

Specifications for:

***CAVEN POINT - SOCCER
FIELD NEW ARTIFICIAL
TURF AND LIGHTING***

PROJECT NO. 2014-025

CITY OF JERSEY CITY

DEPARTMENT OF
ADMINISTRATION
DIVISION OF
ARCHITECTURE,
ENGINEERING, TRAFFIC AND
TRANSPORTATION

13 - 15 LINDEN AVENUE EAST, FIRST FLOOR
JERSEY CITY, NEW JERSEY 07305



SPECIFICATIONS FOR THE LABOR AND MATERIALS REQUIRED FOR

PROJECT: CAVEN POINT - SOCCER FIELD NEW ARTIFICIAL TURF AND LIGHTING

LOCATION: CAVEN POINT ROAD AND CHAPEL AVENUE
JERSEY CITY, NEW JERSEY 07305

OWNER: CITY OF JERSEY CITY
280 GROVE STREET
JERSEY CITY, N.J. 07302

HONORABLE STEVEN M. FULOP, MAYOR
ROBERT KAKOLESKI, BUSINESS ADMINISTRATOR
PETER FOLGADO, PURCHASING AGENT, RPPO, QPA

PROJECT ARCHITECTS DIVISION OF ARCHITECTURE, ENGINEERING, TRAFFIC AND TRANSPORTATION
13 - 15 LINDEN AVENUE EAST, FIRST FLOOR
JERSEY CITY, NEW JERSEY 07305
(201) 547-5900

CONSULTING ENGINEERS: ASSOCIATED TECHNOLOGY, INC.
MECHANICAL & ELECTRICAL CONSULTING ENGINEERS
24 COMMERCE STREET, SUITE 1200
NEWARK, NEW JERSEY 07102
(973) 286-2860

DATE: JULY, 2015

PROJECT NUMBER: 2014-025

**SPECIFICATIONS FOR
CAVEN POINT - SOCCER FIELD NEW ARTIFICIAL TURF AND LIGHTING
JERSEY CITY, NEW JERSEY**

PROJECT NO. 2014-025

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**CAVEN POINT - SOCCER FIELD NEW ARTIFICIAL
TURF AND LIGHTING**

JULY/2015

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ABBREVIATIONS

Abbreviations of names of Associations, Institutes or Agencies used throughout the Contract Documents are as follows:

AASHTO or AASHO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association, Incorporated
AISC	American Institute of Steel Construction, Incorporated
ANSI or ASA	American National Standards Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BOG&T	Bureau of Geology and Topography, State of New Jersey
CIPRA	Cast Iron Pipe Research Association
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
EIAJ	Electronic Industries Association of Japan
FED. SPEC.	Federal Specification
IEEE	Institute of Electrical and Electronics Engineer (Successor to AIEE and IRE)
NEMA	National Electrical Manufacturer's Association
NJDOT	New Jersey Department of Transportation
NJSS or SS	New Jersey State Highway Department, Standard Specifications for Road & Bridges Construction, 1983, as currently amended. Also called Standard Specifications
OSHA	Occupational Safety and Health Administration
UL	Underwriter's Laboratory

NOTICE TO BIDDERS

Sealed bid proposals will be received, opened and read in public by the Purchasing Agent at **394 Central Avenue, Second Floor, Jersey City, New Jersey 07307** on _____ 2015, at 11:00 A.M.

Prevailing time, or as soon thereafter as the matter can be reached, for the:

**CAVEN POINT - SOCCER FIELD NEW ARTIFICIAL
TURF AND LIGHTING
JERSEY CITY, NEW JERSEY**

Bidders are required to comply with the requirements of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27. Full requirements of the Equal Employment Opportunity and Affirmative Action Programs are incorporated herein by reference and may be obtained with Proposal Form. Bidders are also required to comply with the requirements of P.L. 2004, c.57 (N.J.S.A. 52:32-44) which includes the requirement that contractors provide copies of their Business Registration Certificates issued by the New Jersey Department of the Treasury, as well as other provisions as listed in the Contract Documents.

Proposals **MUST BE ACCOMPANIED** by a Bid Bond or Certified Check, made payable to the City of Jersey City, in an amount equal to Ten (10%) Percent of the Bid.

Each Bidder shall submit with his proposal submittal item nos. one (1) through fifteen (15) listed in the Schedule of Submittals by Bidder on page 51 of the General Conditions.

Bids may be submitted in person, or may be sent by U.S. certified mail return receipt requested, or may be sent by private courier service. Mail bids to: Peter Folgado, Purchasing Agent, RPPO, QPA, Division of Purchasing, 394 Central Avenue, Second Floor, Jersey City, New Jersey 07307. Bids sent by mail must be received by the Purchasing Agent no later than 4:00 P.M. on the last City business day before the day of the bid reception. Bids sent by courier service must be delivered to the Purchasing Agent no later than 11:00 A.M. on the day of the bid reception. The City shall not be responsible for the loss, non-delivery or physical condition of bids sent by mail or courier service. Bids must be submitted individually in a sealed envelope addressed to the Purchasing Agent. Bid proposals must comply with specifications.

The Purchasing Agent reserves the right to reject any and all bids received, or portions thereof, if deemed to be in the best interest of the City to do so.

INFORMATION TO BIDDERS

1. INTENT OF CONTRACT DOCUMENTS:

Under these specifications and the contract which will be based thereon, it is proposed that the bidder shall furnish all materials, equipment, tools, labor and supervision necessary to complete the work upon which he bids in strict accordance with the plans and specifications.

The intent of the Contract Documents is to obtain a complete job, satisfactory to the Architect. It shall be understood that the bidder has satisfied himself as to the full requirements of the Contract Documents and has based his Proposal upon such understanding.

2. FAMILIARITY WITH WORK:

It is the obligation of the Bidder to ascertain for himself all the facts concerning conditions to be found at the location(s) of the Project including all physical characteristics above, and or below the surface of the ground; to fully examine the Plans, Proposal, Estimate of Quantities, to read the Specifications thoroughly and completely, to consider fully these and all other matters which can in any way affect the work under the Contract and to make the necessary investigations relating thereto, and he agrees to this obligation in the signing of the Contract. The City assumes no responsibility whatsoever with respect to ascertaining for the Contractor such facts concerning physical characteristics at the site(s) of the Project. The Contractor agrees that he will make no claim for additional payment or extension of time for completion of the work or any other concession because of any misinterpretation or misunderstanding of the Contract, on his part, or of any failure to fully acquaint himself with all conditions relating to the work.

3. PLANS AND SPECIFICATIONS:

The project shall be performed in strict accordance with the requirements of the Plans and Specifications, subject to addenda issued by the City in writing. The Plans and Specifications are intended to complement and supplement each other. Any work required by either of them and not by the other shall be performed as if denoted both ways. Should any work be required which is not denoted in the Specifications or on the Plans because of an obvious omission but which is nevertheless necessary for the proper performance of the Project, such work shall be performed as fully as if it were described and delineated.

4. INTERPRETATIONS OR ADDENDA:

Should a Bidder find discrepancies or omissions from the Plans, Specifications, or Contract Documents, or should he be in doubt as to their meaning, he should at once notify Brian F. Weller, Division Director in writing at 13 - 15 Linden Avenue East, Jersey City, New Jersey 07305. No oral interpretation will be made to any Bidder as to the meaning of the Contract Documents or any part thereof. Every request for such interpretation shall be in writing and to be given consideration, must be received at least ten (10) calendar days prior to the date fixed for the opening of bids, to allow the City to issue an addendum prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions or addition of items will be in the form of written addenda to the specifications which, if issued, will be mailed by registered mail with return receipt requested to all prospective bidders (at the respective addresses furnished for such purpose). All

INFORMATION TO BIDDERS

addendum so issued shall become part of the Contract Documents and shall be read immediately prior to the opening of the bids by the Purchasing Agent who shall give each bidder or his representative present an opportunity to withdraw his bid before any bids are opened. Any objection arising out of the addendum subsequent to the opening of bids will not be considered. Failure of any bidder to receive any such addendum or interpretation or to attend the reading of the bids shall not relieve such bidder from any obligation under his bid as submitted, including such addendum. The City will not be responsible for any other explanations or interpretations of the proposed documents.

5. SUBSURFACE CONDITIONS:

It is the obligation of the Bidder to make his own investigations of subsurface conditions prior to submitting the Proposal. Borings, test excavations and other subsurface investigations, if any, made by the City prior to the Construction of the Project, the records of which may be available to the bidders, are made for use only as a guide for design. Said borings, test excavations and other subsurface investigations are not warranted to show the actual subsurface conditions.

Any interpretations of the City's subsurface investigation records made by the bidder as to the types, characteristics, quantity and quality of any subsurface material or condition shall be at the sole risk of the bidder.

The Contractor agrees that he will make no claims against the City, if in carrying out the Project he finds that the actual conditions encountered do not conform to those indicated by said borings, test excavations and other subsurface investigations.

6. SUBMITTING PROPOSAL:

Each Bid must be submitted on the prescribed Proposal Form which shall not be removed from the Specifications. All entries must be in ink or typewritten. Bidders shall submit their Proposals in sealed envelopes. On the outside of the envelope shall be stated the name and address of the bidder and the name of the work as shown in the Notice to Bidders.

When the Proposal is made by an individual his Post Office Address shall be stated and he shall sign the Proposal: when made by a firm or partnership its name and Post Office Address shall be stated, and the Proposal shall be signed by one or more of the partners: when made by a corporation, its name and principal Post Office Address shall be stated and the Proposal shall be signed by an authorized official of the Corporation, with Corporate Seal affixed. Signatures shall be notarized in all cases. Proposals shall be delivered in person to the City Purchasing Agent at the time and place stated in the Notice to Bidders, and they will be publicly opened and read aloud on the date, place, and at the time set and stated in the Notice to Bidders.

Bids may be submitted in person, or may be sent by U.S. certified mail return receipt requested, or may be sent by private courier service. Mail bids to: Peter Folgado, Purchasing Agent, RPPO, QPA, 394 Central Avenue, Second Floor, Jersey City, New Jersey 07307. Bids sent by mail must be received by the Purchasing Agent no later than 4:00 P.M. on the last City business day before the day of the bid reception. Bids sent by courier service must be delivered to the Purchasing Agent no later than 11:00 A.M. on the day of the bid reception. The City shall not be responsible for the loss, non-delivery or physical condition of bids sent by mail or courier service. Bids must be submitted individually in a sealed envelope addressed to the Purchasing Agent. Bid proposals must comply with specifications.

INFORMATION TO BIDDERS

7. BID DOCUMENTS:

The Bid Documents to be included in the sealed envelope with the Proposal shall include but not be limited to the following:

- * 1. Proposal
- * 2. Certificate of Experience of General Contractor
- 3. Certificate of Experience of Subcontractors listed on Page P-11, pursuant to N.J.S.A. 40A: 11-16
- * 4. Plant and Equipment Questionnaire of General Contractor
- 5. Plant and Equipment Questionnaire of Subcontractors listed on Page P-11, pursuant to N.J.S.A. 40A: 11-16
- 6. Non-Collusion Affidavit
- * 7. Corporation or Partnership Statement
- * 8. Bid Guarantee
- * 9. Consent of Surety
- 10. New Jersey Business Registration Certificates of General Contractor and all Subcontractors listed on Page P-11, pursuant to N.J.S.A. 40A:11-16
- 11. Equality Information on Substituted Items (if applicable)
- * 12. Written acknowledgment of Addendum (if issued), pursuant to N.J.S.A. 40A:11-23.2(e)
- 13. Public Works Contractor Registration Certificates for bidder and all subcontractors named in bid proposal are required pursuant to N.J.S.A. 34:11-56.48 et seq.
- 14. Exhibit B: Mandatory Equal Employment Opportunity Language
- 15. Form MWB-3; Minority/Women Business Compliance Plan

Failure to include the bid documents listed immediately above that are marked with an asterisk (*) shall result in automatic rejection of the bid at the time of the bid reception.

The contractor/bidder and all subcontractors named in the bid proposal must be registered with the Department of Labor pursuant to the Public Works Contractor Registration Act, N.J.S.A. 34:11-56.48 et seq., at the time the bid proposal is received, or the proposal will be determined to be non-responsive and will be rejected. Any non-listed subcontractor must be registered with the Department of Labor prior to physically starting work. A contractor desiring to register should contact the Contractor Registration Unit, Division of Wage and Hour Compliance, New Jersey Department of Labor, P.O. Box 389, Trenton, New Jersey 08625-0389, telephone no: (609) 292-9464, fax no: (609) 633-8591, e-mail: contreg@dol.state.nj.us, website: www.nj.gov/labor/lsse/lspubcon.html.

INFORMATION TO BIDDERS

8. BID GUARANTEE:

Each proposal shall be accompanied by a Certified Check, Cashier's Check or Bid Bond in the amount of not less than 10% of the total amount bid in the Proposal, but in no case need the Certified Check, Cashier's Check or Bid Bond or any combination thereof exceed \$20,000.00. No cash will be accepted. This Certified Check, Cashier's Check or Bid Bond is offered as evidence of good faith and as a guarantee that, if awarded the contract, the Bidder shall execute the Contract and Performance Bond in the full amount of the Contract.

The bidder's bond is offered as a guarantee, made by a surety company qualified and authorized to do business in the State of New Jersey and must be signed by an officer or agent of the surety company authorized to execute bid bonds on behalf of the surety company. Included with the bid bond must be such documents which indicate that the offer or agent is authorized to execute the bid bond. If a certified check is offered as a guarantee, it shall be made payable to the City of Jersey City.

9. CONSENT OF SURETY:

All bidders shall submit with their bids a certificate from an approved surety company, authorized to do business in the State of New Jersey, stating that it will provide the contractor with a performance bond on such sum as required. The successful bidder will be required to furnish a surety corporation bond in the amount of the contract conditioned for the faithful performance thereof.

10. WITHDRAWAL OF PROPOSAL:

A Proposal, after having been submitted, may be withdrawn by the Bidder on a given Project prior to the opening of any bid on that Project.

N.J.S.A. 40A:11-23.3 authorizes a bidder to request withdrawal of a public bid due to a mistake on the part of the bidder. A mistake is defined by N.J.S.A. 40A:11-2(42) as a clerical error that is an **unintentional and substantial computational error or an unintentional omission of a substantial quantity of labor, material, or both, from the final bid computation.**

A bidder claiming a mistake under N.J.S.A. 40A:11-23.3 must submit a request for withdrawal, **in writing**, by certified or registered mail to: Peter Folgado, Purchasing Agent, RPPO, QPA, 394 Central Avenue, Second Floor, Jersey City, New Jersey 07307. The bidder must request withdrawal of a bid due to a mistake, as defined by law, within five business days after the receipt and opening of the bids. Since the bid withdrawal request shall be effective as of the postmark of the certified or registered mailing, Peter Folgado, Director, Division of Purchasing may contact all bidders, after bids are opened, to ascertain if any bidders wish to, or already have exercised a request to withdraw their bid pursuant to N.J.S.A. 40A:11-23.3.

A bidder's request to withdraw the bid **shall** contain evidence, including any pertinent documents, demonstrating that a mistake was made. Such documents and relevant written information shall be reviewed and evaluated by the public owner's designated staff pursuant to the statutory criteria of N.J.S.A. 40A:11-23.3.

The City will not consider any written request for a bid withdrawal for a mistake, as defined by N.J.S.A. 40A:11-2(42), by the bidder in the preparation of a bid proposal unless the postmark of the certified or registered mailing is within the five business days following the opening of bids.

INFORMATION TO BIDDERS

11. CAUSES FOR REJECTION:

Proposals from bidders who are found to be unqualified and Proposals not accompanied by all required and properly completed bid documents may be rejected.

In addition, causes for rejection of Proposals may include but not be limited to the following:

- A. if prices are obviously unbalanced,
- B. if received from Bidders who have previously performed work in an unsatisfactory manner,
- C. if the Purchasing Agent, at his/her sole discretion, deems it advisable to do so in the best interest of the City of Jersey City,
- D. if conditions, limitations or provisions are attached by a Bidder to his Proposal, if Proposals are otherwise irregular or if the enclosed or accompanying documents are not completed and properly executed,
- E. if the bidder has not constructed at least three (3) comparable projects within the previous three (3) years,
- F. if the bidder does not own sufficient or satisfactory equipment to perform the work.

12. RETURN OF BID GUARANTEES:

The Bid Guarantees of all except the apparent three (3) lowest responsible bidders on the project will be returned within ten (10) working days after the opening of bids. The bids of such bidders will be considered as officially withdrawn. Within three (3) working days after awarding the contract, and the approval of the contractor's Performance Bond, the bid guarantees of the remaining unsuccessful bidders will be returned.

Upon execution of the contract by the successful bidder and acceptance by the City of the Performance Bond, and the receipt of the certificate of insurance, the bid guarantee of the lowest bidder will be returned.

No interest will be paid on any form of bid guarantee.

13. AWARD OF CONTRACT:

The Contract, if awarded, will be awarded to the lowest responsible, qualified bidder whose Proposal complies with the requirements as stated herein. Proposals may be rejected where the prices as bid are obviously unreasonable. Award of the contract will be announced by the Municipal Council of the City of Jersey City. If the Total Price is found to have been incorrectly computed, change will be made in any and all unit prices so as to attain conformity with the Total Price before the award is made.

