguard all work performed under permit and when necessary, maintain sufficient warning lights, department approved signs and safety devices for the protection of the general public until the project has been completed.

### PROTECTION OF STRUCTURES AND DRAINAGE

There shall be no interference with structures on, over or under the highway. Interference with drainage installations must be avoided. The existing cross section and drainage of the highway shall not be disturbed. The longitudinal flow of water along the gutter line must not be interrupted. It shall be the responsibility of the owner to make adequate provision for all transverse, lateral and longitudinal drainage affected by his construction.

### MATERIALS AND WORKMANSHIP

Materials and workmanship used in construction affecting Highway property shall be in accordance with the Department=s Standard Specifications and are subject to inspection and approval of the Department of Transportation. Where conditions warrant, the Department may assign an inspector to the project at the expense of the permittee. The Department shall reserve the right to demand from the applicant as a condition of any permit, a bond or certified check in an amount sufficient to guarantee or insure the proper maintenance or restoration of the area disturbed.

### ADVERTISING STRUCTURES

Signs or structures shall not be erected on or overhanging any portion of the Department of Transportation Right-of-Way.

### SPECIAL CONDITIONS

This permit is subject to all local municipal ordinances, rules and regulations. The Department reserves the right to impose special conditions in special cases.

1. The Permittee shall not interfere with the normal flow of traffic, reduce the number of traffic lanes, or change any traffic pattern prior to 9:00 A.M. or beyond 3:30 P.M. on weekdays and all day on Saturday, Sunday, and holidays; unless specifically approved by the Regional Maintenance Engineer.

2. The local police department should be notified by the Permittee before starting any construction that may interfere with traffic.

3. Material cannot be stored nor equipment parked within the State's Right of Way except as necessary during actual working operations.

4. Lane widths and traffic control devices shall be in conformance to the traffic control plan.

5. The Permittee is responsible for installing and maintaining approved construction warning signs. All signs and other protective devices, unless otherwise directed, shall comply with the requirements of the current edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways" issued by the Federal Highway Administration (FHA).

6. Competent uniformed traffic directors shall be employed at every location where the contractor's equipment is working immediately adjacent to, or is entering, leaving or crossing active traffic lanes. The traffic directors, shall be employed continuously for the full time such conditions exist.

7. In the event of severe weather, or exigent circumstance, the Department shall require the Permittee to take whatever steps necessary to secure the traveled way for emergency operations. All work on the roadway shall stop and be cleared of all equipment and material. The area shall be secured to allow safe passage as to not interfere with Department emergency operations.

8. All employees and/or supervisors engaged in a work operation which exposes them to the motoring public, or to a hazardous road condition, or whenever an employee or supervisor is within the State Right of Way (shoulder, etc.) or within a coned-in area, will wear the proper safety apparel, which includes a safety vest.

9. No lane closures will be permitted on the following holidays:
   *Easter Sunday (including 6:00 AM Saturday until Noon Monday
   *Memorial Day (See Note Below)
   *July 4th (See Note Below)
   *Labor Day (See Note Below)
   *Election Day (6:00 AM until 8:00 PM)
   *Thanksgiving Day (See Note Below)
   *Christmas Day (See Note Below)
   *New Year's Day (See Note Below)

   NOTE:
   If Holiday Falls On No Lane Closures Permitted
   Sunday or Monday 6:00 AM Friday until Noon Tuesday
   Tuesday 6:00 AM Friday until Noon Wednesday
   Wednesday 6:00 AM Tuesday until Noon Thursday
   Thursday 6:00 AM Wednesday until Noon Monday
   Friday or Saturday 6:00 AM Thursday until Noon Monday

10. The Permits office (732 308-4106) is to be notified a minimum of 72 hours (3 Department Business days) before the start of work covered by this permit. All traffic restrictions, including lane width reductions, lane closures, and detours are subject to the approval of the Permits office, Regional Traffic Engineer, and the Bureau of Traffic Operations.

# SCHEDULE OF MINIMUM WAGE RATESINJI

GENERAL DECISION: **NJ20030003** 07/29/2005 NJ3

Date: July 29, 2005
General Decision Number: **NJ20030003** 07/29/2005

Superseded General Decision Number: NJ020003

State: New Jersey

Construction Types: Building, Heavy and Highway

Counties: Bergen, Essex, Hudson, Hunterdon, Middlesex, Morris, Passaic, Somerset, Sussex, Union and Warren Counties in New Jersey.

Does not include building construction in Hunterdon and Somerset Counties

BUILDING CONSTRUCTION PROJECTS (does not include single family homes and apartments up to and including 4 stories) (does not include building construction in Hunterdon or Somerset Counties)

HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

| Modification Number | Publication Date |
|---|---|
| 0 | 06/13/2003 |
| 1 | 12/19/2003 |
| 2 | 01/23/2004 |
| 3 | 02/27/2004 |
| 4 | 03/05/2004 |
| 5 | 03/19/2004 |
| 6 | 05/07/2004 |
| 7 | 06/04/2004 |
| 8 | 07/02/2004 |
| 9 | 08/13/2004 |
| 10 | 01/28/2005 |
| 11 | 06/10/2005 |
| 12 | 07/29/2005 |

* ASBE0032-001 09/01/2004

BERGEN, ESSEX AND HUDSON COUNTIES; HUNTERDON COUNTY (Borough of Califon; Township of Tewksbury); MIDDLESEX COUNTY (Boroughs of Carteret and Dunellen; Township of Edison; Boroughs of Highland Park, Metuchen and Middlesex; City of New Brunswick; Township of Old Bridge; City of Perth Amboy; Township of Piscataway; Borough of Sayreville; City of South Amboy; Boroughs of South Plainfield and South River; Township of Woodbridge); MORRIS AND PASSAIC COUNTIES: SOMERSET COUNTY (Boroughs of Bernardsville and Bound Brook; Township of Bridgewater; Borough of Far Hills; Township of Green Brook; Boroughs of North Plainfield, Peapack-Gladstone, Raritan, Somerville, South Bound Brook and Watchung; Township of Warren); SUSSEX AND UNION COUNTIES; WARREN COUNTY (Townships of Allamuchy, Blairstown and Frelinghuysen; Town of Hackettstown; Townships of Hope, Independence, Knowlton, Liberty and Mansfield):

| | Rates | Fringes |
|---|---|---|
| Asbestos worker/insulator (includes the application of all insulating | | |

materials, protective
coverings, coatings and
finishings to all types of
mechanical systems; also,
the application of
firestopping material to
openings and penetrations
in walls, floors, ceilings
and curtain walls; also,
all lead abatement).....$ 36.27 20.91
Includes the application
of all insulating
materials, protective
coverings, coatings and
finishings to all types of
mechanical systems.....$ 36.27 20.91
Hazardous material
handler/asbestos removal worker$ 21.75 5.00

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ASBE0089-001 09/01/2004

HUNTERDON COUNTY (remainder of county); MIDDLESEX COUNTY (remainder of county); SOMERSET COUNTY (Townships of Branchburg, Franklin, Hillsborough and Montgomery); WARREN COUNTY (Townships of Franklin, Greenwich, Harmony, Lopatcong, Oxford, Pohatcong, Washington and White):

| | Rates | Fringes |
|---|---|---|
| Asbestos worker/insulator Includes the application of all insulating materials, protective coverings, coatings, and finishings to all types of mechanical systems | $ 30.00 | 10.00 |

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BOIL0028-001 08/01/2004

| | Rates | Fringes |
|---|---|---|
| Boilermaker | $ 34.28 | 44% + 7.83 |

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* BRNJ0004-001 11/01/2003

BERGEN, ESSEX AND HUDSON COUNTIES; HUNTERDON COUNTY (remainder of county); MORRIS AND PASSAIC COUNTIES; SOMERSET COUNTY (north of a line drawn from the point where the Lamington River leaves the boundary line between Hunterdon and Somerset Counties; then, continuing along the Lamington River to where it becomes the North Branch of the Raritan River; then, continuing along the North Branch of the Raritan River to where it becomes Chambers Brook; then, continuing along Chambers Brook until it becomes the boundary line between the Townships of Bernards and Bridgewater; then, continuing along the boundary line between the Townships of Bernards and Bridgewater, until that boundary intersects with Route 78; then, continuing along Route 78 until Route 78 intersects with Route 525; then, continuing along Route 525 until Route 525 intersects with the boundary line between the Townships of Bridgewater and Warren; then, continuing along the boundary line between the Townships of Bridgewater and Warren until that boundary line intersects with Route 22; then, following Route 22 until Route 22 intersects

with Sebrings Mills Rd. (also known as King George Rd.); then, continuing south on Sebrings Mills Rd. until it goes over Green Brook, which is the Middlesex County line); SUSSEX, UNION AND WARREN COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Bricklayer | $ 31.37 | 15.55 |

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* BRNJ0005-002 01/01/2004

HUNTERDON (Townships of Lebanon and Readington) ; MIDDLESEX COUNTY; SOMERSET COUNTY (remainder of county):

| | Rates | Fringes |
|---|---|---|
| Bricklayer | $ 30.55 | 15.40 |

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CARP0006-001 05/01/2005

BERGEN County (east of the Hackensack River); HUDSON COUNTY (east of the Hackensack River):

| | Rates | Fringes |
|---|---|---|
| Carpenter | $ 34.52 | 15.88 |

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CARP0015-001 05/01/2005

BERGEN COUNTY (west of the Hackensack River (does not include the city of Garfield, or the Boroughs of Lodi and Wallington)):

| | Rates | Fringes |
|---|---|---|
| Carpenter | $ 34.52 | 15.88 |

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CARP0029-003 05/01/2004

| | Rates | Fringes |
|---|---|---|
| Soft Floor Layer | $ 31.04 | 40.23% + .04 |