BID FOR UNIT PRICES CONTRACT:

The Bidder shall state on the Proposal Form the price per unit of measure for each scheduled item of work for which he will agree to carry out the work, and the total price for the performance of the Project, as determined by multiplying each estimated quantity by the price per unit of measure bid and adding together the resulting amounts. Unit prices shall be given in writing and in figures and in the case of variance the prices in writing shall prevail.

INFORMATION TO BIDDERS

BID FOR LUMP SUM CONTRACT:

Lump Sum Bid, Base Bid prices and Alternates shall be in figures and words. In case of discrepancy the amount described in words shall govern. If any of the alternates listed in the Proposal Form does not involve change in price, the Bidder shall so indicate by writing the words "no change" on the space provided.

If the Base Bid is within the amount of funds available to finance the construction contract and the City wishes to accept alternate bids, then contract award will be made to that responsible bidder submitting the low combined bid, consisting of the base bid plus alternate bids. Under this procedure, if the City wishes to make award on only the base bid, then contract award will be made to that responsible bidder submitting the low base bid.

For the purpose of comparison of bids received, the total price stated in the Proposal will be considered to be the amount bid for the Project and award will be made on that Total Price. The Purchasing Agent may consider informal any Bids not prepared and made in accordance with the provisions stated herein and may waive or reject any or all bids. Bids containing any conditions, omissions, unexplained erasure or alterations, or items not called for in the proposal, or irregularities of any kind may be rejected by the City.

The Purchasing Agent will either award the Contract or reject all Proposals received within sixty (60) days after the formal opening of Proposals. The acceptance of a Proposal will be a notice in writing signed by the Purchasing Agent and no other act shall constitute the acceptance of a Proposal.

14. TIME FOR EXECUTING CONTRACT & LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT:

Any bidder whose Proposal is accepted will be required to execute four (4) copies of the Contract and furnish satisfactory bond, and insurance certificate to the City of Jersey City within ten (10) days after notice of acceptance.

The successful bidder, upon his failure or refusal to execute and deliver the signed contract, bonds and certificate of insurance required within ten (10) days after receipt of contracts shall forfeit the certified check, cashier's check or bid bond to the City as liquidated damages for such failure or refusal.

The damages to the City of Jersey City for breach as above provided will include loss from interference with its construction program and other items whose accurate amount will be difficult or impossible to compute. The amount of the Bid Guarantee accompanying the proposal of such Bidder shall be retained by the City of Jersey City, not as a penalty, but as liquidated damages for such breach. In the event any bidder whose proposal has been accepted shall fail, refuse or resist to execute the contract as hereinbefore provided, the Municipal Council of the City of Jersey City may, as their option, determine that such Bidder has abandoned the Contract and thereupon his proposal and the acceptance thereof shall be null and void, and the City shall be entitled to liquidated damages as above provided.

The rights and obligations provided for in the Contract shall become effective and binding upon the parties only with its formal execution by the City of Jersey City. Any work started or materials delivered prior to said execution of contract shall be at the Contractor's risk.

INFORMATION TO BIDDERS

15. PERFORMANCE BOND:

Within ten (10) days of the date of award of the Contract, the Bidder to whom the Contract has been awarded shall furnish and deliver Surety Corporation Bond, conditioned for the faithful performance and completion of the work, and for the payment of all lawful claims and bills against the contractor for all labor, material, tools and equipment used in or in connection therewith. The Bond shall not be returned or canceled until all liability to any and all persons protected by the conditions of said Bond shall have been met by the Contractor or person primarily liable for the payment thereof, or by the Surety on said Bond.

The Bond required for the faithful performance of the Contract shall be in such sum equal to one hundred percent (100%) of the total amount of the contract, shall be satisfactory to the Corporation Counsel of the City of Jersey City shall be executed by a Surety Company licensed to do business in the State of New Jersey, and shall comply with N.J.S.A. 2A: 44-143 to 147 and amendments thereof and supplements thereto. In no case shall the contractor begin work prior to approval of said bond by the City.

16. CERTIFICATE OF INSURANCE:

The contractor shall also supply to the City, at the time the Contract is signed, Certificate of Insurance in such amounts as described elsewhere in these specifications, which will be maintained by the contractor during the life of the contract. The City of Jersey City shall be named as co-insured on Certificate/Policy.

17. ESTIMATES QUANTITIES AND UNIT PRICES:

The Unit Price bid in each of the items included in the Proposal shall cover all costs of whatever nature, incidental to the work. In explanation but not in limitation thereof, these costs shall include the cost of all work, labor, material, equipment, transportation and all else necessary to perform and complete the Project in the manner and within the time required, and all incidental expenses in connection therewith, all costs on account of loss by damage or destruction encountered for settlement of damages, and for replacement of defective work and materials.

The Estimate of Quantities specified covering all work to be done and materials to be furnished is approximate only and is given solely to be used as a uniform basis for comparison of bids. The Architect reserves the right to increase or diminish any or all quantities, or to omit any, if it is deemed necessary to do so.

If any part is so withdrawn by the City, the contractor shall have no claim for loss incurred by him for commitments made by him in anticipation of the work contemplated, or for loss of anticipated profits, or for work done prior to his having been authorized to proceed therewith.

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18. LUMP SUM PRICE:

The Lump Sum Price in the Proposal shall cover all costs of whatever nature, incident to and growing out of the work. In explanation but not in limitation thereof, these costs shall include the cost of all work, labor, material, equipment, transportation, and all else necessary to perform and complete the Project in the manner and within the time required, and all incidental expenses for unforeseen difficulties encountered for settlement of damages, and for replacement of defective work and materials.

19. CHANGES - EXTRA WORK FOR UNIT PRICE CONTRACT:

The City may at any time desire changes in either the quantity or the quality of Work or materials to be performed or furnished. These changes may be such as to either reduce or to increase quantities specified or may call for Extra Work or materials not contemplated in the original Schedule of Prices in the Proposal.

The City may make changes in the Work required to be performed by the Contractor under the Contract by making additions thereto, or by omitting Work therefrom, without invalidating the Contract, and without relieving or releasing the Contractor from any of his obligations under the Contract or any Bonds given by him pursuant to the Contract provisions, and without relieving or releasing the Surety or Sureties of said Bonds. All such changes in the Work will be authorized by written Change Order, the Total Contract Price and the Contract Time being adjusted accordingly; and shall be executed under the terms of the original Contract unless it is expressly provided otherwise. The Change Orders shall be limited to the following types:

- A. Emergency occurrence affecting health, safety or welfare.
- B. Unforeseeable problems.
- C. Minor modifications to effect economics, improve service or resolve minor problems with affected property owners.

When the Extra Work to be performed is of a kind not embraced in the Proposal or being so embraced is to be done at a lesser or greater price or quantity than originally agreed upon, the Contractor shall be furnished a written Change Order signed by the City and approved by the City Council. Said Change Order shall state the Extra Work to be done, the amount to be paid therefor, and the number of additional days, if any, that will be added to the time specified for the completion of the entire Project covered by this Contract.

The price stated in this written Change Order representing the sum to be added to or deducted from the Total Contract Price shall be determined as follows:

- (1) By such applicable Unit Prices, if any, as are set forth in the Contract; or
- (2) If no such Unit Prices are set forth, then by a Lump Sum mutually agreed upon by the City and the Contractor; or
- (3) If no such Unit Prices are so set forth and if the parties cannot agree upon a Lump Sum then by the actual net cost in money to the Contractor of:
 - a. The wages of applied labor, including foreman, required for such Extra Work. Labor rates shall be as per current New Jersey Department of Labor Prevailing Wage Rates plus thirty-four (34%) percent of the Prevailing Wage Rate for other direct cost of labor to the Contractor, which includes taxes (eg. FICA, FUTA,

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SUTA, SDI, etc.), insurance premiums (Workmen's Compensation Insurance, General Liability, etc.), bond premiums (Performance and Payment Bonds, etc.), plus benefits listed in the Prevailing Wage Rates;

- b. Plus the materials entering permanently into such Extra Work;
- c. Plus such rental for plant and equipment (other than small tools) required and approved for such Extra Work. The Contractor's hourly equipment rates shall be as per the monthly rates divided by 176 in the current "Blue Book" published by Nielsen/DATAQUEST. The weekly, hourly and daily rates will not be used.
- d. Plus power and consumable supplies for the operation of power equipment required for such Extra Work;
- e. Plus fifteen (15%) percent of a, b, c and d above as compensation for all other items and profits, and costs or expenses including administration, overhead, superintendence, materials used in temporary structures, allowances made by the Contractor to the Subcontractors, the use of small tools and any other general expenses. The Contractor's compensation for overhead and profit shall be limited to five (5%) percent on Work performed by a Subcontractor. All time and material quantities shall be verified by the City on a daily basis.

When Extra Work is performed under Method 3, the Contractor shall furnish satisfactory bills, certified payrolls and vouchers covering all items of cost, and when required, shall give the City access to accounts relating thereto.

The provisions hereof shall not affect the power of the Contractor to act in case of emergency, as hereinafter provided. Under no circumstances shall the Contractor perform Work in excess of the quantities delineated in the Proposal without a written Change Order issued by the City. The City shall not be liable for any claims for Work performed outside the Contract unless so authorized by a written Change Order.

It is understood and agreed to by the Bidder that any delays necessary to institute a Change Order, resolved by the City Council, shall not be a basis for claims for additional compensation. Wherever possible the Contractor shall mobilize his forces to construct another portion of the Project while awaiting said written Change Order.

20. CHANGES - EXTRA WORK FOR LUMP SUM CONTRACT:

The City, through the City, may at any time desire changes in either the quantity or the quality of Work or materials to be performed or furnished. These changes may be such as to either reduce or to increase quantities specified or may call for Extra Work or materials not contemplated in the original Schedule of Prices in the Proposal.

The City, through the City, may make changes in the Work required to be performed by the Contractor under the Contract by making additions thereto, or by omitting Work therefrom, without invalidating the Contract, and without relieving or releasing the Contractor from any of his obligations under the Contract or any Bonds given by him pursuant to the Contract provisions, and without relieving or releasing the Surety or Sureties of said Bonds. All such changes in the Work will be authorized by written Change Order, the Total Contract Price and the Contract Time being adjusted accordingly; and shall be executed under the terms of the original Contract unless it is expressly provided otherwise. The Change Orders shall be limited to the following types:

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- A. Emergency occurrence affecting health, safety or welfare.
- B. Unforeseeable problems.
- C. Minor modifications to effect economics, improve service or resolve minor problems with affected property owners.

When the Extra Work to be performed is of a kind not embraced in the Proposal or being so embraced is to be done at a lesser or greater price or quantity than originally agreed upon, the Contractor shall be furnished a written Change Order signed by the City and approved by the City Council. Said Change Order shall state the Extra Work to be done, the amount to be paid therefor, and the number of additional days, if any, that will be added to the time specified for the completion of the entire Project covered by this Contract.

The price stated in this written Change Order representing the sum to be added to or deducted from the Total Contract Price shall be determined as follows:

1. By such applicable Unit Prices, if any, as are set forth in the Contract; or
2. If no such Unit Prices are set forth, then by a Lump Sum mutually agreed upon by the City and the Contractor; or
3. If no such Unit Prices are so set forth and if the parties cannot agree upon a Lump Sum then by the actual net cost in money to the Contractor of:
 - a. The wages of applied labor, including foreman, required for such Extra Work. Labor rates shall be as per current New Jersey Department of Labor Prevailing Wage Rates plus thirty-four (34%) percent of the Prevailing Wage Rate for other direct cost of labor to the Contractor, which includes taxes (eg. FICA, FUTA, SUTA, SDI, etc.), insurance premiums (Workmen's Compensation Insurance, General Liability, etc.), bond premiums (Performance and Payment Bonds, etc.), plus benefits listed in the Prevailing Wage Rates;
 - b. Plus the materials entering permanently into such Extra Work;
 - c. Plus such rental for plant and equipment (other than small tools) required and approved for such Extra Work. The Contractor's hourly equipment rates shall be as per the monthly rates divided by 176 in the current "Blue Book" published by Nielsen/DATAQUEST. The weekly, hourly and daily rates will not be used.
 - d. Plus power and consumable supplies for the operation of power equipment required for such Extra Work;
 - e. Plus fifteen (15%) percent of a, b, c and d above as compensation for all other items and profits, and costs or expenses including administration, overhead, superintendence, materials used in temporary structures, allowances made by the Contractor to the Subcontractors, the use of small tools and any other general expenses. The Contractor's compensation for overhead and profit shall be limited to five (5%) percent on Work performed by a Subcontractor. All time and material quantities shall be verified by the City on a daily basis.

When Extra Work is performed under Method 3, the Contractor shall furnish satisfactory bills, certified payrolls and vouchers covering all items of cost, and when required, shall give the City access to accounts relating thereto.

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The provisions hereof shall not affect the power of the Contractor to act in case of emergency, as hereinafter provided. Under no circumstances shall the Contractor perform Work in excess of the quantities delineated in the Proposal without a written Change Order issued by the City. The City shall not be liable for any claims for Work performed outside the Contract unless so authorized by a written Change Order.

It is understood and agreed to by the Bidder that any delays necessary to institute a Change Order, resolved by the City Council, shall not be a basis for claims for additional compensation. Wherever possible the Contractor shall mobilize his forces to construct another portion of the Project while awaiting said written Change Order.

21. SUBSTITUTIONS:

Each Bidder represents that his Proposal is based upon the materials and equipment described in the bidding documents.

Where materials are specified by a trade name or manufacturer's model or catalog number, the name product shall be construed to read "or equivalent". If a bidder substitutes any material other than those named in the Specifications, such material shall be equivalent in all respects to the named products specified. The burden of submitting adequate information to prove equivalency of substituted materials shall be the responsibility of the Contractor. All information necessary to prove equivalency of substituted materials should be included with the proposal submitted at the bid reception. Proposed substitutions shall satisfy all design conditions including performance and physical properties which will be reviewed prior to approving the substitute; physical dimensions, pattern, colors, weight effect on other trades, availability, cost, performance and test data, guarantee and other properties. Where a Contractor substitutes materials, he shall submit two (2) samples of materials specified and two (2) samples of material considered by contractor to be an equivalent, along with technical information on each. Where a Contractor's information on a product is insufficient to determine "equivalency", laboratory tests will be required. A private laboratory will be selected by the Architect to conduct the test, the cost of which will be paid by the Contractor regardless of the test result. All modifications to existing work or to adjoining work, which are necessary to accommodate any item offered as an equivalent, shall be performed at no additional cost to the City. The Contractor shall substantiate in writing, by economic analysis, that items offered as equivalents will cause no addition in maintenance, fuel, or utility cost over the items shown or specified and have an equal life expectancy.

If after review of all submitted material, the substitution is deemed not an equivalent, the bid will be rejected.

All materials, equipment and assemblies shall be accompanied by manufacturer's instructions pertaining to installation, use and maintenance, as applicable, so as to be suitable for the intended purpose or service in the proposed methods of construction. All materials shall be used in strict accordance with manufacturer's instruction, which will include instructions for appropriate reconditioning of existing or previously applied materials in a manner that will provide conditions to ensure satisfactory completed Work.

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22. INTENT OF PLANS AND SPECIFICATIONS:

It is the intent of these contract documents to detail a complete job and to specify the work to be accomplished. The plans and specifications are complementary and what is called for by one shall be binding as if called for by both.

Interpretation of the drawings and specifications shall be given preference in the following order:

1. Addenda to the specifications and/or drawings, (later dates to take precedence over earlier dates).
2. Specifications
3. Contract drawings (notes on drawings to take precedence over other data on drawings).

In case the Contractor finds the specifications or plans are not sufficiently clear or complete, he shall request the Architect to provide supplementary plans and specifications and the Architect will provide such additional information as may be necessary. Such request shall be made in writing at least two weeks prior to the time such drawings and specifications are to be needed, and no delay caused by the tardiness of the Architect, in supplying such information, shall be considered as neglect or default on his part unless written application shall have been so made.

The Architect shall have the authority to resolve any controversy as to the meaning and intent of these plans and specifications and he shall have the right to correct any errors or omissions therein for the proper completion of the project.

The Contractor shall also keep at least one set of the plans and specifications on the job site(s) at all times.

23. RESPONSIBILITY OF WORK:

The Contractor assumes full responsibility for materials and equipment employed in the construction of the Project and agrees to make no claim against the City of Jersey City for damages to such materials and equipment from any cause whatsoever. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the Project, or to any part thereof, due to any cause whatsoever.

The provisions of the foregoing paragraph shall not be a waiver of the Contractor's guarantee to replace defective work and materials during the maintenance period after date of acceptance.

The Contractor shall make good all work damaged or destroyed before the final acceptance of the Project and the cost thereof shall be included in the prices bid for the various items scheduled in the Proposal.

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24. LAWS, ORDINANCES, REGULATIONS & PERMITS:

The successful bidder must secure all permits, insurance, licenses and pay any inspection in accordance with provisions as set forth in laws, ordinances, and regulations by all governmental agencies affecting the work at his own expense. The successful bidder shall be solely responsible for any damage resulting from his neglect to obey all laws, regulations, rules, and ordinances. Ignorance regarding such requirements shall in no way serve to modify the provisions of the contract.

The Contractor shall keep fully informed of all Federal and State laws, all local laws, ordinances, safety codes, regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. He shall at all times observe and comply with all such laws, ordinances, safety code, regulations, order, or decree, whether by himself or his employees.

The Contractor shall, at his own expense, secure and pay to the appropriate department of the City of Jersey City, the fees or charges for all permits for street pavement, sidewalks, sheds, removal of abandoned water taps, sealing of house connection drains, pavement cuts, buildings, electrical, plumbing, water, gas and sewer permits required by the City of Jersey City and any of its agencies.

The Contractor shall comply with applicable City laws and ordinances governing the disposal of surplus excavation materials, debris and rubbish on or off the Project Area and commit no trespass on any public or private property in any operation due to or connected with the work embraced in this Contract.

25. PROVISIONS REQUIRED BY 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 herein and if, through mistake or otherwise any such provision is not correctly inserted, then upon the application of either party, the contract shall forthwith be physically amended to correct such insertion.

26. INSURANCE:

Certificates of liability and Workmen's Compensation Insurance satisfactory to the City shall be filed with the City at the time the contract is signed. All of the contractor's insurance coverage shall contain a clause indemnifying and saving harmless the City of Jersey City and its other agents from any and all liability of whatever nature arising from the work to be performed under the contract, including attorney's fees and costs in connection with the defense of such claims. The certificate of insurance furnished by the contractor shall spell out specifically that the above indemnification is guaranteed by the policy.

The Contractor shall not commence work under the Contract or under any special condition until he has obtained all insurance as required under the following sub-paragraphs, and until such insurances have been approved by the City, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurances required of the subcontractor have been obtained and approved.

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The Contractor shall take out and maintain, during the life of this Contract, Workmen's Compensation Insurance for all its employees at the site of the project and, in case any work is sublet, the Contractor shall require the Subcontractor similarly to provide Workmen's Compensation Insurance for all the latter's employees unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in hazardous work under this Contract at the site of the Project is not protected under Workmen's Compensation Statutes, the Contractor shall provide, and shall cause each Subcontractor to provide Compensation Insurance with a private company in an amount equivalent to that provided by the Workmen's Compensation Statutes for the protection of his employees not otherwise protected.

The Contractor shall obtain and keep in force during the term of the Contract, General Liability and Property Damage Insurance in companies and in form to be approved by the City. Said insurance shall provide coverage to the Contractor, any Subcontractor performing work provided by this Contract, and the City. The City of Jersey City, its officers, agents, servants, and employees as their interest may appear, shall be named as an additional insured on said policy insofar as the work and obligations performed under the Contract are concerned. The coverage so provided shall protect against claims for personal injuries, including accidental death, as well as claims for property damages, which may arise from any act or omission of the City, the Contractor or the Subcontractor or by anyone directly or indirectly employed by either of them.

The minimum policy limits of such insurance shall be as follows:

A. General Liability and Property Damage Insurance:

In an amount not less than \$1,000,000 for injuries, including wrongful death, to any one person, and subject to the same limit for each person, and an amount of not less than \$2,000,000 on account of one accident, and property damage insurance in an amount of not less than \$100,000 for each accident, and for an aggregate limit of not less than \$300,000. This insurance shall be written with an acceptable company authorized to do business in the State of New Jersey, shall be taken out before any operations of the Contractor are commenced, and shall be kept in effect until all operations shall be satisfactorily completed.

B. Special Hazards Insurance:

The following special hazards shall be covered during the life of this Contract by rider or riders to the policy or policies above required or by separate policies of insurance: (A) blasting and explosion; (b) collapse of or structural injury to any structure or facility due to (1) excavation or pumping, (2) shoring or demolition of any structure or the removal or rebuilding of any structural support thereof; (c) all vehicles and equipment; (d) the term "caused by accident" in the standard policy shall be broadened by the inclusion of the term "occurrence". This policy shall contain a broad form contractual coverage endorsement.

C. Automobile Insurance:

(a) Automobile Liability Insurance to cover each automobile, truck, vehicle or other equipment used in the performance of the Contract in an amount not less than \$1,000,000 on account of injury or death of one person and not less than \$2,000,000 on account of

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injury or death of two or more persons; (b) Property Damage Liability Insurance to cover each automobile, truck, vehicle or other equipment used in performance of the Contract in an amount not less than \$100,000 in any accident.

D. Workers' Compensation:

Workers' Compensation coverage with NJ statutory limits and including Employer's Liability limits of no less than \$1,000,000.

E. Builders Risk Insurance:

Coverage shall be in an amount equal to the full value of the material cost to adequately protect the Contractor and the City from all risks resulting in damage to the property.

F. Notice of Change:

Each and every insurance policy required by the terms of this Contract shall carry endorsement to the effect that the insurance company will give at least thirty days notice to the City of any modification or cancellation of any policy or policies.

27. INDEMNITY:

The Contractor agrees to save the City of Jersey City, its officers, agents, servants, and employees as their interest may appear, harmless from all loss or damage occasioned to it or to any third person or property by reason of any carelessness or negligence on the part of the City, the Contractor, Subcontractors, agents, and employees in the performance of the Contract and will, after reasonable notice thereof, defend and pay the expense of defending any suit which may be commenced against the City of Jersey City, its officers, agents, servants and employees as their interest may appear, by any third person alleging injury by reason of such carelessness or negligence, and will pay any judgement which may be obtained against the City of Jersey City, its officers, agents, servants, and employees as their interest may appear, in such suit.

The cost of such indemnification shall be included in the prices bid for the various scheduled items in the Proposal. So much money due to the Contractor under and by virtue of the Contract as shall be considered necessary by the City may be retained by the City and held until such suits, actions, claims or amounts shall have been settled and suitable evidence to that effect furnished to the City.

28. SUBMISSION OF POST-BID INFORMATION:

Upon request by the Architect, the selected Bidder shall within seven (7) days thereafter submit the following:

- A. A statement of costs for each major item of work included in the Proposal.
- B. A designation of the work to be performed by the Bidder with his own forces.

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- C. A list of names of the subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for such portions of the work as may be designated in the bidding documents or, if no portions are so designated, the names of the subcontractors proposed for the principal portions of the work.

The bidder will be required to establish to the satisfaction of the Architect the reliability and responsibility of the proposed Subcontractors to furnish and perform the work described in the sections of the Specifications pertaining to such proposed Subcontractor's respective trades. Prior to the award of the Contract, the Architect will notify the bidder in writing if the Architect after due investigation, has reasonable and substantial objection to any person or organization or such list. If the Architect has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization, the Bidder shall obtain another Subcontractor satisfactory to the Architect at no additional cost to the contract.

GENERAL CONDITIONS

GC-1 PUBLIC SAFETY AND CONVENIENCE:

The Contractor shall conduct his work with the least possible obstruction to traffic. The convenience of the public and of the residents adjacent to the Project, and the protection of persons and property, are of first importance and shall be provided for by the Contractor in an adequate and satisfactory manner. Adequate temporary crossings shall be constructed and maintained where access to adjacent property is desired, the fire hydrants shall be kept accessible.

Trucks hauling materials shall have tight tail gates and shall be loaded with adequate freeboard of not less than three (3) inches without precarious cones or piles of material.

The Contractor shall provide for prompt removal from existing roadways of all dirt and other materials that have been spilled, washed, tracked or otherwise deposited thereon by his hauling and other operations whenever the accumulation is sufficient to cause the formation of mud, interfere with drainage, damage pavements or create a traffic hazard.

The Contractor shall employ construction methods and means that will keep flying dust to the minimum. He shall provide for the laying of dust retardants on the Project, and on roads, streets and other areas immediately adjacent to the Project limits, wherever traffic, or buildings that are occupied or in use, are affected by such dust caused by his hauling or other operations. The materials and methods used for retardant laying shall be subject to the approval of the Engineer. The cost of carrying out the foregoing provisions shall be included in the prices bid for the various items scheduled in the Proposal.

The Contractor shall conduct his operations in such a manner as to provide maximum safety for all employees on the work and the public as well. He shall comply promptly with such safety regulations as may be prescribed by the Engineer and shall, when so directed by the Engineer of his duly authorized agents, properly correct any unsafe conditions created by or unsafe practices on part of his employees. In the event of the Contractor's failure to comply, the Engineer may take the necessary measures to correct the conditions or practices and all costs thereof will be deducted from any monies due the Contractor. Failure of the Engineer to direct the correction of unsafe conditions or practices shall not relieve the Contractor of his responsibility herein.

GC-2 FAILURE TO MAINTAIN STREETS IN SAFE CONDITION:

In the event that the Contractor fails to maintain trenches and roads in a safe and passable condition following pipe laying or fails to clean up or fails to install and maintain pavement replacement over trenches, the City shall have the right to order this work done by others at the cost and expense of the Contractor. The Contractor will be given notice of the unsatisfactory condition. After such notice is submitted to the Contractor, the City may order this work done and deduct the cost of same from payment due under this contract.

GC-3 ACCIDENT PREVENTION:

Precaution shall be exercised at all times for the protection of persons and property. The safety provisions of applicable laws, building and construction codes, and the rules and regulations of U. S. Occupational Safety & Health Administration (OSHA), shall be observed. Machinery, equipment and other hazards of whatsoever character shall be guarded in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not inconsistent with applicable Federal, State and City laws and regulations.

If any operation, practice or condition during the course of the work be deemed by the Engineer to be unsafe, the Contractor shall take corrective action when notified in writing by the Engineer. However, where in the opinion of the Engineer, any operation, practice or condition endangers persons or property, it shall be discontinued and adequate remedial action taken before the affected part of the work is resumed.

Nothing in the foregoing paragraphs shall be construed as relieving the Contractor from full responsibility for safe prosecution of the work at all times.

GC-4 PROPERTY DAMAGE:

The Contractor shall protect all property, monuments, trees, existing structures, utilities and work of any kind along and adjacent to the work under this contract against damage or interruption of service. Damage, injury, loss, or interruption of service resulting from the failure to do so shall be repaired or restored promptly by the contractor at his own expense.

The Contractor shall shore up, brace, underpin, secure, and protect as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity to the site, which may be in any way affected by the excavations or other operations connected with the construction or reconstruction of the work embraced in this contract.

The Contractor shall not enter on or make use of private property in the prosecution of the Project unless written permission therefor is secured in duplicate, from the owner, one copy of which shall be filed with the Engineer. He shall promptly restore or repair, without cost to the City and in a manner satisfactory to its owner, property damaged or destroyed by his operations. Special attention shall be given to the protection of existing landscape features and vegetation.

GC-5 PUBLIC UTILITIES & UNDERGROUND FACILITIES:

The terms public utility or public utilities used in this Article shall be construed to include those publicly and privately owned.

It shall be the Contractor's responsibility to notify in writing all the various utility companies concerned prior to the initial start of construction, so that they will have sufficient time to locate, relocate or construct their facilities. He shall also be responsible for the location of all other underground lines and appurtenances such as existing sanitary sewers and house connections,

existing water and gas lines, existing storm drains, etc., whether such underground lines and appurtenances are noted or not noted on the plans, so as to prevent any direct interference with underground lines being constructed.

The Contractor is responsible for coordinating said work with the utility companies so as not to disrupt the progress of the job nor the workmanship of said improvement. All existing utilities are to be located and adjusted by the various utilities concerned. All the utilities have been located on the drawings by the Engineer as designated by the utility companies. The Engineer does not assume responsibility for said locations. The contractor must have the utility companies verify said locations.

The Contractor shall at his own expense properly support and maintain all public utility structures and facilities together with all other existing underground lines and appurtenances he may encounter in connection with the work, and shall replace any street signs, stop signs, bus station signs, etc., which may have to be removed temporarily and replace or repair any he may damage. The Contractor is cautioned to insure the safety of all persons with reference to overhead power lines.

Should the Contractor in course of the construction work cause any damage to the existing underground lines and appurtenances, he shall at his own expense restore or repair the damaged lines.

The Contractor shall carry out his work carefully and skillfully and shall support and secure public utility structures so as to avoid damage to them. Flow in drains and sewers shall be satisfactorily maintained. He shall not move without the owner's written consent any public utility structures, and at the completion of the work their condition shall be as safe and permanent as before. When public utility structures, facilities or equipment are damaged by the Contractor, he shall notify their owners, who may cause the damage to be repaired at the Contractor's expense. If the cost thereof is not paid by the Contractor within 30 days after repairs have been completed, the City may retain an amount sufficient to cover the cost from any moneys due or that may become due the Contractor under this Contract. House service connections damaged by the Contractor shall be repaired by competent skilled mechanics.

When the removal, relocation or replacement of public utility structures or facilities is not deemed essential by the Engineer for carrying out the Project as planned, but is performed for the Contractor's convenience, the cost of such work shall be included in the prices bid for the various items scheduled in the Proposal. When such removal, relocation or replacement is deemed essential by the Engineer for carrying out the work of the Project as planned, the cost shall be borne by the City or by the owner of the utility in accordance with City policy.

Due notice will be given to all interested parties in accordance with N.J.S.A., that all surface openings within the site of the Project shall be made prior to the laying of the finished pavement.

GC-6 MAINTENANCE AND PROTECTION OF TRAFFIC:

All roadways within the limits of the project which are reserved for traffic shall be maintained by the Contractor free from obstruction and in a smooth riding condition at all times.

The Contractor shall always provide a safe driveway and/or walkway for the use of traffic and/or pedestrians to and from properties along the street. Such passageways shall be adequately maintained and provided with adequate signs, barricades, lights and watchmen.

In streets and roadways the contractor will be responsible for the maintenance of traffic with a minimum of one lane open at all times. Where necessary, steel plates shall be employed to provide for the maintenance of traffic as directed by the Engineer. Under no circumstances will a street or roadway be completely closed to traffic without permission from the Engineer; and the Contractor, upon receiving permission from the Engineer; shall notify the Police, Fire and Public Works Department of such closing.

The Contractor shall supply, erect, place and maintain in good and upright condition during the course of the work, barricades, warning signs, lights, flares, approved flashing electric flasher units, rubber traffic cones, and other warning and danger signals and devices, appropriate and adequate for the specific needs and subject to the Engineer's approval, at working sites, closed roads, intersections, open excavations, locations of material storage, standing equipment, and other obstructions, at points where the usable traffic width of the road is reduced, at points where traffic is deflected from its normal courses or lanes, and at other places of danger to vehicular or pedestrian traffic or to the completed work.

Signs, barricades, traffic cones, flares and electric flasher units shall be established, relocated, repaired and replaced in such a manner and at such times and places as may be necessary for adequate protection of vehicular and pedestrian traffic, subject to approval by the Engineer.

The Contractor shall provide sufficient watchmen and traffic directors and shall take all other precautions, including any which may be ordered by the Engineer, that may be necessary for the safety of the public and protection of the work.

When detours are required due to the construction, such detours shall be established with the approval of the Police Department in advance, and the Contractor at his own expense shall furnish, erect and maintain barricades as specified above to close the street or highway and protect traffic and his work at the beginning and end of the detour.

The Contractor shall take all precautions, including any which may be ordered by the Engineer, that may be necessary for the safety of the public and the protection of the work during night time hours, with adequate patrolling during this period and replace missing flares and other lighting units.

Where traffic is to be maintained on main thoroughfares, the Contractor shall provide approved metal plates to cover open trenches, as directed by the Engineer. All signs and barricades shall conform to current specifications set forth in the "Manual on Uniform Traffic Control Devices for Streets and Highways", U.S. Department of Transportation, Federal Highway Administration, as currently amended.

The cost of Maintenance and Protection of Highway or Street Traffic as described above will not be paid for under any specific item, but the cost thereof shall be included in the prices bid for the various items scheduled in the Proposal.

GC-7 OTHER CONTRACTORS:

The right is reserved by the city to do work with its own employees or with the use of contractors and to permit public utility companies and others to do work during the progress of the project within the limits thereof or adjacent thereto. The Contractor shall conduct his work and cooperate with such utility companies and others so as to cause as little interference as possible with their work, as the Engineer may direct. The Contractor shall allow other contractors and utility companies and their agents access to their work within the site of the Project. The Contractor shall and hereby does agree, to make no claims against the City for additional payment due to delays or other conditions created by the operations of such other parties. If there be a difference of opinion as to the respective rights of the Contractor and others doing work within the limits of or adjacent to the Project, the Engineer will decide as to the respective rights of the various parties involved in order to secure the completion of the City's work in general harmony and in a satisfactory manner.

His decision shall be final and binding on, and shall not be cause for claims by the Contractor.

The Contractor will be held responsible for any damage done or caused by his work or forces to the work performed by other Contractors or utility companies within or adjacent to the site of the Project, and he shall repair or make good any such damage in a manner satisfactory to the Engineer and without cost to the City.

GC-8 EXISTING MONUMENTS:

Existing monuments and title stones which need not be removed shall be left in place and protected by the Contractor against damage and dislocation. When relocation or change in the grade of existing monuments is necessary, they shall be protected in their original position until their removal is approved by the Engineer, and shall be reset when directed and in conformance with the new lines and grades to be furnished, by him. Monuments and title stones, that are to be left in place or reset and are removed without approval of the Engineer shall be replaced at the Contractor's expense. The cost of resetting monuments shall be included in the base bid.