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CARP0031-002 05/01/2005

HUNTERDON COUNTY (starting at the south of the town of Frenchtown on the Delaware River, thence following the line in the center of the road to Bapistown to Croton to the City of Flemington to Flemington Junction to Three Bridges, thence following the Somerset County line northward, all territory south of this line including the city of Flemington); SOMERSET COUNTY (all territory south of a line beginning at Amwell on the county line to Zion to Fairview to Dutchtown to Plainsville to Bell Mead to Griggstown to the Delaware and Raritan Canal):

| | Rates | Fringes |
|---|---|---|
| Carpenter | $ 34.52 | 15.88 |

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CARP0041-002 05/01/2005

ESSEX COUNTY (Township of Millburn); MIDDLESEX AND MORRIS COUNTIES; SOMERSET COUNTY (Municipalities of Greenbrook, North Plainfield, Watchung, and all communities east of King George's

Road); SUSSEX AND UNION COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Carpenter & Insulator..... | $ 34.52 | 15.88 |

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CARP0099-001 05/01/2005

| | Rates | Fringes |
|---|---|---|
| Lather..... | $ 35.25 | 15.15 |

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CARP0124-001 05/01/2005

BERGEN COUNTY (City of Garfield and Boroughs of Lodi and Wallington); PASSAIC COUNTY:

| | Rates | Fringes |
|---|---|---|
| Carpenter..... | $ 34.52 | 15.88 |

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CARP0399-001 05/01/2005

WARREN COUNTY:

| | Rates | Fringes |
|---|---|---|
| Carpenter & Insulator..... | $ 34.52 | 15.88 |

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CARP0715-001 05/01/2004

| | Rates | Fringes |
|---|---|---|
| Millwright..... | $ 34.22 | 45% + .18 |

Work of erection and dismantling of elevators and towers, such as concrete conveyors and temporary material elevators, scaffolding or other structures to be used as scaffolding inside or outside buildings: the first sixty feet at the regular rate, 10% per hour additional for each additional fifty feet thereafter.

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CARP1342-001 05/01/2005

ESSEX COUNTY (does not include the township of Millburn); HUDSON COUNTY (west of the Hackensack River):

| | Rates | Fringes |
|---|---|---|
| Carpenter..... | $ 34.52 | 15.88 |

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CARP1456-001 05/01/2003

| | Rates | Fringes |
|---|---|---|
| Diver Tender..... | $ 28.82 | 26.41 |
| Diver..... | $ 38.28 | 26.41 |

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CARP1456-002 05/01/2003

| | Rates | Fringes |
|---|---|---|
| Dock Builder & Piledriver | | |

person.....$ 31.54 26.41

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ELEC0017-001 07/01/1994

| | Rates | Fringes |
|---|---|---|
| Commercial Telephone Installation | $ 21.20 | 26.5% |
| Electrician (RAILROAD CONSTRUCTION) | $ 21.20 | 26.5% |

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* ELEC0102-001 06/01/2003

MORRIS AND PASSAIC COUNTIES; SOMERSET COUNTY (Township of Franklin (west of a line following Cedar Grove Lane from the Raritan River, southwest to the Millstone Branch of the Pennsylvania Railroad; then, west along the railroad to the Delaware and Raritan Canal; then, south along the canal to the Middlesex County line)): SUSSEX, UNION AND WARREN COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Line Construction: | | |
| Cable splicer | $ 42.13 | 42.5% |
| Ground person | $ 22.98 | 42.5% |
| Line technician and equipment operator | $ 38.30 | 42.5% |

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* ELEC0102-002 06/01/2004

HUNTERDON COUNTY (Townships of Alexandria and Bethlehem; Borough of Bloomsbury; Borough of Califon; Town of Clinton; Township of Clinton; Township of Delaware (west of a line following County Route 523 from the Delaware River north to the Raritan Township line); Township of East Amwell (east of State Hwy. 31); Township of Franklin; Boroughs of Frenchtown, Glen Gardner, Hampton and High Bridge); Townships of Holland and Kingwood; Borough of Lebanon; Township of Lebanon; Borough of Milford; Township of Raritan (east of State Hwy. 31 and north of County Route 523); Townships of Readington, Tewksbury and Union); MORRIS AND PASSAIC COUNTIES; SOMERSET COUNTY (Township of Franklin (west of a line following Cedar Grove Lane from the Raritan River, southwest to the Millstone Branch of the Pennsylvania Railroad; then, west along the railroad to the Delaware and Raritan Canal; then, south along the canal to the Middlesex County line)); SUSSEX, UNION AND WARREN COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Cable splicer | $ 44.52 | 45% |
| Electrician | $ 40.47 | 45% |

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* ELEC0164-001 08/15/2000

BERGEN, ESSEX AND HUDSON COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Line Construction: | | |
| Cable splicer | $ 38.89 | 41% |
| Ground person | $ 20.66 | 41% |
| Line technician, welder, x-ray technician, equipment | | |

repair person, and
equipment service person....$ 34.42 41%

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* ELEC0164-002 06/01/2005

BERGEN, ESSEX AND HUDSON COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Cable splicer..... | $ 49.87 | 46% |
| Electrician on radio tower work | $ 53.40 | 46% |
| Electrician..... | $ 44.13 | 46% |

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* ELEC0456-001 06/01/2005

MIDDLESEX COUNTY; SOMERSET COUNTY (Township of Franklin (east of a line following Cedar Grove Lane from the Raritan River, southwest to the Millstone Branch of the Pennsylvania Railroad; then, west along the railroad to the Delaware and Raritan Canal; then, south along the canal to the Middlesex County line)):

| | Rates | Fringes |
|---|---|---|
| Cable splicer..... | $ 48.18 | 47% |
| Electrician..... | $ 42.64 | 47% |

Work on line voltage of 440 volts and over: 10% per hour additional.

Work from trusses, scaffolds and ladders 40 ft. or more from the ground or floor; or under air pressure; or over conveyors or moving equipment or machinery: 10% per hour additional.

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ELEC0456-002 06/01/2002

MIDDLESEX COUNTY:

| | Rates | Fringes |
|---|---|---|
| Line Construction: | | |
| Cable splicer..... | $ 38.95 | 45.75% |
| Ground person..... | $ 33.98 | 45.75% |
| Line technician..... | $ 34.77 | 45.75% |
| Winch operator..... | $ 33.98 | 45.75% |

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* ELEV0001-001 01/01/2004

| | Rates | Fringes |
|---|---|---|
| Elevator Mechanic | | |
| Construction..... | $ 39.26 | 14.845 |
| Modernization..... | $ 31.43 | 14.695 |

PAID HOLIDAYS:
New Year's Day, Lincoln's Birthday, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Election Day, Veteran's Day, Thanksgiving Day and Christmas Day.

VACATION PAY CREDIT:
A worker with 6 months but less than 5 years of service

receives two weeks vacation; a worker with 5 years or more of service receives three weeks vacation.

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* ELEV0084-005 01/01/2005

HUNTERDON AND WARREN COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Elevator mechanic..... | $ 33.24 | 12.115 |

PAID HOLIDAYS:
New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day.

VACATION PAY CREDIT:
A worker with 6 months but less than 5 years of service receives two weeks vacation; a worker with 5 years or more of service receives three weeks vacation.

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* ENGI0825-003 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Power equipment operators: | | |
| Tank erection: | | |
| GROUP 1..... | $ 36.71 | 19.65 |
| GROUP 2..... | $ 35.77 | 19.65 |
| GROUP 3..... | $ 36.25 | 19.65 |
| GROUP 4..... | $ 33.68 | 19.65 |
| GROUP 5..... | $ 31.22 | 19.65 |
| GROUP 6..... | $ 29.97 | 19.65 |
| GROUP 7..... | $ 28.47 | 19.65 |

Hazardous waste removal:
Work where the worker is in direct contact with hazardous material, and when personal protective equipment is required for respiratory, skin and eye protection: 20% per hour additional.

PAID HOLIDAYS:
New Year's Day, Washington's Birthday observed, Memorial Day, Independence Day, Labor Day, Presidential Election Day, Veteran's Day, Thanksgiving Day and Christmas Day; provided 1) that the worker works three of the preceding five work days before the holiday; or, the work day before the holiday and the work day after the holiday; and, 2) that the worker works the work day before and the work day after the holiday.

DEFINITION OF GROUPS:

GROUP 1: Operating engineer - on all equipment, including cranes and derricks with boom including jib, 140 ft. or more above the ground

GROUP 2: Operating engineer - on all equipment, including cranes and derricks with boom including jib, less than 140 ft. above the ground

GROUP 3: Helicopter pilot

GROUP 4: Air compressor, welding machine and generator (gas, diesel, or electrical-driven equipment and sources of power from a permanent plant (steam, compressed air, hydraulic or other power), for the operation of any machine or automatic tool used in the erection, alteration, repair and dismantling of tanks and any and all "dual-purpose" trucks used on the construction job site

GROUP 5: Concrete cleaning/decontamination machine operator, decontamination and remediation work only; directional boring machine; heavy equipment robotics, operator/technician, decontamination and remediation work only; master environmental maintenance technician, decontamination and remediation work only; ultra high-pressure waterjet cutting tool system operator/maintenance technician, decontamination and remediation work only; vacuum blasting machine operator/maintenance technician, decontamination and remediation work only

GROUP 6: Off-road back dump

GROUP 7: Oiler

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* ENGI0825-004 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Power equipment operators: | | |
| Steel erection: | | |
| GROUP 1 | $ 36.89 | 19.65 |
| GROUP 2 | $ 35.98 | 19.65 |
| GROUP 3 | $ 37.75 | 19.65 |
| GROUP 4 | $ 33.69 | 19.65 |
| GROUP 5 | $ 31.03 | 19.65 |
| GROUP 6 | $ 29.50 | 19.65 |
| GROUP 7 | $ 27.74 | 19.65 |

Hazardous waste removal:
Work where the worker is in direct contact with hazardous material, and when personal protective equipment is required for respiratory, skin and eye protection: 20 per hour additional.