GC-9 PATENTS:

The Contractor shall hold and save the City of Jersey City, its officers, and employees, harmless from liability of any nature or kind, including costs and expenses, for, or an account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the City, unless otherwise specifically stipulated in the Technical Specifications.

GC-10 CONTRACT AND CONTRACT DOCUMENTS:

The Plans, Bid Specifications, Technical Specifications and Addenda, if any, shall form part of the contract, and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the contract documents and in no way affect limit, or cast light on the interpretation of the provisions to which they refer. The organization of the Specifications into divisions, sections and articles, and the

arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

Anything mentioned in the Technical Specifications and not shown on Drawings, or shown on the Drawings and not mentioned in the Technical Specifications, shall be of like effect as if shown on or mentioned in both. In case of difference between Drawings and Technical Specifications, the Technical Specifications shall govern. In case of any discrepancy in Drawings, or Technical Specifications, the matter shall be immediately submitted to the Engineer, for a decision.

The figured dimensions on the Drawings or notes indicating dimensions shall be used instead of measurements of the Drawings by scale, and shall be strictly complied with. No scale measurements shall be used as a dimension to work with except on large scale drawings not dimensioned. In case of difference between small and large scale drawings, the large scale drawings shall govern.

GC-11 CONTRACTOR'S ORGANIZATION & EQUIPMENT:

Methods and Equipment. The Contractor shall at all times employ competent supervision, labor and adequate equipment for prosecuting the several classes of work to full completion in the manner and time required by these Specifications.

All workmen shall have sufficient skill and experience to perform properly the work assigned to them. Workmen engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Should the Contractor fail to remove any employee from work when requested or fail to furnish suitable and sufficient personnel and equipment for the proper prosecution of the work, the Engineer may suspend the work by written notice until compliance with such order.

The Contractor shall be responsible for the proper fitting of all work and for the coordination of the operations of all trades, subcontractors, or material men engaged upon this Contract. He shall be prepared to guarantee to each of his subcontractors the locations and measurements which they may require for the fitting of their work to all surrounding work.

All equipment which is used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the project shall be such that no injury to the roadway, adjacent property, or other highways will result from its use.

When the methods and equipment to be used by the Contractor in accomplishing the construction are not prescribed in the Contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the Contract.

When the Contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Engineer. If the Contractor desires to use a method or type of equipment other than those specified in the Contract, he may request authority from the Engineer to do so. The request shall be in writing and shall include a full description of the methods

and equipment proposed and the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with Contract requirements. If, after trial use of the substituted methods or equipment, the Engineer determines that the work produced does not meet Contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove the deficient work and replace it with work of specified quality, or take such other corrective action as the Engineer may direct. Unless otherwise provided, no change will be made in basis of payment for the construction items involved nor in Contract time as a result of authorizing a change in methods or equipment under these provisions.

The Contractor and his Subcontractors shall not engage, on a full or part-time or other basis during the period of the Contract, any of the professional or technical personnel of the Division of Architecture, Engineering or Traffic and Transportation, or of any State, County or City Department, who are or have been at any time during the period of the Contract, or for 30 days prior to the award of the Contract, in the employ of such public agencies, except regularly retired employees, without the written consent of the public employer of such personnel.

GC-12 SUPERINTENDENT AND WORKMEN:

The Contractor shall attend to the work personally or through a competent, English-speaking superintendent on the work, authorized to receive and carry out instructions. The workmen shall be competent and shall perform their work in a neat and workmanlike manner. Any workman not properly qualified for his work or who is doing it in an unsatisfactory manner or contrary to the Specifications or the Engineer's instructions, or who is disorderly, shall be discharged if so requested by the Engineer, and shall not be employed again on the Project except with the approval of the Engineer. The superintendence and the number of workmen shall be sufficient, in the opinion of the Engineer, to insure the completion of the Project within the time stipulated therefor.

The Contractor shall also furnish to the City the telephone numbers of his superintendent and assistants for any emergency arising outside the normal work day schedule as a result of the Contract. If such an emergency does arise, and the City cannot contact the Contractor or his agents, or the Contractor or his agents do not arrive on the job site within two hours of such notification, the City reserves the right to correct the situation. Any costs incurred by the City shall be reported, in writing, to the Contractor for immediate payment. No additional estimates for work under this Contract shall be paid to the Contractor until the City is in receipt of payment for such emergency work.

GC-13 EQUIPMENT:

Good equipment only shall be used, and it shall be in proper working conditions. Sufficient equipment shall be used to insure the completion of the Project within the time specified. The equipment shall be operated so as not to damage public or private property. When a specific type or character of equipment is called for it shall be provided and used. All equipment shall be subject to the approval of the Engineer.

If the Contractor or his subcontractors do not own all or part of the equipment required, a written statement shall be submitted by the Contractor or his subcontractors, respectively, of the name and address of the owner or owners, stating that an agreement has been made to lease or loan the equipment and that in event of default, the Architect/Engineer has the right to take over and use such equipment or cause it to be used for completing the Project.

GC-14 WORKING SITE:

Any space that the Contractor may require for plant, equipment, storage or other purpose, in addition to that available therefore at the site of the Project, shall be procured by the Contractor and the cost thereof shall be included in the prices bid for the various items scheduled in the Proposal. In event of default the Architect/Engineer has the right to take over and occupy such space, or cause it to be occupied, for the purpose of completing the Project, at the Contractor's expense. If leased, the lease shall contain a provision that in event of default by the Contractor the lease may be assigned to the City or its nominee. The Contractor agrees in said default, that he will make such assignment.

GC-15 SANITARY PROVISIONS:

The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees and for the use of government employees when the special provisions do not contain other provisions, to comply with the requirements of the State and local Boards of Health, or of other bodies or tribunals having jurisdiction. No direct payment will be made for the work required by this subsection, but the costs thereof will be considered to be included in bid prices of the contract. Attention is directed to Federal, State and local laws, rules and regulations concerning construction safety and health standards. The Contractor shall not require any worker to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his health or safety.

GC-16 MATERIALS AND WORKMANSHIP:

All materials used in the construction shall be new, except where reclaimed materials are indicated, and shall be furnished by the Contractor, and shall be approved by the Engineer. Request for approval of materials shall state the proposed source. All workmanship shall be satisfactory to the Engineer. Materials and workmanship not satisfactory shall be replaced by the Contractor without expense to the City.

The Contractor shall comply with provisions of the N.J. revised statutes 52:33-2 requiring that preference be given to the use of domestic materials.

The Contractor shall do all things necessary in connection with his work, and shall leave the premises in as good condition as found furnishing new materials and work if necessary.

The Contractor shall and will in good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by this contract, within the time herein specified, in accordance with the provisions of this contract and said specifications and in accordance with the plans and drawings covered by this contract and any and all supplemental plans and drawings, and in accordance with the directions of the Engineer as given

from time to time during the progress of the work. He shall furnish, erect, maintain and remove such construction plant and such temporary works as may be required. The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the contract and specifications, and shall do, carry on, and complete the entire work to the satisfaction of the Engineer and the City.

The Contractor shall furnish to the Engineer for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing, together with full information as to type, performance characteristics, and all other pertinent information as required, and shall likewise submit for approval as required full information concerning all other materials or articles which he proposes to incorporate in the work.

Machinery, mechanical and other equipment, materials or articles installed or used without such prior approval shall be at the risk of subsequent rejection.

Materials specified by reference to the number or symbol of a specific standard, such as an A.S.T.M. Standard, a Federal Specification or other similar standard shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the Invitation for Bids, except as limited to type, class or grade, or modified in such reference. The standards referred to, except as modified in the Technical Specifications shall have full force and effect as though printed therein.

GC-17 TESTING AND INSPECTION OF MATERIALS:

All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be selected by the City. The City will pay for all laboratory inspection service direct, and not as a part of the Contract. When instructed, the Contractor shall furnish representative samples of materials and shall make them available for collection by the Engineer.

Materials of construction, particularly those upon which the strength and durability of the structure may depend, shall be subject to inspection and testing to establish conformance with specifications and suitability for uses intended.

This article shall not be construed to mean that the contractor is relieved from inspection services and/or test required by the technical specifications and payments to the same.

GC-18 SAMPLES, CERTIFICATES AND TESTS:

The Contractor shall submit all material or equipment samples, certificates, affidavits, etc., as called for in the Contract Documents or required by the Engineer promptly after award of the contract and acceptance of the Contractor's bond. No such material or equipment shall be manufactured or delivered to the site, except at the Contractor's own risk, until the required samples or certificates have been approved in writing by the Engineer. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the contract time.

Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the project for which it is intended, and the name of the producer. The accompanying certificate or letter from the Contractor shall state that the sample complies with Contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the producer and all specifications or other detailed information which assist the Engineer in passing upon the acceptability of the sample promptly. It shall also include the statement that all materials or equipment furnished for use in the project will comply with the samples and/or certified statements.

Approval of any materials shall be general only and shall not constitute a waiver of the City's right to demand full compliance with Contract requirements. After actual deliveries, the Engineer will have such check tests made as he deems necessary in each instance and may reject materials and equipment and accessories for cause, even though such materials and articles have been given general approval. If materials, equipment or accessories which fail to meet check tests have been incorporated in the work, the Engineer will have the right to cause their removal and replacement by proper materials or to demand and secure such repair by the Contractor as is equitable.

Except as otherwise specifically stated in the Contract, the costs of sampling and testing shall be assumed by the Contractor. The Contractor shall furnish without extra cost, including packing and delivery charges, all samples and tests requested by the Engineer.

GC-19 CONTRACTOR'S TITLE TO MATERIALS:

No materials or supplies for the work shall be purchased by the Contractor or by any subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials and supplies used by him in the work, free from all liens, claims or encumbrances.

GC-20 ASSIGNMENT OR NOVATION:

The Contractor shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities, or responsibilities under this Contract without the written consent of the City provided, however, that assignments to banks, trust companies, or other financial institutions may be made without the consent of the City. No assignment or novation of this Contract shall be valid unless the assignment or novation expressly provides that the assignment or novation expressly provides that the assignment of any of the Contractor's rights or benefits under the Contract is subject to a prior lien for performed services rendered, and materials, tools, and equipment supplied for the performance of the work under this Contract in favor of all persons, firms, or corporations rendering such labor services or supplying such materials, tools, or equipment.

GC-21 STORING OF MATERIALS:

All materials required in the work may be stored on the site upon which the work is to be constructed, subject to the approval of the Engineer. All such materials, tools and machinery shall be neatly and compactly piled in such manner as to cause the least inconvenience to the City and other contractors. All fire hydrants must at all times be kept free and unobstructed and water and gas shut-off boxes, underground power and telephone line manholes, sanitary and sewer manholes, must not be covered at any time by such materials.

Materials, tools and machinery shall not be piled or placed against shade trees unless they shall be amply protected against injury therefrom. All materials, tools, machinery, etc., stored upon public thoroughfares must be provided with flashing amber lights at nighttime to warn the traffic of such obstruction.

The Contractor shall arrange for the timely and orderly delivery of all materials and shall be responsible for their proper handling and protection.

Materials and equipment may be stored on the site, but the protection of same shall be the Contractor's responsibility. In storing materials within the site the Contractor shall consult with the Engineer.

GC-22 CLEAN-UP:

- A. The Contractor shall at all times keep the project site and adjacent areas free of waste material, debris, rubbish and other unsuitable materials caused by his employees or work and shall remove same from any area of the site at least daily and additionally, if in the opinion of the Engineer such material, debris, rubbish, equipment or other material constitutes a hazard or nuisance.

The Contractor shall not allow equipment nor materials to encumber the flow of any watercourse. No equipment shall be left unattended in any watercourse.

- B. Upon completion of the work and before the final acceptance of the project, the Contractor shall remove all equipment, temporary work, unused and useless materials, rubbish and temporary buildings, shall repair or replace in an acceptable manner fences or other private or public property which may have been damaged or destroyed on account of the prosecution of the work, shall fill all depressions and water pockets on public and private property caused by his operations, shall remove all obstructions from waterways caused by his work, shall clean all drains and ditches within and adjacent to the site of the project which has been obstructed by his operations, and shall leave the site of the project and adjacent public and private property in a neat and presentable condition wherever his operations have disturbed conditions existing at the time of starting work. The Contractor shall procure and submit to the Engineer signed statements from property owners affected that he has fulfilled his obligations in the matters enumerated above with regard to their respective properties. Payment for final cleaning up and restoration of property as above provided will not be made under any specific item but the cost of this work shall be included in the priced bid for the various items scheduled in the Proposal.

GC-23 AUTHORITY OF THE ARCHITECT/ENGINEER:

Wherever the term Engineer is used through out these Specifications, it shall be understood to mean Architect/Engineer.

The Architect/Engineer shall make all necessary explanations as to the meaning and intent of the Contract Documents, shall give all orders and directions contemplated under the Contract, and in every case in which a difficult or unforeseen condition shall arise in the performance of the work the Architect/Engineer shall determine the adequacy of the Contractor's methods, plant, and appurtenances. The Architect/Engineer shall determine in all cases the quantity, quality, and

acceptability of the several kinds of work and materials and shall determine all questions in relation to the work and the construction thereof.

In case there is any inconsistency or ambiguity in the Contract Documents brought to his attention by the Contractor, the Architect/Engineer shall base his decision upon the premise that the more stringent interpretation was made by the Contractor in the submission of his bid. The Architect/Engineer shall decide any difference or conflicts which may arise between the Contractor and other Contractors of the City in regard to their work.

GC-24 APPEAL BY THE CONTRACTOR:

Should the Contractor take exception to any determination made by the Engineer relating to this Contract, the Contractor shall, within fourteen (14) calendar days, after receiving notification of such decision, file with the City a written notice of appeal, together with a full statement of facts as he believes them to be true. A copy of said notice and statement of facts shall be furnished to the Engineer.

Upon completion of the work, all matters of appeal shall be submitted to a Board of Arbiters, composed of three members, one of whom shall be appointed by the City, one by the Contractor, and the third member shall be chosen by the first two. The cost of appeal shall be borne by the Contractor in matters wherein the decisions of the Engineer are affirmed, and in other matters the costs shall be borne jointly by the Contractor and the City in such proportion as the Board of Arbiters shall determine.

The decision of the Board of Arbiters shall be conclusive and binding upon both the City and the Contractor.

GC-25 UNAUTHORIZED WORK:

Work done without lines and grade being given, work done beyond the lines and grades shown on the drawings or as given, or any extra work done without written authorization, will be considered unauthorized. Such work will be at the expense of the Contractor and will not be paid for by the City. Work so done may be ordered removed, and/or replaced by the Engineer at the Contractor's expense.

GC-26 INSPECTION:

The City shall have the right to inspect all work done and all materials furnished, including the preparation, fabrication and manufacture in mill, plant, shop and field of the materials to be used, and may assign an Inspector or other authorized representative for this purpose. The Contractor shall provide all facilities necessary for such inspection and shall furnish or cause to be furnished to the said Inspector or other authorized representative safe access at all times to the places where preparations, fabrication or manufacture of materials and construction of the work is in progress, as well as such information and assistance as may be required to make a complete and detailed inspection. The Engineer may undertake the inspection of materials at the source.

Manufacturing plants may be inspected periodically for compliance with specified manufacturing methods, and material samples will be obtained for laboratory testing for compliance with material quality requirements. In the event inspection is undertaken at the plant, the following conditions shall be met:

- (a) The Engineer shall have the cooperation and assistance of the Contractor and the producer with whom he has contracted for materials.
- (b) The Engineer shall have full entry at all times to such parts of the plant as may concern the manufacture or production of the materials being furnished.

If the Contractor is not the owner of the place where fabrication, preparation or manufacture is in progress, the owner thereof shall be deemed to be the agent of the Contractor with respect to the obligation assumed hereunder. The Contractor or his agent shall be responsible for the payment of claims for injuries to the City's authorized representative due to negligence on the part of the said Contractor or his agent. The cost of providing the necessary facilities, information, assistance and protection and of satisfying claims for injuries to the City's representative, as specified above, shall be included in the prices bid for the various items scheduled in the Proposal. If the specifications, the Engineer's instructions, laws, ordinance or any public authority require any work be tested or approved, the Contractor shall give the Engineer timely notice of its readiness in writing for inspection is by another authority other than the Engineer, the date fixed for such inspection shall be confirmed and made in writing.

Inspectors or other authorized representatives may be stationed on the work to report to the Engineer as to the progress thereof and the manner in which it is being performed, to inform him whenever it appears that the materials furnished and the work performed by the Contractor fails to conform to the requirements of the Plans and Specifications; and to direct the attention of the Contractor to such failure. The inspection, however, shall not relieve the Contractor from his obligations to furnish materials or perform work in conformity with the requirements of the Plans and Specifications.

The Inspector or other authorized representative is not authorized to revoke, alter, enlarge, relax or release any requirements of the Specifications or to issue instruction contrary to the Plans and Specifications. If a difference of opinion arises between the Inspector and the Contractor relating to the materials furnished or the performance of the work, the Inspector has the authority to reject the materials and notify the Contractor that further work on the construction involved will not be authorized and will be subject to nonpayment until the question at issue can be referred to and decided by the Engineer.

No work shall be closed or covered up until it has been duly inspected and approved. Should completed work be covered, the Contractor shall, at his own expense, uncover all such work so that it can be properly inspected; and after inspection, he shall properly repair and replace all such work if found defective.

At any time during the progress of the work and up to the date of final acceptance, the Engineer shall have the right to reject any work which does not conform to the requirements of the Contract Documents, even though such work has been previously inspected and paid for. Any omissions or failure on the part of the Engineer to disapprove or reject any work or materials at the time of inspection shall not be or be construed as an acceptance of any defective work or materials. If any

work or materials shall be condemned by the Engineer as defective or improperly done, the work shall be removed and/or reconstructed and replaced in a manner satisfactory to the Engineer and consistent with the intent of the Contract.

The Contractor shall notify the Engineer at least 72 hours prior to start of work of any change in the approved project schedule. In addition, the Contractor shall notify the Engineer during regular working hours on the day prior to any projected interruption in his operations.

Failure to give the proper notification as provided above may result in the rejection of uninspected work and materials, and a reduction in the final payment, in accordance with the liquidated damages sections of these Specifications.

The Contractor shall allow at all times any authorized persons representing The City of Jersey City, its consultants and the granting agencies to inspect the site.

GC-27 WORKING HOURS:

Working hours shall be between the hours of 8:00 A.M. and 4:30 P.M., prevailing time. Working before 8:00 A.M. or after 4:30 P.M. shall not be permitted except upon authorization by the Engineer. No work other than maintenance work shall be performed on Saturdays, Sundays, or legal holidays, except in the case of emergency and then only to the extent necessary and with the written approval of the Engineer. Should permission be obtained to perform night work, the Contractor shall provide, at his own expense, all lighting, safety and other facilities necessary for such work.

GC-28 INSPECTION SERVICES:

The wages and overhead of inspectors employed by the City shall be paid by the City except that the cost of such services required anytime on Saturdays, Sundays, or City holidays, or on weekdays outside of the hours 8:00 a.m. to 4:30 p.m. inclusive, shall be borne by the Contractor. The amount to be paid for by the Contractor for inspection work required on Saturdays, Sundays, City holidays and off-hours shall be at the rate of seventy dollars (\$70.00) per hour per man.

City Holidays

New Year's Day	Labor Day
Martin Luther King Jr.'s Birthday	Columbus Day
Lincoln's Birthday	Election Day
Washington's Birthday	Veterans' Day
Good Friday	Thanksgiving Day
Memorial Day	Friday After Thanksgiving
Independence Day	Christmas

The cost of such services shall be deducted from payments due to the Contractor. If the Contractor is directed or requested in writing by the City or the Engineer to work Saturdays, Sundays, City holidays, or off-hours for the convenience of the City of Jersey City the above described reimbursement requirement will be waived.

GC-29 CONSTRUCTION LAYOUT:

General: Working from lines and levels established by the contract documents and as shown in relation to the work, the General Contractor shall establish and maintain bench marks and other dependable markers to set lines and levels to properly locate all work. The General Contractor shall calculate and measure required dimensions as shown (within recognized tolerances if not otherwise indicated); and shall not scale drawings to determine dimensions. Advise tradespersons performing work, of marked lines and levels provided for their use in layout of work.

Surveyor: The General Contractor shall engage a Land Surveyor experienced and specializing in land survey work, who is licensed in the State of New Jersey, to perform services specified in this article.

Survey Procedures: The General Contractor shall verify layout information shown on drawings, in relation to property survey and existing bench marks, before proceeding with layout of actual work. As work proceeds, surveyor shall check every major element for line, level and plumb (where applicable), and maintain an accurate surveyor's log or record book of such checks, available for Architect's or Engineer's reference at reasonable times. Surveyor shall record deviations from required lines and levels, and advise Architect or Engineer promptly upon detection of deviations exceeding indicated or recognized tolerances. The General Contractor shall record deviations which are accepted (not corrected) on record drawings.

No separate payment shall be made for the work described above; but the costs for this work shall be included in the prices bid for the various items scheduled in the Proposal; except when an item "Construction Layout" is scheduled in the Proposal.

GC-30 CLAIM FOR ADDITIONAL COMPENSATION:

If the Contractor claims that any instructions by Drawings or otherwise involve extra cost or extension of time, he shall, within ten (10) days after the receipt of such instructions, and in any event before proceeding to execute the work, submit his protest thereto in writing to the Engineer, stating clearly and in detail the basis of his objections. No such claim will be considered unless so made.

Any discrepancies which may be discovered between actual conditions and those represented by the Drawings and maps shall at once be reported to the Engineer and work shall not proceed except at the Contractor's risk, until written instructions have been received by him from the Engineer.

If, on the basis of the available evidence, the Engineer determines that an adjustment of the Contract Sum and/or Time is justifiable, the procedure shall be as provided in paragraphs 18 and 19 of the Information to Bidders.

GC-31 COMMENCEMENT AND PROCEDURE:

The contractor shall commence work not later than ten (10) calendar days after execution of the contract or as specified in the "Notice to Proceed" and shall continue operations without interruptions until the work is completed, except when weather or other conditions are interfering or the Engineer deems it advisable to suspend work.

The sequence of the work shall conform to the approved progress schedule submitted, provided, however, that said schedule may be modified from time to time as directed or approved by the Engineer. The Contractor shall give the Engineer not less than seven (7) days notice of the time and place or places he will start the work.

GC-32 NOTICE TO PROCEED:

A written "Notice to Proceed" will be issued by the Contracting Agent for the City of Jersey City.

GC-33 PROGRESS SCHEDULE AND PRECONSTRUCTION:

After the execution of the contract, but before the issuance of "Notice to Proceed" the contractor shall contact the Engineer to set up a preconstruction conference.

At the conference, the Contractor shall furnish the Engineer with a "Progress Schedule" and the anticipated amount of each monthly payment that will become due the Contractor in accordance with the "Progress Schedule" for his approval. Updated "Progress Schedules" shall be submitted with each monthly invoice. "Progress Schedules" shall be executed on forms approved by the City.

In addition to the "Progress Schedule", the Contractor shall submit to the Engineer a cost breakdown of his estimated cost of all the work, so arranged and itemized as to meet the approval of the Engineer. This breakdown shall be submitted promptly after execution of the agreement and before any payment is made to the Contractor for the work performed under this contract. After approval by the Engineer the prices established in the breakdown shall be used in estimating the amount of partial payments to the Contractor.

If required the progress schedule shall be prepared on the basis of an accepted critical path method of scheduling. The progress schedule may be used as the basis for establishing major construction operations and as a check on the progress of the work.

The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the times set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall:

- a. Submit a revised schedule for completion of the work within the contract time.
- b. Modify his operation to provide such additional materials, equipment, and labor necessary to meet the revised time estimates.

Should the prosecution of the work be discontinued for any reason, the Contractor shall notify the Engineer at least twenty-four (24) hours in advance of resuming operations.

GC-34 LIMITATION OF OPERATIONS:

The Contractor shall conduct the work at all times in such a manner and in such sequence as will assure the least interference with traffic. The Engineer may require the Contractor to finish a section on which work is in progress before work is started on any additional sections if the opening of such section is essential to public convenience.

GC-35 SHOP DRAWINGS AND SAMPLES:

All required shop drawings, machinery details, layout drawings, samples, etc. shall be submitted to the Engineer for approval sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting and rechecking if necessary. The Contractor may proceed, only at his own risk, with manufacture or installation of any equipment or work covered by said drawings, etc. until they are approved and no claim by the Contractor for extension of the Contract time will be granted by reason of his failure in this respect.

Any drawings submitted without the Contractor's stamp of approval will not be considered and will be returned to him for proper resubmission. If any drawings show variations from the requirements of the contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter or transmittal in order that, if acceptable, suitable action may be taken for proper adjustment of Contract price and/or time. Otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though the drawings have been approved.

By approving and submitting Shop Drawings, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, and that he has checked and coordinated each Shop Drawing with the requirements of the Work and of the Contract Documents. Shop Drawings shall be available on the site.

All calculations, if required, shall be signed and sealed by a New Jersey State licensed Professional Engineer. Date and reference of work shall be shown.

If a shop drawing is in accord with the Contractor or involves only a minor adjustment in the interest of the City of Jersey City not involving a change in Contract price or time, the Engineer may approve the drawing. The Engineer shall accept no responsibility for the Shop Drawings even though they carry his approval. The checking of the Shop Drawings is a gratuitous service to the General Contractor and in no way relieves the General Contractor of full responsibility for the completion of the job as drawn and specified. The approval shall be general and shall not relieve the Contractor from his responsibility for adherence to the contract or for any error in the drawing and shall represent in substance the following:

"Any modification shown on the attached drawings is approved in the interest of the City of Jersey City to effect an improvement for the Project and is ordered with the understanding that it does not involve any change in the Contract Price or time; that it is subject generally to all Contract stipulation and covenants; and that it is without prejudice to any and all rights to the City of Jersey City under the Contracts and surety bond or bonds."

Shop drawings and samples shall be dated and marked to show the names of the Project, Engineer, Contractor, originating subcontractor, manufacturer or supplier, and separate detailer if pertinent. Shop drawings shall completely identify Specification section and locations of which materials or equipment are to be installed. Reproductions of Contract Drawings are acceptable as Shop Drawings only when specifically authorized in writing by the Engineer.

Submission of shop drawings and samples shall be accompanied by 2 copies of a transmittal letter containing Project name, Contractor's name, number of drawings and samples, titles and other pertinent data.

Unless otherwise specified, the number of shop drawings and the number of samples which the Contractor shall submit and, if necessary, resubmit, is the number that the Contractor requires to be returned plus 2 copies which will be retained by the Engineer.

Submit minimum 4 prints of each shop drawing, including fabrication erection, layout and setting drawings and such other drawings as required under various sections of the Specifications, until final approval is obtained. Submit minimum 4 copies of manufacturers' description data including catalog sheets for materials, equipment and fixtures, showing dimensions, performance characteristics and capacities, wiring diagrams and controls, schedules, and other pertinent information as required. Where printed materials describe more than one product or model, clearly identify which is to be furnished.

Contractor is responsible for obtaining and distributing required approved prints of shop drawings to his subcontractors and material suppliers after as well as before final approval.

Contractor will keep one set of all approved shop drawings on the project site till completion of the entire project.

GC-36 TIME FOR COMPLETION, LIQUIDATED DAMAGES AND EXTENSION OF TIME:

It is hereby understood and mutually agreed by and between the Contractor and the City of Jersey City that the date of beginning and the time for completion as specified in the contract of work to be done hereunder are ESSENTIAL CONDITIONS of this contract: and it is further mutually understood and agreed that the work embraced in this contract shall be commenced within ten (10) calendar days from the execution of the contract or as specified in the Notice to Proceed.

The Contractor agrees that said work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the City of Jersey City that the time for the completion of the work described herein is a reasonable time for the completion of the same taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

Extension of Contract Time for extreme weather conditions will be granted in accordance with the following chart:

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

In utilizing the above chart, the Architect will:

consider days on which an extension is granted under the category above “floods, tidal waves, earthquakes, cyclones, tornadoes, hurricanes or other cataclysmic natural phenomeon,” as days on which the Contractor’s work is limited as the result of adverse weather conditions;

consider days for which an extension is granted under the categories above for causes other than “floods, tidal waves, earthquakes, cyclones, tornadoes, hurricanes or other cataclysmic natural phenomeon” as days on which the Contractor worked and was unaffected by adverse weather conditions; and

make the above calculation based on the full 30 or 31 days in the calendar month as being days on which the Contractor could have worked without regard to Saturdays, Sundays and holidays.

If the said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the City of Jersey City then the Contractor does hereby agree, as a part consideration for the awarding of this contract, to pay to the City of Jersey City the amount specified herein, not as a penalty but as a liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Proposal for completing the work.

Liquidated damages in the amount set forth in the following table will be charged for each calendar day of delay until the work is completed and accepted.

CHARGE FOR LIQUIDATED DAMAGES FOR EACH DAY OF DELAY

Original Contract Price

From More than-	To and Including	Calendar Day or Specified Completion Date
\$ 0.	\$ 50,000.	\$ 250.
50,000.	100,000.	500.
100,000.	500,000.	750.
500,000.	1,000,000.	1,000.
1,000,000.	2,000,000.	1,250.
2,000,000.		1,500.

The said amount is fixed and agreed upon by and between the Contractor and the City of Jersey City because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the City of Jersey City would in such event sustain, and said amount is agreed to be the amount of damages which the City of Jersey City would sustain and said amount shall be retained from time to time by the City of Jersey City from current periodical estimates.

It is further agreed that time is of the essence of each and every portion of this contract and of the specification wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract. Provided that the Contractor shall not be charged with liquidated damages or any excess cost when the City of Jersey City determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the City of Jersey City.

Provided further, that the Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

- a. To any preference, priority or allocation order duly issued by the City of Jersey City.
- b. To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including but not restricted to, act of God, or of the public enemy, acts of the City of Jersey City, acts of another Contractor in the performance of a contract with the City of Jersey City, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and severe weather.
- c. To any delays of subcontractors or suppliers occasioned by any of the caused specified in subsections a and b of this article: Provided further, that the Contractor shall, within ten (10) days from the beginning time prior to the date of final settlement of the contract, notify the City of Jersey City in writing, of the cause of delay, who shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

GC-37 NO DAMAGE FOR DELAY

The City shall have the right to defer the beginning or to suspend the whole or any part of the work herein contracted to be done whenever, in the opinion of the City Engineer, it may be necessary or expedient for the City to do so. If the Contractor is delayed in the completion of the work by act, neglect or default of the City, the City Engineer or of any of the contractors or consultants employed by the City upon the work; by change orders in the work; by strikes, lockouts, fire, unusual delay by common carriers, unavoidable casualties or any cause beyond the Contractor's control; or by any cause which the City Engineer shall decide to justify the delay; then for all such delays and suspensions, the Contractor shall be allowed one calendar day addition to the time herein stated for each and every calendar day of such delay so caused in the completion of the work as specified in GC-36 above, the same to be determined by the City Engineer, and a similar allowance of extra time will be made for such other delays as the City Engineer may find to have been caused by the City. No such extension shall be made for any one or more of such delays unless, within 10 calendar days after the beginning of such delay, a written request for additional time shall be filed with the City Engineer. Apart from the extension of time, no payment or allowance of any kind shall be made to the Contractor as compensation for damages on account of hindrance or delay for any cause in the progress of the work, whether such delay be avoidable or unavoidable.

The Contractor shall not be entitled to any damages or extra compensation from the City on the count of any work performed by the City or any other contractor or the City Engineer or any other party, or by reasons of any delays whatsoever, whether caused by the City or any other party including, and not limited to, the delays mentioned in this contract.

GC-38 ACCEPTANCE OF WORK:

When the Project has been completed, the Contractor shall notify the Engineer in writing. If it is not acceptable to the Engineer he will advise the Contractor as to the particular defects to be remedied before final acceptance will be made. Payments made to the Contractor before the final acceptance, do not commit the Engineer to the acceptance of the Project. The final inspection and acceptance will be made by the Engineer when the Project has been completed.

The City shall not be precluded or estopped by any measurement, estimate, or certificate, made either before or after the completion and acceptance of the Project and payment thereof, if such measurement, estimate or certificate be found to be in error or untrue, from showing the true amount and character of the work performed and materials furnished by the Contractor, or from showing that any such measurement, estimate or certificate is incorrectly made or untrue, or that the work or materials do not conform in fact to the requirements of the Contract. The City of Jersey City shall not be precluded or estopped, notwithstanding any such measurement, estimate or certificate, and payment made in accordance therewith, from recovering from the Contractor and his Surety such damages as it may sustain by reason of the Contractor's failure to comply or to have complied with the terms of the Contract.

Neither the acceptance of the whole or any part of the Project by the Engineer or by any representative of the Engineer, nor any payment made for the work, nor any extension of time granted the Contractor, nor any possession taken by the Engineer, shall operate as a waiver of any portion of the Contract or of any power herein reserved, or of any right to damage herein provided. A waiver of any breach of the Contract shall not be held to be waiver of any other or subsequent breach.

GC-39 ACCEPTANCE OF FINAL PAYMENT AS RELEASE:

The acceptance by the Contractor of final payment shall be and shall operate as a release to the City of Jersey City of all claims and all liability to the Contractor for all things done or furnished in connection with this work and for every act and neglect of the City of Jersey City and others relating to or arising out of this work. No payment, however, final or otherwise, shall operate to release the Contractor or his Sureties from any obligation under this contract or the Performance and Payment Bond.

GC-40 SUSPENSION OF WORK:

The Engineer may, by written order, suspend the performance of the work, either in whole or in part for such periods as he deems necessary. Reasons for suspension of work include but are not limited to the following:

- a) Due to weather or soil conditions considered unsuitable for prosecution of the work;
or
- b) For failure of the Contractor to:
 - 1. Correct conditions unsafe for the workmen or the general public; or
 - 2. Carry out orders given by the Engineer; or
 - 3. Perform any provisions of the Contract.