PAID HOLIDAYS:
New Year's Day, Washington's Birthday observed, Memorial Day, Independence Day, Labor Day, Presidential Election Day, Veteran's Day, Thanksgiving Day and Christmas Day; provided 1) that the worker works three of the preceding five work days before the holiday; or, the work day before the holiday and the work day after the holiday; and, 2) that the worker works the work day before and the work day after the holiday.

DEFINITION OF GROUPS:

GROUP 1: Cranes (all cranes, land or floating with boom including jib, 140 ft. and over, above ground); derricks (all derricks, land, floating or Chicago boom type with boom including jib, 140 ft. and over, above ground)

GROUP 2: Cranes (all cranes, land or floating with boom including jib, less than 140 ft. above ground); derricks (all derricks, land, floating or Chicago boom type with boom including jib, less than 140 ft. above ground)

GROUP 3: Helicopter pilot

GROUP 4: "A" frame; cherry picker (10 ton and under); hoist (all types of hoist, including steam, gas, diesel, electric, air, hydraulic, single and double drum, concrete, brick shaft caisson, or any other similar type of hoisting machine, portable or stationary, except Chicago boom type); jack (screw, air, hydraulic power-operated unit or console type (not hand jack or pile load test type); side boom; straddle carrier

GROUP 5: Aerial platform used as a hoist; compressor, two or three in battery; directional boring machine; elevator or house car; concrete cleaning/decontamination machine operator, decontamination and remediation work only; conveyor and tugger hoist; fire fighter; forklift; generator, two or three in battery; heavy equipment robotics, operator/technician, decontamination and remediation work only; maintenance, utility person; master environmental maintenance technician, decontamination and remediation work only; rod bending machine (power); ultra high-pressure waterjet cutting tool system operator/maintenance technician, decontamination and remediation work only; vacuum blasting machine operator/maintenance technician, decontamination and remediation work only; welding machine (gas or electric, two or three in battery, including diesel); captain, power boat; tug master, power boat; oiler, with either one compressor or one welding machine

GROUP 6: Compressor, single; off-road back dump; welding machine (single, gas, diesel and electric converters of any type); welding system, multiple (rectifier, transformer type); generator, single

GROUP 7: Oiler; deckhand

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* ENGI0825-005 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Power equipment operators: | | |
| Oilostatic mainline & transportation pipeline: | | |
| GROUP 1 | $ 37.00 | 19.65 |
| GROUP 2 | $ 36.35 | 19.65 |
| GROUP 3 | $ 33.21 | 19.65 |
| GROUP 4 | $ 31.81 | 19.65 |
| GROUP 5 | $ 29.99 | 19.65 |
| GROUP 6 | $ 38.93 | 19.65 |

Hazardous waste removal: 20% per hour additional.

PAID HOLIDAYS:
New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day.

DEFINITION OF GROUPS:

GROUP 1: Backhoe; crane (all types); dragline; front end loader (5 cu. yd. and over); gradall; scooper (loader and shovel); Koehring and trench machine

GROUP 2: "A" frame/backhoe combination; hoe loader; boring and drilling machine; ditching machine, small; ditchwitch or similar type; forklift; front end loader (2 cu. yd. and over but less than 5 cu. yd.); grader, finish (fine); hydraulic crane, 10 tons and under (over 10 tons - crane rate applies); side boom and winch truck (hoisting)

GROUP 3: Backfiller; broom and sweeper; bulldozer; compressor (2 or 3 in battery); front end loader (under 2 cu. yd.); generator; giraffe grinder; grader and motor patrol; mechanic; pipe bending machine (power); tractor; water and sprinkler truck; welder and repair mechanic

GROUP 4: Compressor (single); dope pot (mechanical with or without pump); dust collector; farm tractor; pump (4-in. suction and over); pump (2, less than 4-in. suction); pump, diesel engine and hydraulic (immaterial of power); welding machine, gas or electric converter of any type, single; welding machine, gas or electric converter of any type, 2 or 3 in battery; multiple welder; wellpoint system (including installation and maintenance)

GROUP 5: Oiler; grease person; gas, fuel and supply trucks; tire repair and maintenance

GROUP 6: Helicopter pilot

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* ENGI0825-009 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Power Equipment Operator | | |
| GROUP 1 | $ 36.37 | 19.65 |
| GROUP 2 | $ 34.78 | 19.65 |
| GROUP 3 | $ 32.87 | 19.65 |
| GROUP 4 | $ 31.24 | 19.65 |
| GROUP 5 | $ 29.53 | 19.65 |
| GROUP 6 | $ 38.09 | 19.65 |

Hazardous waste removal work:
Work where the worker is in direct contact with hazardous material, and when personal protective equipment is required for respiratory, skin and eye protection: 20% per hour additional.

PAID HOLIDAYS:
New Year's Day, Washington's Birthday observed, Memorial Day, Independence Day, Labor Day, Presidential Election Day, Veteran's Day, Thanksgiving Day and Christmas Day; provided 1) that the worker works three of the preceding five work days before the holiday; or, the work day before the holiday and the work day after the holiday; and, 2) that the worker works the work day before and the work day after the holiday.

DEFINITION OF GROUPS:

GROUP 1: Autograde - combination subgrader; base metal spreader and base trimmer (CMI and similar types); autograde placer - trimmer spreader combination (CMI and similar types); autograde slipform paver (CMI and similar types); backhoe; central power plant (all types); concrete paving machine; crane (all types, including overhead and straddle traveling type); crane, gantry; derrick (land, floating or Chicago boom type); drillmaster, quarrymaster (down-the-hole drill, rotary drill, self-propelled hydraulic drill, self-powered drill); dragline; elevating grader; front end loader (5 cu. yd. and over); gradall; grader, raygo; locomotive (large); mucking machine; pavement and concrete breaker (superhammer and hoe ram); pile driver (length of boom, including length of leads, shall determine premium rate applicable); roadway surface grinder; scooper (loader and shovel); shovel; tree chopper with boom; trench machine (cable plow)

GROUP 2: "A" frame/backhoe combination; boom attachment on loader (rate based on size of bucket, not applicable to pipehook); boring and drilling machine; brush chopper, shredder and tree shredder; carryall; concrete pump; concrete pumping system, pumpcrete and similar type; conveyor, 125 ft. and over; drill doctor, including dust collecting and maintenance work); front end loader (2 cu. yd. but less than 5 cu. yd.); grader (finish); groove cutting machine (ride-on type); heater planer; hoist (all types of hoist, shall also include steam, gas, diesel, electric, air, hydraulic, single and double drum, concrete, brick shaft caisson, snorkel roof, and/or any other similar type hoisting machine, portable or stationary, except Chicago boom type) (if hoist is "outside material tower hoist", long boom rate is to be applied); hydraulic crane, 10 tons and under; hydro-axe; hydro-blaster; jack (screw, air, hydraulic power-operated unit or console type (not hand jack or pile load test type); log skidder; pan; pavers (all) (concrete); plate and frame filter press; pumpcrete machine; squeezecrete and concrete pump (regardless of size); scraper; side boom; straddle carrier, Ross and similar type; whip hammer; winch truck (hoisting)

GROUP 3: Asphalt curbing machine; asphalt plant engineer; asphalt spreader; autograde tube finisher and texturing machine (CMI and similar types); autograde curecrete machine (CMI and similar types); autograde curb trimmer and sidewalk, shoulder, slipform (CMI and similar types); bar bending machine (power); batcher; batching plant and crusher on site; belt conveyor system; boom-type skimmer machine; bridge deck finisher; bulldozers (all); car dumper (railroad); compressor and blower-type unit (used independently or mounted on dual-purpose truck, on jobsite or in conjunction with jobsite, in loading and unloading of concrete, cement, fly ash, instantcrete, or similar type materials); compressor (2 or 3) (battery) (within 100 ft.); concrete cleaning/decontamination machine operator, when used for decontamination and remediation; concrete finishing machine; concrete saw and cutter (ride-on type); concrete spreader, hetzel, rexomatic and similar type; concrete vibrator; conveyor, under 125 ft.; crushing machine; directional boring machine; ditching machine, small (Ditchwitch, Vermeer or similar type); dope pot (mechanical with or without pump); dumpster; elevator; fire fighter; forklift (Economobile, Lull and similar type of

equipment); front end loader (1 cu. yd. and over but less than 2 cu. yd.); generator (2 or 3) in battery (within 100 ft.); giraffe grinder; grader and motor patrol; gunite machine (does not include nozzle); hammer, vibratory (in conjunction with generator); heavy equipment robotics, operator/technician, when used for decontamination and remediation; hoist (roof, tugger, aerial platform hoist and house cars); hopper; hopper door (power-operated); hydro-blaster, where required; ladder (motorized); laddervator; locomotive, dinky type; maintenance, utility person; master environmental maintenance technician, when used for decontamination and remediation; mechanic; mixer (except paving mixer); motor patrol and grader; pavement breaker, small, self-propelled ride-on type (also maintains compressor or hydraulic unit); pavement breaker, truck-mounted; pipe bending machine (power); pitch pump; plaster pump regardless of size; posthole digger (post pounder and auger); rod bending machine (power); roller, blacktop; scale, power; seaman pulverizing mixer; shoulder widener; silo; skimmer machine (boom type); steel cutting machine, servicing and maintaining; tractor; captain (power boat); tug master (power boat); ultra high-pressure waterjet cutting tool system operator/maintenance technician, when used for decontamination and remediation; vacuum blasting machine operator/maintenance technician, when used for decontamination and remediation; vibrating plant (used in conjunction with unloading); welder and repair mechanic