Suspension of work on some but not all items will be considered "partial suspension." Work of an emergency nature ordered by the Engineer for the convenience of public traffic and minor operations not affected by or connected with the cause of suspension may be performed during a period of total suspension if permitted by the Engineer.

No compensation or allowance will be made on account of such suspensions unless it shall be for more than 10 working days. Should this suspension be for more than 10 working days and should the Contractor be put to additional expense on account thereof, he shall have the right to file with the Engineer a statement showing the character and amount of such additional expense and, if the Engineer deems it a proper charge, the Contractor will be reimbursed therefor. However, he shall have no claim for additional expense for said first ten days of suspension, and any claim for all allowances as above provided shall be filed, in writing, with the Engineer before the expiration of the first ten days of suspension. No payment will be made for work done by the Contractor on suspended work.

Any adjustment of Contract Time for suspension of the work shall be as provided in subsection entitled TIME FOR COMPLETION, EXTENSION OF TIME.

GC-41 RIGHT OF THE CITY TO DECLARE CONTRACTOR IN DEFAULT:

The City of Jersey City has the right to declare the Contractor in default under the following circumstances:

- a) If the Contractor fails to begin the work within the required time.
- b) If the work to be done under this Contract is abandoned.
- c) If the Contractor is adjudged bankrupt or makes an assignment for the benefit of creditors.
- d) If the Contractor fails to or refuses to regard laws, ordinances, regulations, and such orders as given by the City of Jersey City or Architect with respect to the work.
- e) If the Contractor, after notice from the Architect, refuses or fails to supply enough properly skilled workmen or proper materials or equipment.
- f) If the Contractor violates any of the provisions of this Contract or shall not perform the same in good faith.
- g) If the Contractor refuses or fails to prosecute the work or any part thereof with such diligence as will insure the work's completion within the specified period (or any duly authorized extension) or fails to complete the work within the prescribed period.
- h) If the Contractor fails to make prompt payment to persons supplying labor or materials for the work.
- i) If the Contractor assigns or sublets the work otherwise than as specified.
- j) If the Contractor fails to remove an incompetent foreman or superintendent as requested by the Architect.
- k) If the Architect is of the opinion, and has certified in writing, that the work or any part thereof is unnecessarily or unreasonably delayed, or that the Contractor is not complying with the order of the Architect, or that sufficient workmen, materials, plant, tools, supplies, safety standards, or other means of carrying on the work are not provided to carry out all the requirements of the Contract.

The City of Jersey City shall serve written notice to the Contractor ordering the Contractor not to begin, or not to resume, or to discontinue all work under this Contract for any of the above stated reasons.

The City of Jersey City may then enter upon and take possession of the work, or any part thereof and may complete the work by purchase of necessary materials and equipment and by direct employment of labor; or the City of Jersey City may cause the work to be completed by other persons by contract without advertising; or the City of Jersey City may readvertise and re-let the uncompleted portions of the work and all expenses of financial loss to the City of Jersey City by reason of any of the above methods for completing the unfinished work shall be deducted out of monies then due, or to become due the Contractor under this Contract.

In case such expenses shall exceed the amount which would have been payable under this Contract, if the same had been completed by the Contractor, the Contractor or his sureties shall pay the amount of such excess to the City of Jersey City.

Should such expense be less than the amount payable, under this Contract, had the same been completed by the Contractor, the Contractor or his Surety shall receive the difference after deducting the amount retained as herein before specified.

All the work undertaken by the City of Jersey City, by contract or otherwise, shall be certified by the Architect as to the amount of work done, the cost and amount of excess cost, if any. Such certification shall be binding and conclusive upon the Contractor, his sureties, successors, assigns or lienors.

In case this Contract, or any alterations or modifications thereof be thus terminated, the decision of the City of Jersey City shall be conclusive, and said Contractor shall not be allowed to claim or receive any compensation or damages for not being allowed to proceed with the work.

GC-42 REMOVAL OF EQUIPMENT:

In case of termination of work, from any cause whatever, prior to completion, the Contractor shall promptly remove any part or all of his equipment and supplies from the work. If such removal is not completed within five (5) working days after written notification by the City of Jersey City, the City of Jersey city shall have the right to remove such equipment and supplies at the expense of the Contractor.

GC-43 PAYMENTS:

The Contractor will be entitled to monthly payments for portions of the project work which have been fully completed as required by the Contract to the satisfaction of the Architect and such completion has been certified by the Architect.

To insure proper performance of the Contract, the City shall retain a percentage of the amount of each estimate as herein after described until final completion and acceptance of all work covered by the Contract.

Applications for Payment are to be submitted on the G702 and G703 forms and be based on the schedule of values that were submitted at the Preconstruction Conference. Four (4) copies of the Application for Payment are to be submitted to the architect showing completion of the term of the payment term as of the 30th of each month.

Applications for Payment are to be submitted with four (4) copies to the Division of Architecture.

Release of Liens, schedule update, and other material required to accompany the Application must be included in order to receive payment on the Application.

The contractor is to include along with the Application for Payment, a Release of Liens (payment of debits and claims form attached) on the attached form with each Application for Payment for the previous payment period.

In preparing estimates, the material delivered on the site and preparatory work done may be taken into consideration, if the Contractor furnishes releases of liens for the materials at the time each estimate of work is submitted for payment. All materials and work covered by partial payments made shall thereupon become the sole property of the City, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work, or as waiver of the right of the City to require fulfillment of all the terms of the Contract.

The Contractor agrees that he will indemnify and save the City harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this contract. The Contractor shall, at the City's request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If the Contractor fails to do so, then the City may, after having

served written notice on the said Contractor, either pay unpaid bills, of which the City has written notice, direct, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of this contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon the City to either the Contractor or his Surety.

In paying any unpaid bills of the Contractor, the City shall be deemed the agent of the Contractor, and any payment so made by the City, shall be considered as a payment made under the contract by the City to the Contractor, and the City shall not be liable to the Contractor for such payment made in good faith.

A. LUMP SUM PAYMENTS:

The sum bid for any lump sum items shall constitute payment in full for all of the various classes of work, including materials, equipment and labor necessary or required to complete, in conformity with the Contract Documents, the entire Project Work shown, indicated or specified under such lump sum item.

B. PROGRESS PAYMENTS:

- (1) On lump sum items, the Contractor shall submit to the Architect for his approval, prior to the start of the Work under the Contract, a schedule giving a breakdown of labor, materials, equipment and other costs used in preparation of the bid. This schedule shall be in sufficient detail to indicate separate figures for excavation, concrete, reinforcing steel, equipment, and all other items which make up the lump sum price. This schedule shall be used in computing the periodic estimate which is issued monthly, and as a basis for negotiations concerning any credits which may arise during the execution of the Work of this Contract.
- (2) During the first ten days of each month, the Architect, in consultation with the Contractor, will estimate the amount of work during the preceding calendar month. The quantities so determined will be used as the basis for a periodic estimate. The periodic estimate will be presented to the Architect by the Contractor and shall indicate the value of the work performed and materials and equipment built into the Project, in accordance with the Contract. As soon as practicable thereafter, the City will pay the Contractor an amount equal to the value of such work, materials and equipment indicated on the periodic estimate less the amount of all previous payments. The retainage as hereinafter described shall be deducted from each and every estimate presented during the Contract and shall be retained until final completion and acceptance of all work covered by the Contract.
- (3) No claim by the Contractor for additional payment based on any error in any periodic estimate will be recognized.
- (4) The City may withhold payment for any of the following:
 - a. Failure to submit a revised progress schedule, which has been approved by the Architect, with each monthly invoice.
 - b. Defective work not corrected.

- c. Claims filed or responsible evidence indicating probability of filing claims.
 - d. Failure of the Contractor to make proper payments to Subcontractors or for material or labor.
 - e. Unpaid damages by the Contractor to Subcontractors, the City or any other agency or person.
 - f. If in the judgement of the Architect the Project is not proceeding in accordance with the Contract or the Contractor is not complying with the requirements of the Contract Documents.
 - g. The Contractor is found to be in default.
- (5) No payment voucher shall protect the Contractor and no claim shall be founded thereon by the Contractor in case of overpayment or in case it shall at any time appear that the Project or any part thereof have not been constructed, completed and maintained in strict accordance with the Contract Documents.
 - (6) No interim payment voucher shall be held to signify the approval of permanent work, materials, or other things to which such certificate relates, and the Contractor shall not be relieved by any such certificates from any risks or liability to which he may be subject under the Contract until the Final Certificate, hereinafter referred to, has been granted to them.
 - (7) Errors in any monthly measurements or bill, on being discovered, shall be rectified by the Architect in subsequent measurements and bills.
 - (8) If any work the value of which has been included in any interim bill is damaged or destroyed and has to be removed or reconstructed by the Contractor, an amount representing the value of the work so damaged or destroyed, less any insurance monies therefor received by the City, shall be deducted by the Architect in succeeding monthly bills until such time as such work has been renovated or reconstructed.
 - (9) The State Law requires that all claims for payments must be approved by the governing body of the municipality. The Contractor should allow 4 to 6 weeks for receipt of partial payment after the payment has been approved by the Architect.

C. RETAINAGE:

The following procedures will apply in accordance with the Contractor's chosen option of retainage as indicated on the proposal:

- (1) An amount of ten percent (10%) of each and every payment made to the contractor shall be withheld by the City until the project is completed to the satisfaction of the City; and all maintenance bonds, plans, shop drawings, etc., are in the possession of the City; and all other requirements of the contract are met by the contractor. The amount withheld shall be deposited with a banking institution or savings and loan association insured by an agency of the federal

government, in an account bearing interest at the rate currently paid by such institutions or associations on time or savings deposits. Any interest accruing on cash payments withheld shall be credited to the City.

- (2) Whenever any contract, the total price of which exceeds \$100,000.00, is entered into by the City for the Construction, reconstruction, alteration or repair of any building, structure, facility or other improvement of real property, the amount of withholding enumerated in Item (1) shall be reduced to two percent (2%) pursuant to N.J.S.A. 40A:11-16.3. All other provisions of Item (1) shall remain in full force and effect.
- (3) In lieu of the withholding of funds as prescribed in Item (2) above, the contractor may agree to deposit with the City, negotiable bearer bonds of the State of New Jersey, or negotiable bearer bonds or notes of any political sub-division of the State, the value of which is equal to the amount necessary to satisfy the amount that otherwise would be withheld pursuant to Item (2) above. The nature and amount of the bonds or notes to be deposited shall be subject to the approval of the City. For purposes of this section, "value" shall mean par value or current market value, whichever is lower. The bonds shall be returned to the contractor pursuant to the same conditions for retainage which is stated in Item (1) above.

The bidder shall denote in the Proposal the method of his choice in accordance with the above amount.

As to the subject retainage, the above provisions are controlling and any and all other references to retainage in these specifications which conflict with the above sections shall be interpreted in the light of the above and, this section taking a precedent over any other.

D. FINAL PAYMENT:

- (1) Upon written notice from the Contractor that the Project is complete, the Architect will make a final inspection and will notify the Contractor in writing of any particulars in which this inspection reveals that the Work is defective. The Contractor shall immediately make such corrections as are necessary to remedy such defects.
- (2) When the Contractor has completed all such corrections to the satisfaction of the Architect and delivered all maintenance and operating instructions, schedules, guarantees, bonds, certificates and other documents, all as required by the Contract Documents, he may make application for final payment. The Architect will determine from actual as-built field measurement, the amount of the work performed by the Contractor, and also the value of such work under and according to the terms of the Contract. After final acceptance of the Project completed, in place, tested and ready for use the Architect will process the final certificate for payment upon receipt of a maintenance bond as described in these specifications. The final payment will include retainage and all other monies due the Contractor as determined by the Architect. The final certificate will also serve as an instrument to recommend release of negotiable securities held as retainage.
- (3) The acceptance by the Contractor of final payment shall be and shall operate as a release to the City of all claims and all liability to the Contractor for all things done or furnished in connection with this work and for every act and neglect of the City and others relating to or arising out of

this work. No payment, however, final or otherwise shall operate to release the Contractor or his Sureties from any obligation under this contract or the Performance and Payment Bond.

GC-44 MAINTENANCE BOND:

Before final payment is made, the Contractor shall furnish a surety corporation bond to the Architect in a sum equal to one hundred percent (100%) of the Contract price. The bond shall remain in full force and effect for a period of two (2) years from the date of acceptance of the Project by the Architect, regardless of the date of installation of individual items, and shall provide that the Contractor guarantees to replace for said period of two (2) years all work performed and all materials furnished that were not performed or furnished according to the terms and performance requirements of the contract, and made good the defects thereof which have become apparent before the expiration of the said period of two (2) years.

If, in the judgment of the Architect, any part of the Project need be replaced, repaired or made good during the specified guarantee period, for the reasons stated above, he will so notify the Contractor in writing. If the Contractor refuses or neglects to start such work within five (5) days from the date of service of such notice or at such other time as the Architect may direct, or if he fails to complete such work within the time prescribed by the Architect, the Contractor agrees that the Architect may have the work done by others and the cost thereof shall be paid by the Contractor, or his Surety. Before the Surety is released from its bond, the Architect shall certify in writing that the forgoing obligations have been duly performed.

GC-45 SUBCONTRACTING:

The Contractor shall not subcontract, sublet, sell transfer, assign, or otherwise dispose of any portion of the contract work without written consent of the Architect. Before consent is given to subcontract any work, the Contractor, if requested by the Architect, shall present evidence that the proposed subcontractor is fully qualified to do the work. If consent is given, the Contractor will be permitted to subcontract a portion of the work, but shall perform with his own organization, work amounting to not less than fifty percent (50%) of the original contract amount, except that any items designated in the contract as "specialty items" may be performed by subcontract and the cost of any such specialty items so performed by subcontract may be deducted from the original contract amount before computing the amount of work required to be performed by the Contractor with his own organization. No subcontracts shall relieve the Contractor of his liability under the contract and bonds.

No subcontract, approval of a subcontract, or any other action shall create any contractual relation between subcontractors and the City of Jersey City. The contractor shall be liable and responsible for any action or lack of action of a subcontractor. Contractors and subcontractors shall be charged with all direct, imputed or presumed knowledge the others might possess.

Within ten (10) days after award, either by the Contractor or subcontractor, of any subcontract for performance of work at the construction site, the Contractor shall deliver to the Contracting Officer and Architect an executed statement and acknowledgment in regard to award of subcontract and incorporation of labor clauses in the subcontract.

GC-46 PREVAILING RATE OF WAGES ON PUBLIC CONTRACTS:

The attention of all bidders is specifically called to the fact that wage rates determined by the Commissioner of Labor and Industry, in accordance with the provisions of Chapter 150 of the Laws of 1963, commonly known as the Prevailing Wage Act, shall be required to be paid for all services performed under this contract.

The wages to be paid for a legal day's work to laborers, workmen or mechanics employed upon the work contemplated by this contract or upon any materials to be used thereon shall not be less than the "prevailing rate of wage", pursuant to law, which Schedule of Wage Rates is on file in the office of the Purchasing Agent and hereby made part of this contract.

The act also provides among other requirements, the following, which are selected excerpts from the statute:

Every contract in excess of \$2,000.00 for any public work to which any public body is a party shall contain a provision stating the prevailing wage rate which can be paid (as shall be designated by the Commissioner) to the workmen employed in the performance of the contract and the contract shall contain a stipulation that such workmen shall be paid not less than such prevailing wage rate. Such contract shall also contain a provision that in the event it is found that any workman, employed by the Contractor or any Subcontractor covered by said contract, has been paid by such contract the public body may terminate the Contractor's or Subcontractor's right to proceed with the work, or such part of the work as to which there has been a failure to pay required wages and to prosecute the work to completion or otherwise. The Contractor and his sureties shall be liable to the public body for any excess costs occasioned thereby.

The public body awarding any contract for public work or otherwise undertaking any public work shall ascertain from the commissioner the prevailing wage rate in the locality in which the public work is to be performed for each craft or trade needed to perform the contract and shall specify in the contract itself what the prevailing wage rate in the locality is for each craft or trade or classification of all workmen needed to perform the contract during the anticipated term thereof. Nothing in this act however shall prohibit the payment of more than the prevailing wage rate to any workmen employed on a public work.

Every Contractor and Subcontractor shall keep an accurate record showing the name, craft or trade and actual hourly rate of wages paid to each workman employed by him in connection with a public work and such records shall be preserved for two (2) years from date of payment. The record shall be open at all reasonable hours to the inspection of the public body awarding the contract and to the commissioner.

The State of New Jersey Department of Labor and Industry prevailing wage rates are made a part of this Contract for performance of the work described.

GC-47 EQUAL EMPLOYMENT OPPORTUNITY/AFFIRMATIVE ACTION:

Bidders (Contractors) are required to comply with the requirements of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27. No firm may be issued a contract unless it complies with these equal employment opportunity and affirmative action provisions. The following information summarizes the full, required regulatory text, which is included as Exhibit B of this Bid specification:

After notification of award, but prior to signing a construction contract, the contractor shall submit to Public Agency Compliance Officer and the New Jersey Division of Contract Compliance & Equal Employment Opportunity in Public Contracts, an Initial Project Workforce Report (Form AA-201) provided to the public agency by the Division for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7.

The contractor shall also submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of the contract to the Division and the Public Agency Compliance Officer. The contractor shall also cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the job and/or off-the-job programs for outreach and training of minorities and women.

GC-48 AMERICANS WITH DISABILITIES ACT OF 1990:

Discrimination on the basis of disability in construction contracting is prohibited. Bidders are required to read Americans With Disabilities language that is included as Appendix A of this specification and agree that the provisions of Title II of the Act are made a part of the contract. The contractor is obligated to comply with the Act and to hold the owner harmless.

GC-49 NOT USED

GC-50 WARRANTY OF TITLE:

No material, supplies, or equipment to be installed as part of the work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The Contractor shall warrant good title to all materials, supplies and equipment installed or incorporated in the work and, upon completion of all work shall deliver the same together with all work and appurtenances constructed or placed thereon by him to the City of Jersey City free from any claim, liens, or charges. Neither the Contractor nor any person, firm, or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any work or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of person furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law

permitting such person to look to funds due Contractor in the hands of the City of Jersey City. The provisions of this paragraph shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials. At the completion of work and prior to final acceptance by the Architect, the contractor shall execute the attached form entitled Warranty of Good Title.

GC-51 COMMUNICATIONS:

All notices, demands, requests, instructions, approvals, proposals and claims must be in writing.

GC-52 DEFECTIVE WORK:

All materials furnished and all work performed which, in the opinion of the Architect, is not in accordance with the plans and specifications shall be removed from the City immediately, and other materials which are satisfactory shall be furnished and work which is satisfactory shall be performed. In the event that defects are discovered, the Contractor shall immediately take all actions necessary to correct any and all defects to achieve compliance with the Plans, Specifications or as directed by the Architect. The contractor is responsible for his own work and that of his subcontractors. The contractor is to guarantee that all work and materials are in all respects conformable to the Plans and Specifications.

GC-53 CO-RELATED SPECIFICATIONS:

In addition to these specifications, the following Standard Specifications & Codes shall be considered a part of these specifications where such specifications are applicable, and shall include all current changes and revisions:

New Jersey State Highway Department Standard Specifications for Road and Bridge Construction, 1983 as currently amended.

National Electrical Code for the National Board of Fire Underwriters.

Standard Specifications of American Water Works Association.

State of New Jersey Uniform Construction Code, Chapter 23, Title 5, New Jersey Administration Code.

American Concrete Institute Building Code.

National Standard Plumbing Code.

Ordinances and Laws of the City of Jersey City

American Society for Testing and Materials.

GC-54 USE AND OCCUPANCY PRIOR TO ACCEPTANCE BY THE CITY:

The contractor agrees to the use and occupancy of a portion or unit of the project before formal acceptance by the City, provided the City:

- a. Secures written consent of the Contractor except in the event, in the opinion of the Architect/Engineer, the Contractor is chargeable with unwarranted delay in completing the contract requirements:
- b. Secures consent of the Surety:
- c. Secures endorsement from the insurance carrier(s) permitting occupancy of the building or use of the project during the remaining period of construction: or
- d. When the project consists of more than one building, and one of the buildings is occupied, secures permanent fire and extended coverage insurance, including a permit from the insurance carrier to complete construction.

GC-55 STATED ALLOWANCES:

The Contractor shall include in his proposal the cash allowances if any, stated in the Technical Specification Conditions. The Contractor shall purchase the "Allowed Materials" as directed by the Architect on the basis of the lowest and best bid of at least three competitive bids. If the actual price for purchasing the "Allowed Materials" is more or less than the "Cash Allowances", the contract price shall be adjusted accordingly. The adjustment in contract price shall be made on the basis of the purchase price without additional charges for overhead, profit, insurance or any other incidental expenses. The cost of installation of the "Allowed Materials" shall be included in the applicable sections of the contract specifications covering this work.

GC-56 PROOF OF BUSINESS REGISTRATION

P.L. 2004, c. 57 (Chapter 57) amends and supplements the business registration provisions of N.J.S.A. 52:32-44 which requires that each bidder (contractor) submit proof of business registration with the bid proposal or prior to the contract award. Proof of Registration shall be a copy of the bidder's Business Registration Certificate (BRC). A BRC is obtained from the New Jersey Division of Revenue. Information on obtaining a BRC is available on the internet at www.njgov/njbgs or by phone at (609) 292-1730. N.J.S.A. 52:32-44 imposes the following requirements on contractors and all subcontractors that **knowingly** provide good or perform services for a contractor fulfilling this contract:

- a) The contractor shall provide written notice to its subcontractors and suppliers to submit proof of business of business registration to the contractor;
- b) Prior to receipt of final payment from a contracting agency, a contractor must submit to the contracting agency an accurate list of all subcontractors or attest that none was used;

- c) During the term of this contract, the contractor and its affiliates shall collect and remit, and shall notify all subcontractors and their affiliates that they must collect and remit to the Director, New Jersey Division of Taxation, the use tax due pursuant to the Sales and Use Tax Act, (N.J.S.A. 54:32B-1 et seq.) On all sales of tangible personal property delivered into this State.

A contractor, subcontractor or supplier who fails to provide proof of business registration or provides false business registration information shall be liable to a penalty of \$25 for each day of violation, not to exceed \$50,000 for each business registration not properly provided or maintained under a contract with a contracting agency. Information on the law and its requirements is available by calling (609) 292-1730.

P.L. 2004, c. 57 (N.J.S.A. 52:32-44)
MANDATORY BUSINESS REGISTRATION LANGUAGE

Construction Contracts

The contractor shall provide written notice to its subcontractors and suppliers of the responsibility to submit proof of business registration to the contractor. The requirement of proof of business registration extends down through all levels (tiers) of the project.

Before final payment on the contract is made by the contracting agency, the contractor shall submit an accurate list and the proof of business registration of each subcontractor or supplier used in the fulfillment of the contract, or shall attest that no subcontractors were used.

For the term of the contract, the contractor and each of its affiliates and a subcontractor and each of its affiliates [N.J.S.A. 52:32-44(g)(3)] shall collect and remit to the Director, New Jersey Division of Taxation, the use tax due pursuant to the Sales and Use Tax Act on all sales of tangible personal property delivered into this State, regardless of whether the tangible personal property is intended for a contract with a contracting agency.

A business organization that fails to provide a copy of a business registration as required pursuant to section 1 of P.L.2001, c.134 (C.52:32-44 et al.) or subsection e. or f. of section 92 of P.L.1977, c.110 (C.5:12-92), or that provides false business registration information under the requirements of either of those sections, shall be liable for a penalty of \$25 for each day of violation, not to exceed \$50,000 for each business registration copy not properly provided under a contract with a contracting agency."

**STATE OF NEW JERSEY
BUSINESS REGISTRATION CERTIFICATE
FOR STATE AGENCY AND CASINO SERVICE CONTRACTOR**

DEPARTMENT OF TREASURY
DIVISION OF REVENUE
PO BOX 322
TRENTON, NJ

TAXPAYER NAME: TAX REGISTRATION TEST ACCOUNT

TAX REGISTRATION TEST ACCOUNT

TAXPAYER IDENTIFICATION#: 070-097-382/000

ADDRESS: 847 ROEBLING AVE
TRENTON NJ 08611

ISSUANCE DATE: 07/14/04

TRADE NAME: AMM

CLIENT REGISTRATION SEQUENCE NUMBER: 01073

John S. Teally
Adj. Director

This Certificate is NOT assignable or transferable. It must be conspicuously displayed at above address.


**STATE OF NEW JERSEY
BUSINESS REGISTRATION CERTIFICATE**

Taxpayer Name: TAX REG TEST ACCOUNT

Trade Name:

Address: 847 ROEBLING AVE
TRENTON, NJ 08611

Certificate Number: 1093907

Date of Issuance: October 14, 2004

For Office Use Only:
20041014112823633

GC-57 SCHEDULE OF SUBMITTALS BY BIDDER

<u>SUBMITTAL ITEM</u>	<u>TIME OF SUBMISSION</u>	<u>CONSEQUENCES OF NON COMPLIANCE</u>
1. Proposal	Prior to Bid Opening	Bid Rejected
2. Certificate of Experience of General Contractor	With Proposal	Bid Rejected
3. Certificate of Experience of Subcontractors listed pursuant to <u>N.J.S.A. 40A:11-16</u>	With Proposal, or within 24 hours of bid opening	Bid May Be Rejected
4. Plant and Equipment Questionnaire of General Contractor	With Proposal	Bid Rejected
5. Plant and Equipment Questionnaire of Subcontractors listed pursuant to <u>N.J.S.A. 40A:11-16</u>	With Proposal, or within 24 hours of bid opening	Bid May Be Rejected
6. Non-Collusion Affidavit	With Proposal, or within 24 hours of bid opening	Bid May Be Rejected
7. Corporation or Partnership Statement	With Proposal	Bid Rejected
8. Bid Guarantee	With Proposal	Bid Rejected
9. Consent of Surety	With Proposal	Bid Rejected
10. New Jersey Business Registration Certificates for General Contractor and all Subcontractors listed pursuant to <u>N.J.S.A. 40A:11-16</u>	With Proposal or prior to the Contract award	Bid May Be Rejected
11. Written Acknowledgment of addenda (if issued) pursuant to <u>N.J.S.A. 40A:11-23.2(e)</u>	With Proposal (See Bid Form P-1)	Bid Rejected
12. Public Works Contractor Registration Certificates for General Contractor and all Subcontractors listed pursuant to <u>N.J.S.A. 40A:11-16</u>	With Proposal or prior to the Contract award	Bid Rejected (See Section 7 of Information to Bidders)
13. Exhibit B: Mandatory Equal Employment Opportunity Language	With Proposal, or within 24 hours of bid opening	Bid May Be Rejected
14. MWBE (Contractor Compliance Plan)	With Proposal, or within 24 hours of bid opening	Bid May Be Rejected

<u>SUBMITTAL ITEM</u>	<u>TIME OF SUBMISSION</u>	<u>CONSEQUENCES OF NON COMPLIANCE</u>
15. Initial Manning Report (JCAA-1)	After notification of award but prior to signing a construction Contract	Forfeiture of Bid Security
16. Monthly Project Workforce Report	Once a month thereafter for the Duration of Contract	Default of Contract
17. Insurance Certificates	Prior to Execution of Contract by the City	Forfeiture of Bid Security
18. Performance and Payment Bond	Prior to Execution of Contract by the City	Forfeiture of Bid Security
19. Execution of Contract Agreement	Within 10 days of City Notice of Contract Award	Forfeiture of Bid Security
20. Construction Permits	Prior to Start of Construction (where required)	Default of Contract
21. Subcontractor Prequalification and Insurance other than those listed under <u>N.J.S.A.</u> 40A:11-16	Prior to Subcontractor's Participation	Denial of Subcontractor or Default
22. Material Certifications	Prior to Incorporation in Project	Removal of Unapproved Materials or Default of Contract
23. Shop Drawings	Prior to Incorporation in Project	Removal of Unapproved Materials or Default of Contract
24. Preconstruction Photographs	Prior to Commencement of Work or Stockpiling of Materials (where required)	Default of Contract
25. Notification to Public Utilities	Prior to Commencement of Work	Default of Contract
26. Commencement of Work	Within 10 days of Contract or as Stated in "Notice to Proceed"	Default of Contract
27. Claims for Extra Cost	Within 48 Hours of Instructions from Architect	Denial of Claim
28. Construction Schedule Periodic Estimates	Prior commencement of work and following with each partial payment	Payment Withheld Until Received
29. Request for Additional Time	Within 10 days of Beginning of Delay	Denial of Request Liquidated Damages
30. Water Sample Analysis or other Required Tests	Testing of New Water Mains and Equipment	No Acceptance Final Payment Withheld

The Contractor shall provide all submittals required under this Contract whether or not listed above.

**WARRANTY
OF GOOD
TITLE**

City of Jersey City
280 Grove Street
Jersey City, New Jersey 07302

ARCHITECT'S PROJECT NO:

CONTRACT FOR:

CONTRACT DATE:

PROJECT :
(name, address)

State of:

County of:

This is to certify that no material, supplies, or equipment installed as part of the work of this contract, was purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The contractor shall warrant good title to all materials, supplies and equipment installed or incorporated in the work and, upon completion of all work shall deliver the same together with all work and appurtenances constructed or placed thereon by him to the City of Jersey City free from any claim, liens, or charges. Neither the contractor nor any person, firm, or corporation furnishing any material or labor for any work covered by this contract shall have any right to a lien upon any work or appurtenance thereon.

CONTRACTOR:

Address:

BY:

Subscribed and Sworn to before me this _____ day of _____ 20____

Notary Public:

My Commission Expires:

**CONTRACTOR'S
AFFIDAVIT OF
RELEASE OF LIENS**

City of Jersey City
280 Grove Street
Jersey City, New Jersey 07302

ARCHITECT'S PROJECT NO:

CONTRACT FOR:

CONTRACT DATE:

PROJECT :
(name, address)

State of:

County of:

The undersigned hereby certified that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of payment noted above.
2. Separate Release or Waivers of Liens from Subcontractors and material and equipment suppliers accompanied by a list thereof.

CONTRACTOR:

Address:

BY:

Subscribed and Sworn to before me this
day of 20

Notary Public:

My Commission Expires:

CONTRACTOR'S INTERIM AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS

City of Jersey City
280 Grove Street
Jersey City, New Jersey 07302

ARCHITECT'S PROJECT NO:

CONTRACT FOR:

CONTRACT DATE:

PROJECT :
(name, address)

State of:

County of:

The undersigned hereby certified that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered for the period of _____ to _____ represented in payment no. _____ .

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of payment noted above.
2. Separate Release or Waivers of Liens from Subcontractors and material and equipment suppliers accompanied by a list thereof.

CONTRACTOR:

Address:

BY:

Subscribed and Sworn to before me this
day of 20

Notary Public:

My Commission Expires:

**CAVEN POINT - SOCCER FIELD NEW ARTIFICIAL
TURF AND LIGHTING**

JULY/2015

SUPPLEMENTARY CONDITIONS

1. **EXAMINATION OF SITES:**

Every prime and sub-contract bidder shall study the conditions at the site(s) thoroughly before submitting his bid. No allowance for extra charges will be permitted because of lack of knowledge of all conditions peculiar thereto except such conditions as are indeterminable before the commencement of the work.

2. **CHARGE OF SITES:**

The contractor shall take the site as found, and shall assume charge of his work throughout the site until completion and acceptance of project by the Architect/Engineer.

The contractor shall cooperate fully and coordinate his work with the City, all utility companies, and all other contractor(s) so that all work is completed on time, with good workmanship and in a harmonious and efficient manner.

The contractor shall be responsible for the security of all his materials, equipment, facilities within the confines of the site.

It shall be the responsibility of the contractor to provide all necessary work of a permanent or temporary nature to safeguard public and construction site.

Work scheduling shall take into full consideration the requirements of the City with respect to minimal disruption of existing functions by demolition and alterations, including the following:

- a. Electrical, gas, water, telephone and drainage services.
- b. Accessibility to existing areas.
- c. Parking areas.
- d. Accessibility by City Maintenance Crews.
- e. Safety of park patrons.
- f. Noise of demolition and construction operations.

The scheduling of shutdowns and other interruptions of existing utilities shall have the approval of the Owner. No shutdowns will be allowed without prior clearance. Shutdown time shall be held to a minimum.

The time and date agreed upon for shutdown periods shall occur during hours approved by the Owner. The performance of this work at such times shall not result in additional expense to the City.

SUPPLEMENTARY CONDITIONS

3. PROTECTION OF PERSONS AND PROPERTY:

This bidder shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with his work. The bidder shall take all reasonable precautions for the safety of and shall provide all reasonable protection to prevent damage, injury, or loss to:

1. All employees on the site and all other persons who may be affected thereby.
2. Other property at the site or adjacent thereto, including interiors and exteriors of the buildings, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation, or replacement in the courses of construction.

The bidder shall comply with all applicable laws, ordinances, rules, regulations, and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection, including precaution against fire, erection of solid fencing, posting of danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities. He shall designate a responsible member of his organization at the site, whose duty shall be the prevention of accidents.

Material Safety Data Sheets (MSDS) must be filed with the designated city personnel and copy to the architect, a minimum of ten (10) days prior to any material being brought onto the site. Failure to file MSDS will result in rejection of the material by the city inspector and it will not be permitted on the site.

No requirement of or omission to this Contract shall be deemed to limit or impair any responsibilities or obligations assumed by the contractor under or in connection with this contract.

All debris and waste resulting from the performance of the work shall be removed in such a manner as to prevent damage to all existing and new construction, and shall be legally disposed of by the contractor at his expense at the end of each day. Stockpiling of debris and waste is not permitted.

When the work is in progress, the contractor shall protect the areas directly below and/or around the work areas with yellow traffic cones. This bidder shall not load or permit any part of the work to be loaded so as to endanger its safety.

Fire protection during the contractor's activity shall be provided by installation of a minimum of two (2) chemical fire extinguishers on the site.