GROUP 4: Broom and sweeper; chipper; compressor (single); concrete spreader (small type); conveyor loader (does not include elevating grader); engine, large diesel (1620 H.P.) and staging pump; farm tractor; fertilizing equipment (operation and maintenance of); fine grade machine (small type); form line grader (small type); front end loader (under 1 cu. yd.); generator (single); grease, gas, fuel and oil supply truck; heater (Nelson or other type including propane, natural gas or flow-type unit); lights (portable generating light plant); mixer, concrete, small; mulching equipment (operaton and maintenance of); off-road back dump; pump (4-in. suction and over, including submersible pump); pump (diesel engine and hydraulic) (immaterial of power); road finishing machine (small type); roller, grade, fill or stone base; seeding equipment (operation and maintenance of); sprinkler and water pump truck; steam jenny and boiler; stone spreader; tamping machine, vibrating ride-on; temporary heating plant (Nelson or other type, including propane, natural gas or flow-type unit); water and sprinkler truck; welding machine (gas, diesel, and/or electric converter of any type, single, two or three in a battery) (within 100 ft.); welding system, multiple (rectifier transformer type); wellpoint system

GROUP 5: Oiler; tire repair and maintenance

GROUP 6: Helicopter pilot; helicopter engineer

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IRON0011-002 07/01/2002

BERGEN, ESSEX AND HUDSON COUNTIES; HUNTERDON COUNTY (west half); MIDDLESEX COUNTY (north half); MORRIS AND PASSAIC COUNTIES; SOMERSET COUNTY (north half); SUSSEX AND UNION COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Ironworkers: | | |
| Reinforcing | $ 27.63 | 24.10 |
| Structural | $ 29.53 | 24.10 |

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IRON0036-003 07/01/2003

WARREN COUNTY:

| | Rates | Fringes |
|---|---|---|
| Ironworker: | | |
| Projects $25 million and over | $ 27.95 | 14.02 |
| Projects under $25 million | $ 27.45 | 14.02 |

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IRON0068-004 07/01/2003

HUNTERDON COUNTY (east half); MIDDLESEX COUNTY (south half); SOMERSET COUNTY (south half):

| | Rates | Fringes |
|---|---|---|
| Ironworkers: | | |
| Ornamental & structural | $ 28.41 | 23.80 |
| Reinforcing | $ 26.41 | 23.80 |

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LABO0172-001 03/01/2005

HEAVY AND HIGHWAY CONSTRUCTION:

| | Rates | Fringes |
|---|---|---|
| Laborers: | | |
| GROUP 1 | $ 24.95 | 15.45 |
| GROUP 2 | $ 25.15 | 15.45 |
| GROUP 3 | $ 25.45 | 15.45 |
| GROUP 4 | $ 25.65 | 15.45 |
| GROUP 5 | $ 25.90 | 15.45 |
| GROUP 6 | $ 29.45 | 15.45 |
| GROUP 7 | $ 25.95 | 15.45 |
| GROUP 8 | $ 27.95 | 15.45 |

PAID HOLIDAYS:
New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Presidential Election Day, Veteran's Day, Thanksgiving Day and Christmas Day, provided the worker works three days for the same employer within a period of ten working days consisting of five working days before and five working days after the day upon which the holiday falls or is observed.

DEFINITION OF GROUPS:

GROUP 1: Common laborer; landscape laborer; railroad track laborer; flag person; salamander tender; pit person; dump person; waterproofing laborer; raker and tamper on cold patch work; laborer (wrapping and coating of all pipe)

GROUP 2: Powder carrier; magazine tender; signal person

GROUP 3: Sewer pipe; laser person; conduit and duct line layer; power tool operator; jackhammer; chipping hammer; pavement breaker; power buggy; concrete cutter; asphalt cutter; sheet hammer operator; tree cutter operator; laborer (sandblasting, cutting, burning and operating such other power tools used to perform work usually done manually by laborers)

GROUP 4: Wagon drill operator; timber person; drill master

GROUP 5: Finisher; manhole; catch basin or inlet builder; form setter; rammer; paver; gunite nozzle person; stonecutter

GROUP 6: Blaster

GROUP 7: Hazardous waste removal work, Levels A, B, C, or D, personal protection not required

GROUP 8: Hazardous waste removal work, Levels A, B or C, personal protection required

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* LABO0172-002 03/01/2005

| | Rates | Fringes |
|---|---|---|
| Laborers: | | |
| FREE AIR TUNNEL: | | |
| GROUP 1 | $ 29.40 | 15.45 |
| GROUP 2 | $ 26.00 | 15.45 |
| GROUP 3 | $ 25.85 | 15.45 |
| GROUP 4 | $ 25.35 | 15.45 |

PAID HOLIDAYS:
New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Presidential Election Day, Veteran's Day, Thanksgiving Day and Christmas Day, provided the worker works three days for the same employer within a period of ten working days consisting of five working days before and five working days after the day upon which the holiday falls or is observed.

DEFINITION OF GROUPS:

GROUP 1: Blaster

GROUP 2: Skilled laborer (miner, drill runner, iron person, maintenance person, conveyor person, safety miner, rigger, blocklayer, cement finisher, rod person, caulker, powder carrier)

GROUP 3: Semi-skilled laborer (chuck tender, track person, nipper, brake person, derail person, cable person, hose person, grout person, gravel person, form person, bell or signal person (top or bottom), form worker and mover, concrete worker, shaft person, tunnel laborer)

GROUP 4: Powder watch person, change house attendant, top laborer

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LABO0172-003 03/01/2005

| | Rates | Fringes |
|---|---|---|

Laborers:
ASPHALT WORK:

| | | |
|---|---|---|
| GROUP 1 | $ 25.75 | 15.45 |
| GROUP 2 | $ 25.35 | 15.45 |
| GROUP 3 | $ 25.60 | 15.45 |
| GROUP 4 | $ 25.45 | 15.45 |

Traffic control coordinator: $.50 per hour additional.

PAID HOLIDAYS:
New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Presidential Election Day, Veteran's Day, Thanksgiving Day and Christmas Day, provided the worker works three days for the same employer within a period of ten working days consisting of five working days before and five working days after the day upon which the holiday falls or is observed.

DEFINITION OF GROUPS:

GROUP 1: Head raker

GROUP 2: Painter, shoveler, roller person, kettle person, smother person, tamper

GROUP 3: Raker, screed person, lute person

GROUP 4: Milling controller

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LABO0222-002 05/01/2004

BUILDING CONSTRUCTION:

| | Rates | Fringes |
|---|---|---|
| Laborer | | |
| GROUP 1 | $ 24.65 | 13.37 |
| GROUP 2 | $ 24.15 | 13.37 |
| GROUP 3 | $ 20.53 | 13.37 |

DEFINITION OF GROUPS:

GROUP 1: Jackhammer; tamper; motorized tamper and compactor; street cleaning machine; scaffold builder; hydro; demolition equipment; all types of motorized forklift; riding motor buggy operator; Bobcat operator; mortar person; burner; nozzle person on gunite work

GROUP 2: All laborers not listed in Groups 1 or 3

GROUP 3: Laborer doing janitorial-type light clean-up work associated with the turnover of the project to the owner; flag person; laborer manning temporary heat of all types

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LABO1030-001 05/01/2004

| | Rates | Fringes |
|---|---|---|
| Laborer | | |
| The removal, abatement, enclosure and decontamination of | | |

personal protective equipment, chemical protective clothing and machinery relating to asbestos and/or toxic and hazardous waste or materials which shall include but not necessarily be limited to: the erection, moving, servicing and dismantling of all enclosures, scaffolding and barricades; the operation of all tools and equipment normally used in the removal or abatement of asbestos and toxic or hazardous waste or materials; the labeling, bagging, cartoning, crating, or other packaging of materials for disposal; the clean-up of the worksite; and all other work incidental to the removal, abatement, encapsulation, enclosure, and decontamination of asbestos and toxic or hazardous waste or materials; and, in addition, all work tasks involved in the maintenance and operation of energy resource recovery plants (co-generation plants).....$ 23.35 12.11

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PAIN0711-003 05/01/2005

| | Rates | Fringes |
|---|---|---|
| Glazier..... | $ 32.05 | 27% + 4.55 |

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PAIN0711-004 05/01/2005

Repaint work, on projects on which no major alterations occur (does not include work on bridges, stacks, elevated tanks and generating stations):

| | Rates | Fringes |
|---|---|---|
| Drywall Finisher..... | $ 24.55 | 27% + 4.55 |
| Painter, Brush and Roller..... | $ 24.55 | 27% + 4.55 |
| Painter, Spray..... | $ 27.00 | 27% + 4.55 |

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PAIN0711-009 05/01/2005

All other work:

| | Rates | Fringes |
|---|---|---|

| | | |
|---|---|---|
| Drywall Finisher.....$ 32.05 | 27% + 4.55 | |
| Painter, Brush and Roller.....$ 32.05 | 27% + 4.55 | |
| Painter, Spray.....$ 35.25 | 27% + 4.55 | |

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PLAS0008-006 05/01/2004

HUNTERDON, MIDDLESEX AND SOMERSET COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Plasterer.....$ | 28.35 | 15.80 |

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* PLAS0029-001 05/01/2005

BERGEN, ESSEX, HUDSON, MORRIS, PASSAIC, SUSSEX, UNION AND WARREN COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Cement Masons & Plasterers.....$ | 34.00 | 15.55 |

Cement masons:
Work on suspended staging, not supported from the ground, and over twenty feet above the ground: $.50 per hour additional.

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* PLAS0592-030 11/01/2004

HUNTERDON, MIDDLESEX AND SOMERSET COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Cement Mason.....$ | 31.70 | 17.46 |

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* PLUM0009-001 03/01/2005

| | Rates | Fringes |
|---|---|---|
| Air Conditioning and refrigeration mechanic.....$ | 27.92 | 11.83 |

PAID HOLIDAYS:
New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and Christmas Day.

SCOPE OF WORK:
Installation of refrigeration equipment for any type of building where the combined compressor tonnage does not exceed 5 tons; installation of water-cooled air conditioning that does not exceed 10 tons (including the piping of the component system and the erection of the water tower); installation of air-cooled air conditioning that does not exceed 15 tons.

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PLUM0009-002 07/01/2004

HUNTERDON COUNTY (Township of West Amwell); MIDDLESEX COUNTY (remainder of county); SOMERSET COUNTY (Townships of Green Brook and Warren):

| | Rates | Fringes |
|---|---|---|

Plumber.....$ 38.08 18.80

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PLUM0009-009 07/01/2004

HUNTERDON COUNTY (Township of West Amwell); MIDDLESEX COUNTY (Townships of Cranbury, East Brunswick, Edison, Monroe, North Brunswick, Old Bridge, Plainsboro, South Brunswick and Woodbridge); SOMERSET COUNTY (Townships of Green Brook and Warren):

| | Rates | Fringes |
|---|---|---|
| Pipefitter | $ 38.08 | 18.80 |

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* PLUM0014-002 05/01/2005

BERGEN COUNTY; HUDSON COUNTY (City of Bayonne, Town of Guttenberg, City of Hoboken, City of Jersey City, Township of North Bergen, Town of Secaucus, City of Union City, Township of Weehawken, and Town of West New York); MORRIS, PASSAIC, SUSSEX AND WARREN COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Plumber | $ 39.91 | 19.59 |

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PLUM0024-001 05/01/2003

ESSEX COUNTY; HUNTERDON COUNTY (remainder of county); MIDDLESEX COUNTY (Township of Piscataway); MORRIS COUNTY (Townships of Chatham, Chester, Harding, Mendham, Mount Olive and Washington); SOMERSET COUNTY (remainder of county); UNION COUNTY; WARREN COUNTY (Townships of Franklin, Greenwich, Harmony, Hope, Lopatcong, Mansfield, Oxford, Washington and White):

| | Rates | Fringes |
|---|---|---|
| Plumber | $ 37.28 | 16.45 |

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PLUM0274-002 05/01/2004

BERGEN, HUDSON, PASSAIC AND SUSSEX COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Pipefitter | $ 39.93 | 18.07 |

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PLUM0475-001 05/01/2004

ESSEX COUNTY; HUNTERDON COUNTY (remainder of county):

| | Rates | Fringes |
|---|---|---|
| Pipefitter | $ 36.91 | 21.04 |

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ROOF0004-002 06/01/2002

ESSEX COUNTY; HUDSON COUNTY (west of the Hackensack River); MORRIS, SUSSEX, UNION AND WARREN COUNTIES:

| | Rates | Fringes |
|---|---|---|

Roofer.....$ 29.57 12.75

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ROOF0008-004 07/01/2004

HUDSON COUNTY (east of the Hackensack River):

| | Rates | Fringes |
|---|---|---|
| Roofer | $ 32.08 | 21.28 |

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* ROOF0010-001 06/01/2005

BERGEN AND PASSAIC COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Mop person | $ 30.40 | 13.45 |
| Roofers: | | |
| Mop person | $ 31.50 | 13.70 |
| Roofer | $ 30.75 | 13.70 |

Work operating slag chipping machine, felt laying machine, power broom machine and adhesive machine:
New work: $1.00 per hour additional.
Re-roofing: $.50 per hour additional.

Work operating mechanized equipment (felt-layer, hot spreader, slag spreader) (on new work only): $.50 per hour additional.

Work involving the use of pitch, including all tear-offs: $1.00 per hour additional.

Work involving asbestos removal: $1.00 per hour additional.

Work operating adhesive machine on one-ply system (on new work only): $.50 per hour additional.

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SFNJ0669-001 01/01/2005

HUNTERDON; MIDDLESEX (Remainder); AND WARREN COUNTIES

| | Rates | Fringes |
|---|---|---|
| Sprinkler Fitter | $ 35.55 | [illegible].20 |

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SFNJ0696-001 07/01/2003

BERGEN, ESSEX AND HUDSON COUNTIES; MIDDLESEX COUNTY (Township of Old Bridge); MORRIS, PASSAIC AND UNION COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Sprinkler Fitter | $ 40.45 | 10.55 |

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SHEE0019-014 06/01/2003

WARREN COUNTY:

| | Rates | Fringes |
|---|---|---|

Sheet metal worker.....$ 24.57 17.09

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SHEE0025-001 06/01/2000

BERGEN, ESSEX, HUDSON, MORRIS, PASSAIC, SOMERSET, SUSSEX AND UNION COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Sheet metal worker..... | $ 26.92 | 16.12 |

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SHEE0027-001 01/01/2004

HUNTERDON AND MIDDLESEX COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Sheet metal worker..... | $ 34.20 | 21.10 |

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* TEAM0408-001 05/01/1997

ESSEX AND MORRIS COUNTIES; UNION COUNTY (north of Wood Ave.):

| | Rates | Fringes |
|---|---|---|
| Truck drivers: | | |
| GROUP 1..... | $ 24.45 | 7.01 |
| GROUP 2..... | $ 24.50 | 7.01 |
| GROUP 3..... | $ 24.60 | 7.01 |
| GROUP 4..... | $ 24.70 | 7.01 |

Hazardous waste removal:
With suit-up: $3.00 per hour additional.
Without suit-up: $1.00 per hour additional.

Paid Holidays:
New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Election Day, Veteran's Day, Thanksgiving Day and Christmas Day, provided the worker has been assigned to work or "shifts" one day of the calendar week during which the holiday falls.

Employer contributes $663.57 per month per worker for health and welfare.

DEFINITION OF GROUPS:

GROUP 1: Driver of the following types of vehicles: dump, flat, float, pick-up, container hauler, fuel, water sprinkler, road oil, stringer bead, hot pass, bus, dumpcrete, transit mixer, agitator mixer, half truck, winch truck, side-o-matic, dynamite, powder, x-ray, welding, skid, jeep, station wagon, A-frame, dual purpose truck, truck with mechanical tailgate, asphalt distributor, batch truck, seeding, mulching, fertilizing, air compressor truck (in transit); parts chaser; escort; scissor; hi-lift; telescope; concrete breaker; gin pole; stone, sand, asphalt distributor and spreader; nipper; fuel truck (driver of fuel truck including handling of hose and nozzle - entire unit); team driver; vacuum or vac-all truck (entire unit); skid truck (debris container - entire unit); concrete mobile truck (entire unit); expediter (parts chaser); beltcrete truck; pumpcrete truck; line truck; reel truck;

wrecker; utility truck; tack truck; warehouse person; warehouse parts person; yard person; lift truck in warehouse; warehouse clerk; parts person; material checker; receiver; shipper; binning person (materials); cardex person; drivers on the following type of vehicle: Broyhill coal tar epoxy truck, Littleford bituminous distributor, slurry seal truck or vehicle, thiokol track master, pick-up (swamp cat pick-up), bucker loader, dump truck and any rubber-tired tractor used in pulling and towing farm wagons and trailers of any description; off-site and on-site repair shop

GROUP 2: Drivers of 3-axle materials truck and float

GROUP 3: Drivers of all Euclid-type vehicles: Euclid, International Harvester, Wabco, Caterpillar, Koehring, tractor and wagon; dumpster; bottom, rear and side dump; carry-all and scraper (not self-loading, loading over the top); water sprinkler trailer; water pull and similar types of vehicle; driver of tractor and trailer-type vehicles: flat, float, I-beam, low bed, water sprinkler, bituminous transit mix, road oil, fuel, bottom dump hopper, rear dump, office, shanty, epoxy, asphalt, agitator mixer, mulching, stringing, seeding, fertilizing, pole, spread, bituminous distributor, water pull (entire unit), tractor trailer, reel trailer and similar types of vehicle

GROUP 4: Winch trailer driver

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* TEAM0469-001 05/01/2000

HUNTERDON, MIDDLESEX AND SOMERSET COUNTIES; UNION COUNTY (south of Wood Ave.); WARREN COUNTY:

| | Rates | Fringes |
|---|---|---|
| Truck drivers: | | |
| GROUP 1 | $ 26.35 | 11.835 |
| GROUP 2 | $ 26.40 | 11.835 |
| GROUP 3 | $ 26.50 | 11.835 |
| GROUP 4 | $ 26.60 | 11.835 |

Hazardous waste removal: $3.00 per hour additional.

PAID HOLIDAYS:
New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Election Day, Veteran's Day, Thanksgiving Day and Christmas Day, provided that the worker has been assigned to work or "shifts" one day of the calendar week during which the holiday falls.

Employer contributes $400.00 per year per worker for apprenticeship training.

DEFINITION OF GROUPS:

GROUP 1: Driver of the following types of vehicle: dump, flat, float, pick-up, container hauler, fuel, water sprinkler, road oil, stringer bead, hot pass, bus, dumpcrete, transit mixer, agitator mixer, half truck, winch truck, side-o-matic, dynamite, powder, x-ray, welding, skid, jeep, station wagon, A-frame, dual purpose truck,

truck with mechanical tailgate, asphalt distributor, batch truck, seeding, mulching, fertilizing, air compressor truck (in transit); parts chaser; escort; scissor; hi-lift; telescope; concrete breaker; gin pole; stone, sand, asphalt distributor and spreader; nipper; fuel truck (driver of fuel truck including handling of hose and nozzle - entire unit); team driver; vacuum or vac-all truck (entire unit); skid truck (debris container - entire unit); concrete mobile truck (entire unit); expediter (parts chaser); beltcrete truck; pumpcrete truck; line truck; reel truck; wrecker; utility truck; tack truck; warehouse person; warehouse parts person; yard person; lift truck in warehouse; driver of the following type vehicles: Broyhill coal tar epoxy truck, Littleford bituminous distributor, slurry seal truck or vehicle, thiokol track master, pick-up (swamp cat pick-up); bucket loader, dump truck and any rubber-tired tractor used in pulling and towing farm wagons and trailers of any description; off-site and on-site repair shop

GROUP 2: Driver of 3-axle materials truck and float

GROUP 3: Driver of all Euclid-type vehicles: Euclid, International Harvester, Wabco, Caterpillar, Koehring tractor and wagon; dumpster; bottom, rear and side dump; carry-all and scraper (not self-loading, loading over the top); water sprinkler trailer; water pull and similar types of vehicle; driver of tractor and trailer-type vehicle: flat, float, I-beam, low bed, water sprinkler, bituminous transit mix, road oil, fuel, bottom dump hopper, rear dump, office, shanty, epoxy, asphalt, agitator mixer, mulching, stringing, seeding, fertilizing, pole, spread, bituminous distributor, water pull (entire unit), tractor trailer, reel trailer and similar types of vehicle

GROUP 4: Winch trailer driver

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* TEAM0560-001 05/01/2005

BERGEN, HUDSON AND PASSAIC COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Truck drivers: | | |
| Utility work: | | |
| GROUP 1 | $ 22.68 | 17.88 |
| GROUP 2 | $ 22.60 | 17.88 |
| GROUP 3 | $ 22.52 | 17.88 |
| GROUP 4 | $ 22.48 | 17.88 |
| All other work: | | |
| GROUP 1 | $ 28.35 | 17.88 |
| GROUP 2 | $ 28.25 | 17.88 |
| GROUP 3 | $ 28.15 | 17.88 |
| GROUP 4 | $ 28.10 | 17.88 |

Hazardous waste removal: $3.00 per hour additional.

PAID HOLIDAYS:
New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Presidential Election Day, Veteran's Day, Thanksgiving Day and Christmas Day.

DEFINITION OF GROUPS:

GROUP 1: Driver of the following types of vehicle: dump, flat, float, pick-up, container hauler, fuel, water sprinkler, road oil, stringer, bead, hot pass, bus, dumpcrete, transit mixer, agitator mixer, half truck, winch truck, side-o-matic, dynamite, powder, x-ray, welding, skid, jeep, station wagon, A-frame, dual-purpose truck, truck with mechanical tailgate, asphalt distributor, batch truck, seeding, mulching, fertilizing, air compressor truck (in transit), parts chaser, escort, scissor, hi-lift, telescope, concrete breaker, gin pole; stone, sand, asphalt distributor and spreader; nipper; fuel truck (driver of fuel truck including handling of hose and nozzle - entire unit); team driver; vacuum or vac-all trucks (entire unit); skid truck (debris container - entire unit); concrete mobile truck (entire unit); expediter (parts chaser); beltcrete truck; pumpcrete truck; line truck, reel truck, wrecker; utility truck; tack truck; warehouse person; warehouse parts person; yard person; lift truck in warehouse; warehouse clerk; parts person; material checker; receiver; shipper; binning person (materials); cardex person; driver on the following types of vehicle: Broyhill coal tar epoxy truck, Littleford bituminous distributor, slurry seal truck or vehicle, thiokol track master, pick-up (swamp cat pick-up); bucket loader truck and any rubber-tired tractor used in pulling and towing farm wagons and trailers of any description; off-site and on-site repair shop

GROUP 2: Driver of 3-axle materials truck and float

GROUP 3: Driver of all Euclid-type vehicles: Euclid, International Harvester, Wabco, Caterpillar, Koehring tractor and wagon; dumpster; bottom, rear and side dump; carry-all and scraper (not self-loading, loading over the top); water sprinkler trailer; water pull and similar types of vehicle; driver of tractor and trailer-type vehicle: flat, float, I-beam, low bed, water sprinkler, bituminous transit mix, road oil, fuel, bottom dump hopper, rear dump, office, shanty, epoxy, asphalt, agitator mixer, mulching, stringing, seeding, fertilizing, pole, spread, bituminous distributor, water pull (entire unit) tractor trailer, reel trailer, and similar types of vehicle

GROUP 4: Winch trailer driver

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

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

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In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be

prevailing.

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WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION

# SCHEDULE OF MINIMUM WAGE RATES[NY]

GENERAL DECISION: **NY20030003** 08/19/2005 NY3

Date: August 19, 2005
General Decision Number: **NY20030003** 08/19/2005

Superseded General Decision Number: NY020003

State: New York

Construction Types: Building, Heavy, Highway and Residential

Counties: Bronx, Kings, New York, Queens and Richmond
Counties in New York.

BUILDING & RESIDENTIAL CONSTRUCTION PROJECTS (includes single family homes and apartments up to and including 4 stories), HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

| Modification Number | Publication Date |
|---|---|
| 0 | 06/13/2003 |
| 1 | 05/14/2004 |
| 2 | 05/28/2004 |
| 3 | 07/16/2004 |
| 4 | 07/23/2004 |
| 5 | 07/30/2004 |
| 6 | 09/24/2004 |
| 7 | 10/01/2004 |
| 8 | 10/15/2004 |
| 9 | 12/03/2004 |
| 10 | 12/24/2004 |
| 11 | 02/11/2005 |
| 12 | 03/04/2005 |
| 13 | 05/20/2005 |
| 14 | 06/03/2005 |
| 15 | 07/22/2005 |
| 16 | 08/05/2005 |
| 17 | 08/19/2005 |

ASBE0012-001 01/03/2005

| | Rates | Fringes |
|---|---|---|
| Asbestos Workers/Insulator includes application of all insulating materials, protective coverings,coatings and finishing to all types of mechanical systems | $ 41.56 | 23.86 |
| Hazardous Material Handler | $ 24.45 | 8.50 |

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BOIL0005-001 09/01/2004

| | Rates | Fringes |
|---|---|---|
| Boilermaker | $ 41.90 | 25.55+a |

FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day, Thanksgiving Day, Memorial Day, Independence Day, Labor Day and Good Friday, Friday after Thanksgiving, Christmas Eve Day and New Year's Eve

BRNY0001-001 07/01/2004

| | Rates | Fringes |
|---|---|---|
| Bricklayer | $ 39.32 | 18.46 |
| Stonemason | $ 37.36 | 18.03 |

BRNY0001-002 07/01/2004

| | Rates | Fringes |
|---|---|---|
| Pointer, cleaner and caulker | $ 33.50 | 17.10 |

BRNY0003-001 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Terrazzo Finisher | $ 38.37 | 21.25 |
| Terrazzo Worker | $ 39.68 | 21.25 |

BRNY0004-001 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Marble Setter | $ 46.60 | 17.00 |

BRNY0020-001 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Marble Finisher | $ 39.33 | 17.32 |

BRNY0024-001 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Bricklayer | | |
| MARBLE POLISHERS | $ 35.86 | 14.45 |

BRNY0052-001 07/01/2004

| | Rates | Fringes |
|---|---|---|
| Tile Layer | $ 39.85 | 18.43 |

BRNY0088-001 07/01/2004

| | Rates | Fringes |
|---|---|---|
| Tile Finisher | $ 33.29 | 15.00 |

CARP0001-009 07/01/2003

| | Rates | Fringes |
|---|---|---|
| Carpenters: | | |
| Carpenters & Soft floor layers | $ 38.78 | 26.05 |

CARP0740-001 07/01/2003

| | Rates | Fringes |
|---|---|---|
| Millwright | $ 37.06 | 30.46 |

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CARP1456-004 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Dock Builder & Piledrivermen | | |
| DOCKBUILDERS | $ 40.27 | 29.86 |

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CARP1456-005 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Diver Tender | $ 36.44 | 29.86 |
| Diver | $ 49.79 | 29.86 |

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CARP1536-001 07/01/2003

| | Rates | Fringes |
|---|---|---|
| Carpenters: | | |
| TIMBERMEN | $ 34.47 | 26.05 |

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ELEC0003-001 05/12/2005

| | Rates | Fringes |
|---|---|---|
| Electrician | | |
| Electricians | $ 39.75 | 25.34 |
| Jobbing, and maintenance and repair work | $ 23.80 | 10.77+a |

PAID HOLIDAYS:

a. New Years Day, Martin Luther King, Jr.'s Birthday, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Election Day, Thanksgiving Day, the day after Thanksgiving Day, and Christmas Day

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ELEC1049-001 04/04/2004

QUEENS COUNTY

| | Rates | Fringes |
|---|---|---|
| Line Construction (Substation and Switching structures pipe type cable installation and maintenance jobs or projects; Railroad electrical distribution/transmission systems maintenance (when work is not performed by railroad employees) Overhead and Underground transmission/distribution line work. Fiber optic, telephone cable and equipment) | | |
| Groundman | $ 21.12 | 12.60 |
| Heavy Equipment Operator | $ 28.16 | 12.60 |
| Lineman and Cable Splicer | $ 35.20 | 12.60 |

| | | |
|---|---|---|
| Material Man | $ 30.62 | 12.60 |
| Tree Trimmer | $ 22.28 | 7.76 |

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ELEV0001-002 03/17/2005

| | Rates | Fringes |
|---|---|---|
| Elevator Mechanic | | |
| Elevator Constructor | $ 41.97 | 20.754+a |
| Modernization and Repair | $ 33.82 | 19.698+a |

FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day, Lincoln's Birthday, Good Friday, President's Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

PAID VACATION: Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 5 years of service, and 6% for employees with less than 5 years of service.

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* ENGI0014-001 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Pavement equipment operator | | |
| Asphalt Plants | $ 37.76 | 21.60+a |
| Asphalt roller | $ 44.79 | 21.60+a |
| Asphalt spreader | $ 46.03 | 21.60+a |
| Power Equipment Operator (HEAVY & HIGHWAY) | | |
| GROUP 1 | $ 59.75 | 21.60+a |
| GROUP 2 | $ 49.13 | 21.60+a |
| GROUP 3 | $ 50.69 | 21.60+a |
| GROUP 4 | $ 49.50 | 21.60+a |
| GROUP 5 | $ 48.50 | 21.60+a |
| GROUP 6 | $ 46.52 | 21.60+a |
| GROUP 7 | $ 47.41 | 21.60+a |
| GROUP 8 | $ 46.03 | 21.60+a |
| GROUP 9 | $ 45.01 | 21.60+a |
| GROUP10 | $ 43.04 | 21.60+a |
| GROUP11 | $ 40.13 | 21.60+a |
| GROUP12 | $ 41.01 | 21.60+a |
| GROUP13 | $ 41.36 | 21.60 |
| GROUP14 | $ 30.98 | 21.60+a |
| GROUP15 | $ 28.71 | 21.60+a |
| Steel erector | | |
| Compressors, Welding Machines | $ 30.77 | 21.60+a |
| Cranes, Hydraulic Cranes, 2 drum derricks, Forklifts, Boom Trucks | $ 51.87 | 21.60+a |
| Three drum derricks | $ 54.02 | 21.60+a |
| Utility Laborer | | |
| Horizontal boring rig | $ 43.72 | 21.60+a |
| Off shift compressors | $ 36.19 | 21.60+a |
| Utility Compressors | $ 28.53 | 21.60+a |

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Tower crane

GROUP 2: Backhoes, power shovel, Hydraulic clam shells, moles and machines of a similar type

GROUP 3: Mine hoists and crane, etc. used as mine hoists

GROUP 4: Gradalls, keystones, cranes (with digging buckets), bridge cranes, trenching machines, vermeer cutter and machines of a similar nature

GROUP 5: Piledrivers, derrick boats, tunnel shovels

GROUP 6: All drills, and machines of a similar nature

GROUP 7: Back filling machines, cranes, mucking machines, dual drum pavers

GROUP 8: Mixers (concrete w/loading attachments), concrete pavers, cableways, land derricks, power house (low pressure units), concrete pumps

GROUP 9: Concrete plants, well drilling machines, stone crushers double drum hoist, power house (other than above)

GROUP 10: Concrete mixers

GROUP 11: Elevators

GROUP 12: Concrete breaking machine, Hoists (single drum), load masters, locomotive and dinkies over 10 tons

GROUP 13: Vibratory console

GROUP 14: Compressors (portable 3 or more in battery), tugger machine (caissons), well point pumps, chum drill

GROUP 15: Boilers, (high pressure, compressors (portable, single, or 2 in battery, not over 100' apart), pumps (river cofferdam and welding machines (except where arc is operated by members of local 15) push button machines, all engines irrespective of power (power pac) used to drive auxilliary equipment, air, hydraulic etc.

PREMIUMS ON CRANES (Crawler or Truck):
100' to 149' boom - add .50
150' to 249' boom - add .75
250' to 349' boom - add 1.00
350' to 450' boom - add 1.50

Premiums for Cranes on Steel Erection:
100' to 149' boom - add 1.75
150' to 249' boom - add 2.00
250' to 349' boom - add 2.25
350' to 450' boom - add 2.75
Tower crane - add 2.00

FOOTNOTE:
a. Paid Holidays: New Year's Day; Lincoln's Birthday; Washington's Birthday; Memorial Day; Independence Day; Labor Day; Veterans Day; Columbus Day; Election Day; Thanksgiving Day; and Christmas Day; provided the employee works one day the payroll week in which the holiday occurs.

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* ENGI0014-002 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Power Equipment Operator | | |
| BUILDING & RESIDENTIAL | | |
| GROUP 1 | $ 48.72 | 21.60+a |
| GROUP 2 | $ 51.60 | 21.60+a |
| GROUP 3 | $ 47.06 | 21.60+a |
| GROUP 4 | $ 42.81 | 21.60+a |
| GROUP 5 | $ 32.04 | 21.60+a |

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Double drum

GROUP 2: Stone derrick, cranes, hydraulic cranes, boom trucks

GROUP 3: 4 pole Hoist, Single Drum Hoists

GROUP 4: Fork lift, house cars, plaster (platform machine), plaster bucket, concrete pump and all other equipment used for hoisting material

GROUP 5: Compressors, welding machines (cutting concrete work), paint spraying, sand blasting, pumps (with the exclusion of concrete pumps), house car (settlement basis only), all engines irrespective of power (power pac) used to drive auxiliary equipment, air, hydraulic, etc., boilers

Premiums for Cranes:

| | | |
|---|---|---|
| 100'-149' boom - | add | 1.75 |
| 150'-249' boom - | add | 2.00 |
| 250'-349' boom - | add | 2.25 |
| 350'-450' boom - | add | 2.75 |
| Tower cranes | add | 2.00 |

FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day, Lincoln's Birthday, Memorial Day, Independence Day, Labor Day, Veteran's Day, Columbus Day, Election Day, Thanksgiving Day, and Christmas Day, provided the employee works one day in the payroll week in which the holiday occurs

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IRON0040-002 01/01/2005

BRONX, NEW YORK, RICHMOND

| | Rates | Fringes |
|---|---|---|
| Ironworker, Structural | $ 37.65 | 41.88 |

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IRON0046-003 07/01/2004

| | Rates | Fringes |
|---|---|---|
| Ironworker | | |
| METALLIC LATHERS | $ 39.50 | 26.14 |

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IRON0197-001 07/01/2003

| | Rates | Fringes |
|---|---|---|

Ironworker
STONE DERRICKMAN.....$ 35.76 29.07

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IRON0361-002 07/01/2005

KINGS, QUEENS

| | Rates | Fringes |
|---|---|---|
| Ironworkers: | | |
| (STRUCTURAL)..... | $ 37.65 | 41.88 |

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IRON0580-001 07/01/2003

| | Rates | Fringes |
|---|---|---|
| Ironworker, Ornamental..... | $ 35.65 | 28.50 |

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LABO0006-001 07/01/2003

| | Rates | Fringes |
|---|---|---|
| Laborers: | | |
| BUILDING CONSTRUCTION | | |
| CEMENT AND CONCRETE WORKERS | $ 31.50 | 15.27 |

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LABO0029-001 07/01/2001

| | Rates | Fringes |
|---|---|---|
| Laborers: | | |
| Heavy | | |
| Blasters (hydraulic trac drill)..... | $ 32.08 | 16.70 |
| Blasters..... | $ 31.53 | 16.70 |
| Hydraulic Trac Drill..... | $ 28.38 | 16.70 |
| Jackhammers, Chippers, Spaders, Concrete Breakers, All Other Pneumatic Tools, Walk Behind Self-Propelled Hydraulic Asphalt and Concrete Breaker..... | $ 27.14 | 16.70 |
| Powder Carriers..... | $ 24.50 | 16.70 |
| Wagon; Airtrac; Quarry Bar Drill Runners..... | $ 27.83 | 16.70 |

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LABO0078-001 12/01/2003

| | Rates | Fringes |
|---|---|---|
| Asbestos Worker | | |
| ASBESTOS (Removal, Abatement, Encapsulation or Decontamination of asbestos); LEAD; & HAZARDOUS WASTE LABORERS (Hazardous Waste, Hazardous Materials, Biochemical and Mold Remediation, HVAC, Duct Cleaning, Re-spray | | |

Fireproofing, etc.....$ 25.50 6.81

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LABO0079-001 01/01/2005

| | Rates | Fringes |
|---|---|---|
| Laborers Building Construction | | |
| Mason Tenders..... | $ 28.00 | 16.39 |
| Demolition Laborers | | |
| Tier A..... | $ 28.00 | 14.99 |
| Tier B..... | $ 17.70 | 8.95 |

CLASSIFICATIONS

TIER A: Responsible for the removal of all interior petitions and structural petitions that can consist of sheet rock, block or masonry. Also, all structural slab openings for ducts, mechanical, shafts, elevators, slab openings and exterior walls where the building is not being completely demolitioned.

TIER B: Responsible for shoveling of debris into containers, pushing containers from the inside to the outside of the building.

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LABO0147-001 07/01/2003

| | Rates | Fringes |
|---|---|---|
| Laborers: | | |
| LABORERS..... | $ 28.86 | 30.51 |

FREE AIR TUNNEL WORKERS Tunnel Workers (including Maintenance Men, Inside Muck Lock Tenders, Pump Men, Electricians, Cement Finishers, Caulkers, Hydraulic Men, Shield Men, Monorail Operators, Motor Men, Conveyor Men, Powder Carriers, Pan Men, Riggers, Chuck Tenders, Track Men Painters, Nippers, Brakemen, Cable Men, Hose Men, Grout Men, Gravel Men, Form Workers, Concrete Workers, Tunnel Laborers, Mole Nipper (one (1) Mole Sipper per Working Shaft per Shift for up to and including Two (2) Moles)

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LABO0731-001 07/01/2001

| | Rates | Fringes |
|---|---|---|
| Laborers: | | |
| Building, Heavy and Residential | | |
| UNSKILLED..... | $ 28.74 | 14.64 |
| UTILITY LABORER..... | $ 28.59 | 14.64 |

Paid Holidays: Labor Day and Thanksgiving Day

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LABO1010-001 07/01/2001

| | Rates | Fringes |
|---|---|---|
| Laborers: | | |
| HIGHWAY CONSTRUCTION | | |
| Fence Installer & Repairer. | $ 28.84 | 15.55+a |
| FORMSETTERS..... | $ 32.04 | 15.55+a |
| LABORERS..... | $ 28.94 | 15.55+a |

| | | |
|---|---|---|
| Landscape Planting & Maintenance | $ 28.84 | 15.55+a |
| Maintenance Safety Surface | $ 28.44 | 15.55+a |
| Slurry/Sealcoater/Play Equipment Installer | $ 28.69 | 15.55+a |
| Small Equipment Operator (Not Operating Engineer) | $ 28.94 | 15.55+a |
| Small Power Tools Operator | $ 28.44 | 15.55+a |

FOOTNOTES:

a. PAID HOLIDAYS: Memorial Day, Fourth of July, Labor Day, Columbus Day, Election Day and Thanksgiving Day, provided the employee has worked one (1) day in the calendar week in which the said holiday occurs.

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LABO1018-001 07/01/2001

| | Rates | Fringes |
|---|---|---|
| Laborers: | | |
| Asphalt Rakers | $ 32.36 | 15.55+a |
| Asphalt Tampers | $ 29.92 | 15.55+a |
| Landscape Planting & Maintenance Fence Installer/Maintenance | $ 29.81 | 15.55+a |
| Line Striping Installers | $ 29.56 | 15.55+a |
| Play Equipment/Safety Surface Installer | $ 29.31 | 15.55+a |
| Screedman/Micropaver | $ 32.73 | 15.55+a |
| Shoveler, General Laborers/ All other incidental work | $ 29.81 | 15.55+a |
| Slurry/Sealcoater | $ 29.31 | 15.55+a |
| Small Equipment Operator | $ 29.56 | 15.55+a |

FOOTNOTE:

a. Paid Holidays: Memorial Day, Independence Day, Labor Day, Columbus Day, Election Day, Veterans Day, and Thanksgiving Day

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PAIN0009-001 05/01/2004

| | Rates | Fringes |
|---|---|---|
| Glazier | $ 33.60 | 22.87 |
| Painters: | | |
| Painters, Drywall Finishers, Lead Abatement Worker (Bridge Work) | $ 32.25 | 16.62 |
| Spray, Scaffold and Sandblasting | $ 35.25 | 16.62 |

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PAIN0806-001 10/01/2004

| | Rates | Fringes |
|---|---|---|
| Painters: | | |
| Structural steel and Bridge | $ 42.00 | 25.37 |

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PAIN1974-001 07/07/2005

| | Rates | Fringes |
|---|---|---|
| Painters: | | |
| Drywall Tapers/Pointers..... | $ 35.32 | 16.42 |

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PLAS0260-001 07/01/1999

BRONX, NEW YORK AND RICHMOND COUNTIES:

| | Rates | Fringes |
|---|---|---|
| Plasterer..... | $ 27.91 | 15.55 |

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PLAS0260-002 07/01/1999

KINGS AND QUEENS COUNTIES

| | Rates | Fringes |
|---|---|---|
| Plasterer..... | $ 27.91 | 15.16 |

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PLAS0530-001 02/04/2004

| | Rates | Fringes |
|---|---|---|
| Plasterer | | |
| DRYWALL PLASTERERS..... | $ 31.00 | 15.55 |

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PLAS0780-001 07/01/2004

| | Rates | Fringes |
|---|---|---|
| Cement Mason..... | $ 40.00 | 21.10 |

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PLUM0001-001 01/01/2005

| | Rates | Fringes |
|---|---|---|
| Plumber | | |
| JOBBING AND ALTERATIONS | | |
| Any repair and/or replacement of the present plumbing system that does not change the existing roughing..... | $ 20.97 | 7.43 |
| PLUMBERS:..... | $ 42.41 | 27.95 |

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* PLUM0638-001 12/29/2004

| | Rates | Fringes |
|---|---|---|
| Plumber | | |
| SERVICE FITTERS..... | $ 26.30 | 2.55 |
| SPRINKLER FITTERS, STEAMFITTERS..... | $ 41.82 | 31.07 |

Service Fitter work shall consist of all repair, service and maintenance work on domestic, commercial and industrial refrigeration, air conditioning and air cooling, stoker and oil burner apparatus and heating apparatus etc., including but not exclusively the charging, evacuation, leak testing and assembling for all machines for domestic, commercial and industrial refrigeration, air conditioning and heating

apparatus. Also, work shall include adjusting, including capacity adjustments, checking and repairing or replacement of all controls and start up of all machines and repairing all defects that may develop on any system for domestic, commercial and industrial refrigeration and all air conditioning, air cooling, stoker and oil burner apparatus and heating apparatus regardless of size or type.

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* ROOF0008-003 07/01/2004

| | Rates | Fringes |
|---|---|---|
| Roofer (including Built Up, Composition and Single Ply).... | $ 32.08 | 21.28 |

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SHEE0028-002 02/03/2005

| | Rates | Fringes |
|---|---|---|
| Sheet metal worker..... | $ 39.99 | 30.26 |

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TEAM0282-001 07/01/2005

| | Rates | Fringes |
|---|---|---|
| Truck drivers: | | |
| TRUCK DRIVERS: | | |
| Asphalt..... | $ 31.24 | 23.6025+a+b |
| Euclids & Turnapulls..... | $ 31.80 | 23.6025+a+b |
| High Rise..... | $ 32.31 | 23.6525+a+b |

FOOTNOTES:

PAID HOLIDAYS: New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Election Day, Veterans' Day (Armistice Day), Thanksgiving Day and Christmas Day. Employees working two (2) days in the calendar week in which a holiday falls are to be paid for such holiday, provided that they shape each remaining workday during such calendar week.

b. VACATION: For each 15 days worked within the contract year an employee will receive one day's vacation with pay with a maximum vacation of 3 weeks per year.

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TEAM0813-001 12/01/1998

| | Rates | Fringes |
|---|---|---|
| Truck drivers: | | |
| GROUP 1..... | $ 19.49 | 3.61+a |
| GROUP 2..... | $ 19.76 | 3.61+a |
| GROUP 3..... | $ 19.90 | 3.61+a |
| GROUP 4..... | $ 20.23 | 3.61+a |
| GROUP 5..... | $ 20.40 | 3.61+a |
| GROUP 6..... | $ 21.29 | 3.61+a |
| GROUP 7..... | $ 22.40 | 3.61+a |
| GROUP 8..... | $ 19.90 | 3.61+a |

FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr.'s Birthday, Presidents' Day, Memorial Day, Independence Day,

Labor Day, Columbus Day, Thanksgiving Day, Christmas Day, Employee's Birthday, Two (2) Personal Days, and any holiday or day of mourning proclaimed as such by the State or Federal Government.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Closed body trucks with self contained loading unit up to and including 22 yard capacity

GROUP 2: Open trucks, rack body or trucks with no self contained mechanical loading device, up to 22 yard capacity. One-container tractor hoist

GROUP 3: 10 wheel, open trucks, container loaders, dino-master, over-cab loaders, rack body trucks, or any trucks 22 yards to and including 25 yards capacity

GROUP 4: Rubbish and garbage trucks, 26 yards to and including 31 yards

GROUP 5: Single axle working non-compactor containers up to 15 yards capacity on rubbish and garbage removal

GROUP 6: Roll-off trucks up to and including 42 yard capacity

GROUP 7: Roll-off truck with more than 42 yard capacity or any tractor trailer trucks

GROUP 8: One-container tractor hoist on construction and alteration debris removal

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

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

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In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

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WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION

THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY

ANALYSIS OF BID

PROJECT Staten Island Bridges Light Pole and Light Pole Support Repairs DATE

THIS IS NOT PART OF THE CONTRACT

SHEET NO. 1 OF 1

(Additional Items of Materials or Work May Be Listed)

CONTRACTOR _____ CONTRACT NO AK-179

| UNIT NO. | DESCRIPTION (1) | QUANTITY | UNIT (2) | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 1 | Reproducibles of As-Built Shop Drawings | 1 | LS | | |
| 2 | General Conditions | 1 | LS | | |
| 3 | 25' Light Pole (Installed-incl. pole, arm, fixture, wiring, conduit) | | EA | | |
| 4 | 29' Light Pole (Installed-incl. pole, arm, fixture, wiring, conduit) | | EA | | |
| 5 | 35' Light Pole (Installed-incl. pole, arm, fixture, wiring, conduit) | | EA | | |
| 6 | 40' Light Pole (Installed-incl. pole, arm, fixture, wiring, conduit) | | EA | | |
| 7 | Duct Bank | | LF | | |
| 8 | Light Pole Foundations | | EA | | |
| 9 | Concrete Barrier Modifications | 1 | LS | | |
| 10 | Steel Light Pole Support Brackets | 1 | LS | | |
| 11 | Maintenance of Traffic | 1 | LS | | |
| 12 | All Remaining Work | 1 | LS | | |
| | | | | | $ |

1) Separate and list all items or operations of work included in your estimate in accordance with Specifications. When listing subcontracts, the prime Contractor will have each subcontractor complete an analysis of bid form.
2) Unit of measure, i.e., Sq. Ft., Cu. Yds., BBLS , PCS, Ea., etc.
3) Include all charges, such as moving on site, removal, rental, etc.
4) In case of conflict between information hereon (whether supplied by the Authority or the bidder) and the terms or prices contained or inserted in the Contract Booklet or Contract Drawings, said Booklet and Drawings shall control.
5) The Bid Analysis is not part of the Contract. No information hereon (whether supplied by the Authority or the bidder) and no information deduced from information hereon, including quantities of materials or work, shall be deemed to vary, alter or modify any provision of the Contract, including provisions therein as to compensation and performance. The unit prices contained hereon serve the sole purpose of informing the Port Authority as to components of the bidder's price quoted in the Contract. The items of materials or work contained hereon shall not be deemed to be an exhaustive list of the items of materials or work required by the Contract Drawings and Specifications in their present form.

J. G. SALAS & SONS INC
CONTRACTS ON HAND
AS OF Jul-06

| OWNER | DESCRIPTION | CONTRACT # | CONTRACT AMOUNT | % COMP | TO BE COMP. | OUR REF. |
|---|---|---|---|---|---|---|
| PANYNJ | PUMP HOUSE ALARMS | LGA 695 | 823,700.00 | 99% | 8,237.00 | 03-704 |
| PANYNJ | REPLACE GENERATOR | PAT624.223 | 1,443,700.00 | 75% | 367,244.00 | 04-704 |
| PANYNJ | SECURITY SYSTEM | MF 100.506 | 1,877,300.00 | 9% | 1,701,015.00 | 06-301 |
| PANYNJ | HYD.SWITCH.UPGRADE | LGA 674 | 1,823,700.00 | 99% | 16,750.00 | 02-1008 |
| PANYNJ | EMERG.GENERATOR | | | | | |
| | LOAD BANK | PAT 634.048 | $ 477,300.00 | 99% | 4,773.00 | 05-908 |
| PANYNJ | REPLACE PANELBOARDS | GWB 503A | $ 297,300.00 | 0 | 297,300.00 | 05-1212 |
| **TOTALS** | | | **6,743,000.00** | | **2,395,319.00** | |

PANYNJ=PORT AUTHORITY OF NY & NJ

PROCUREMENT
2006 AUG 30 PM 3:00