The contractor shall, at his own expense, make good any damage, direct or indirect that may be done in the course of the performance of the work by him or his subcontractor to any utility structure or municipal facility, or to newly completed work, through or by reason of the performance of the work.

SUPPLEMENTARY CONDITIONS

4. TEMPORARY WORK AND SERVICES:

The contractor shall provide all materials, labor and equipment necessary to perform all work of a general or temporary nature as required for the complete construction of the project, all as shown on the accompanying drawings and as specified herein.

All Temporary Work and Services shall be maintained in an acceptable condition for the duration of the project and until removal is authorized. At the end of the project, or as directed, the contractor shall remove all temporary work and services and dispose of all materials off site. Cost of all work plus cost of operating and maintaining temporary services shall be included in the contract price.

Temporary Stairs, Runways, etc.: The contractor shall design and provide the necessary temporary stairs, ladders, runways, platforms, scaffolding, floors, etc. that may be required. All such temporary structures shall be of adequate strength for the purposes for which they are constructed.

Temporary Light and Power: Where necessary, the contractor shall provide at his own expense, suitable power facilities and the temporary lighting required for the proper prosecution of the work.

5. PRODUCT HANDLING, STORAGE AND DELIVERY:

The contractor shall arrange for the timely and orderly delivery of all materials and shall be responsible for their proper handling and protection.

Materials and equipment may be stored on the site, but the protection of same shall be the contractor's responsibility. In storing materials within the site, the contractor shall consult with the Owner.

Deliver material in manufacturer's original, unopened containers and rolls with labels intact and legible, to be inspected by Inspector. Deliver materials in sufficient quantity to allow continuity of work.

Store all materials on clean raised platforms. Store rolled goods on end. Handle rolled goods so as to prevent damage to edge or ends.

Provide continuous water protective covering for those materials which require protection against wetting and moisture absorption. Protect materials against damage by construction traffic. Remove damaged materials from construction site.

The contractor will not be permitted to store any petroleum products or any other flammable materials at the construction site.

The materials and equipment not to be stored at the work site shall be removed from the site and stored in the area designated for the contractor's use prior to the end of each work day. Access to work areas with equipment and material will be approved by the Architect prior to any work.

SUPPLEMENTARY CONDITIONS

6. PROGRESS SCHEDULE AND COST BREAKDOWN:

The Contractor shall submit to the Architect a Progress Schedule and cost Breakdown for approval as described in Article GC-33, of the General Conditions.

The cost breakdown shall generally follow the division of trades in the Technical Specifications. Should any trade amount exceed \$10,000., this trade shall be subdivided into finer cost breakdowns as to meet the Architects/Engineers approval.

7. RECORD DRAWINGS

The Record Drawings (Section 01700, Item 1.5 B) shall be reviewed the same day as the request for payment during the course of the Work. Payment will not be made unless all work which varies substantially or requires precise measurement has been transferred to the Record Drawings.

8. CLEANING UP:

The contractor shall keep the site free from all surplus material, dirt and rubbish at all times. At the completion of the work, he shall remove all waste materials and rubbish from and about the project and shall remove all paint and/or bituminous spots from new and existing surrounding surfaces.

Spaces where construction work is in progress and all the adjacent areas shall be broom cleaned and free of refuse, rubbish, scrap material or debris at the end of each work day.

In addition to general broom cleaning, the following cleaning shall be done at completion of work: remove marks, stains, fingerprints, other soil and dirt from all surfaces affected by this project; clean out all new and existing drainage structures constructed and/or affected in any way by the work of this contract.

9. PUNCH LIST:

Near the completion of the project, upon the contractor's notification, the Architect and Engineer will inspect the work, and prepare one or more punch lists of work that needs to be corrected. The contractor shall have the work on the punch list corrected by the respective trades to conform to the contract documents, shall check the work, and shall notify the Architect when the punch list items are properly corrected.

The final payment shall not be released until all corrective work is completed and approved by the Architect.

END OF SUPPLEMENTARY CONDITIONS

SUPPLEMENTARY CONDITIONS

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections and Geotechnical Investigation apply to this Section (Report in Appendix A.)

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Project consists of the synthetic surfacing of the Caven Point Soccer Field.
 - 1. Project Location: Caven Point Road and Chapel Avenue, Jersey City, New Jersey 07305.
 - 2. Owner: City of Jersey City, 280 Grove Street, Jersey City, New Jersey 07302.
- B. Architect Identification: The Contract Documents, dated July 2015 were prepared for the Project by Jersey City Division of Architecture, Engineering, Traffic and Transportation, 13 - 15 Linden Avenue, Jersey City, New Jersey 07305 and Associated Technology, Inc, Consulting Engineers.
- C. The Work consists of but is not limited to the following:
 - * Removal and disposal of existing site natural turf (grass), as designated on the drawings.
 - * Grading of site to establish new subgrade elevations as shown on the drawings.
 - * Construction of new drainage base for the artificial turf field.
 - * Preparation and installation of new concrete curb and nailer.
 - * Installation of synthetic turf system material with infill granules, in accordance with manufacturers specifications and recommendations. (Turf system supplied by Owner).
 - * Contractor responsible for off-loading of City purchased materials for installation by the contractor.

- * Installation of reinforced concrete drilled piers. (Alternate A - Sports Lighting Foundations).
- * Installation of electrical service/panel and all related wiring conduit required to energize new lighting.
- * Installation of new sports field lighting; poles and lights will be provided to contractor for installation. (Alternate A).

1.3 CONTRACTS

- A. Project will be constructed under a general construction contract.

1.4 USE OF PREMISES

- A. General: Contractor shall have full use of area within the Limit of Construction designated on the drawings for construction operations during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Sewers and drainage.
 - 2. Water service and distribution.
 - 3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
 - 4. Heating facilities.
 - 5. Electric power service.
 - 6. Lighting.
 - 7. Telephone service.
- C. Support facilities include, but are not limited to, the following:
 - 1. Dewatering facilities and drains.
 - 2. Project identification and temporary signs.
 - 3. Waste disposal facilities.
 - 4. Storage and fabrication sheds.
 - 5. Snow and ice removal.
 - 6. Lawn Maintenance.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Environmental protection.
 - 2. Stormwater control.
 - 3. Site enclosure fence.
 - 4. Barricades, warning signs, and lights.
 - 5. Fire protection.

1.3 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
 - 1. Owner's construction forces.
 - 2. Occupants of Project.
 - 3. Architect.
 - 4. Testing agencies.
 - 5. Personnel of authorities having jurisdiction.
- B. Water Service: Pay water service use charges, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site.
- C. Electric Power Service: Pay electric power service use charges, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site.

1.4 SUBMITTALS

- A. Project Identification Sign: Submit shop drawings of project sign with lettering sizes and font types indicated.
- B. Traffic Control Plan: Submit plans indicating work sequencing in terms of traffic control. Indicate traffic patterns, areas to be closed down to pedestrians and automotive traffic including all signs and barricades required.
- C. Application for Street, Lane, Sidewalk Closure: Submit application located at end of Section, or most current revised application, to Jersey City Engineering & Transportation Division.
- D. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- E. Implementation and Termination Schedule: Within 15 days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

1.5 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
 - 1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
 - 2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
 - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 - 1. Keep temporary services and facilities clean and neat.
 - 2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
- B. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.76-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts.

- C. Construction Signs: See Application at end of Section for typical signs. Meet N.J.D.O.T. and J.C. Engineering and Transportation requirements.
- D. Paint: Comply with requirements in Division 9 Section "Painting."
- E. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- F. Water: Potable.

2.2 EQUIPMENT

- A. General: Provide equipment suitable for use intended.
- B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- C. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- D. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
 - 1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7.2 to 12.7 deg C).
- E. Heating Equipment: Unless Owner authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.
- F. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

- G. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.
- H. First Aid Supplies: Comply with governing regulations.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
- B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
 - 1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 - 2. Connect temporary sewers to municipal system as directed by sewer department officials.
 - 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.

4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Provide separate facilities for male and female personnel.
 3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
 - a. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.
 4. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
 - a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7.2 to 12.7 deg C).
 5. Locate toilets and drinking-water fixtures so personnel need not walk more than or 200 feet (60 m) horizontally to facilities.
- E. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.
1. Maintain a minimum temperature of 50 deg F (10 deg C) in permanently enclosed portions of building for normal construction activities, and 65 deg F (18.3 deg C) for finishing activities and areas where finished Work has been installed.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

- G. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.
 - 1. Install electric power service underground, unless overhead service must be used.
 - 2. Install power distribution wiring overhead and rise vertically where least exposed to damage.
- H. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
 - 1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 - 2. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
- J. Telephone Service:
 - 1. Furnish superintendent with electronic paging device or portable two-way radio for use when away from field office.
 - 2. Provide a portable cellular telephone for superintendent's use in making and receiving telephone calls when away from field office.
 - 3. **Provide a cellular phone with charger with unlimited usage for the J.C. Inspectors use during the contract limit through final payment. Turn over activated phone at Pre-Construction Meeting. Include a carrying case or clip along with an automobile charging cord.**

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
 - 2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.

3. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads. Comply with requirements of authorities having jurisdiction.
- C. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent Work or temporary facilities.
 2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
 3. Remove snow and ice as required to minimize accumulations. Snow shall be removed by G.C. from all sidewalks within the right-of-way within 24 hours of stoppage of snow.
- D. Lawn Maintenance within limit of Construction Area: During the growing seasons (April through November) provide lawn cutting and line trimming of all edges of lawns a minimum of three times per month. If General Contractor does not perform this lawn maintenance the Owner will issue one written warning for G.C. to commence lawn maintenance within 48 hours. After the 49th hour the Owner will contract with a lawn maintenance contractor for the duration of the project and the amount will be deducted from the General Contractor's Contract plus 15% additional for Owners overhead costs.
- E. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated at the end of this section. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.
1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated.
 2. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
 3. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.
- F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.

1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
 2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.
- G. Janitorial Services: Provide janitorial services on a bi-monthly basis for temporary offices, first-aid stations, toilets, wash facilities, lunchrooms, and similar areas. Provide weekly service for toilet facilities.
- H. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.
1. Construct framing, sheathing, and siding using fire-retardant-treated lumber and plywood.
 2. Paint exposed lumber and plywood with exterior-grade acrylic-latex emulsion over exterior primer.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- B. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.
- C. Site Enclosure Fence: Before construction operations begin, install chain-link enclosure fence with lockable entrance gates. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
1. Set fence posts in compacted mixture of gravel and earth or in concrete bases.
 2. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.
 3. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.

- D. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- E. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - 2. Vertical Openings: Close openings of 25 sq. ft. (2.3 sq. m) or less with plywood or similar materials.
 - 3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 - 4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
 - 5. Where temporary wood or plywood enclosure exceeds 100 sq. ft. (9.2 sq. m) in area, use fire-retardant-treated material for framing and main sheathing.
- G. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1. Provide fire extinguishers, mounted where visible and accessible from space being served, with sign mounted above.
 - a. Type: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
 - b. Locate fire extinguishers where convenient and effective for their intended purpose.
 - 2. Store combustible materials in containers in fire-safe locations.
 - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
 - 4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
 - 5. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 01500

CAVEN POINT
ARTIFICIAL TURF AND LIGHTING
CITY OF JERSEY CITY
STEVEN M. FULOP
MAYOR

ROLANDO R. LAVARRO JR.
COUNCIL PRESIDENT

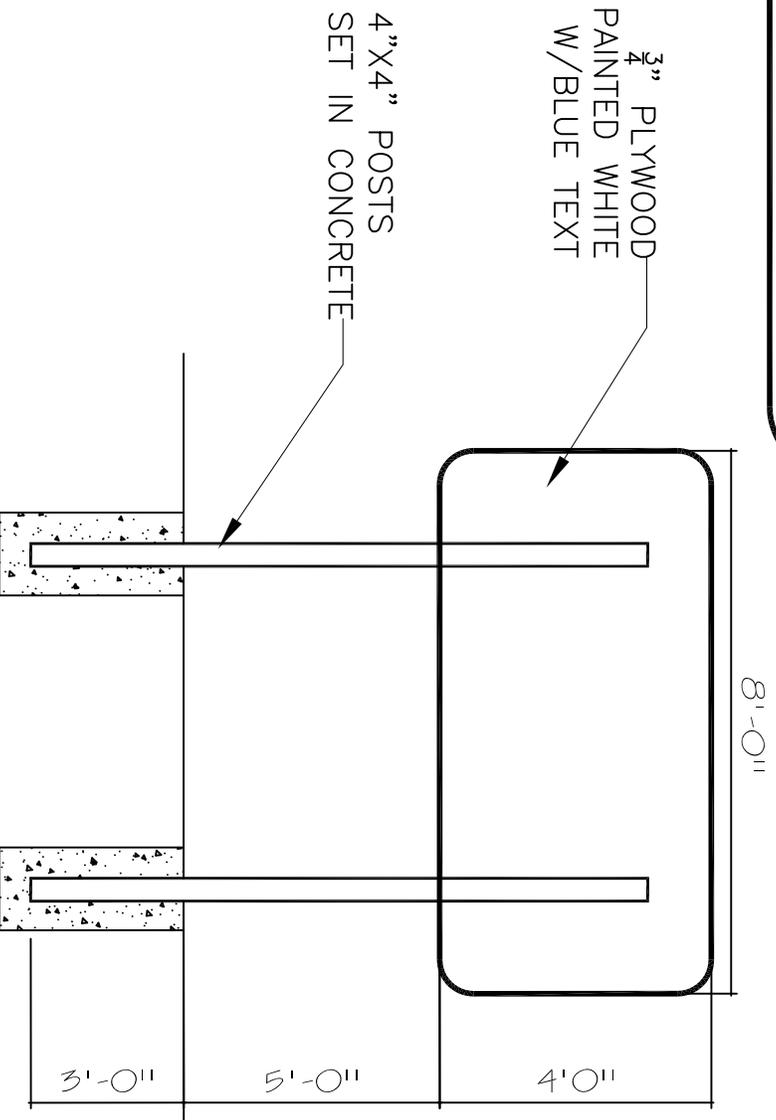
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CITY OF JERSEY CITY
DEPARTMENT OF ADMINISTRATION
DIVISION OF ARCHITECTURE, ENGINEERING AND TRAFFIC
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SECTION 01732 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected site elements.
 - 2. Repair procedures for selective demolition operations.
- B. Related Sections include the following:
 - 1. Division 1 Section "Photographic Documentation" for preconstruction photographs taken before selective demolition.
 - 2. Division 1 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
 - 3. Division 2 Section "Site Clearing" for site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Save: Salvage items from existing construction and deliver them to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
- B. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
 - 1. Coordinate with Owner, who will establish special procedures for removal and salvage.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.

1.6 PROJECT CONDITIONS

- A. Owner assumes no responsibility for condition of areas to be selectively demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- C. Storage or sale of removed items or materials on-site will not be permitted.
- D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 - 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

3.2 UTILITY SERVICES

- A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.
- B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.

- C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
 - 4. All utilities are to be terminated at source in street in accordance with the governing Utility Company's requirements.

3.3 PREPARATION

- A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 - 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 - 3. Protect existing site improvements, appurtenances, and landscaping to remain.
 - 4. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
- C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition areas.

3.4 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.5 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Dispose of demolished items and materials promptly.
 2. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- B. Removed and Reinstalled Items: Comply with the following:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition [and cleaned] and reinstalled in their original locations after selective demolition operations are complete.
- D. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts. Remove footings in their entirety.

3.6 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching: Comply with Division 1 Section "Cutting and Patching."

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 01732

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project Record Documents.
 - 3. Operation and maintenance manuals.
 - 4. Warranties.
 - 5. Instruction of Owner's personnel.
 - 6. Final cleaning.
- B. Related Sections include the following:
 - 1. Division 1 Section "Photographic Documentation" for submitting Final Completion construction photographs and negatives.
 - 2. Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for products of those Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 3. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

4. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
5. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
6. Complete startup testing of systems.
7. Submit test/adjust/balance records.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Advise Owner of changeover in heat and other utilities.
10. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
11. Complete final cleaning requirements, including touchup painting.
12. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to provisions of the contract.
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit pest-control final inspection report and warranty.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will

notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three (3) copies of list. Include name and identification of each area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.6 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
 1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.

2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
6. **At a time near the completion of the work, arrange and pay for reproduction firm with document loss insurance coverage to secure original drawings from Architect to make one complete set of mylar transparencies of all drawings included in this contract. Carefully transfer all changes shown on the record drawings to the corresponding mylars. Call attention to each change entry by drawings neatly in a crisp pen or pencil. Submit full set of mylars as a record document. Original drawings to be returned to the architect by the reproduction firm.**

C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Note related Change Orders and Record Drawings where applicable.

D. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.7 OPERATION AND MAINTENANCE MANUALS

A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.

2. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.

- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.8 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. **Cleaning Agents:** Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

- A. **Instruction:** Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Provide instructors experienced in operation and maintenance procedures.
 - 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 - 3. Schedule training with Owner, through Architect, with at least seven 7 days' advance notice.
 - 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

- B. **Program Structure:** Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
 - 1. System design and operational philosophy.
 - 2. Review of documentation.
 - 3. Operations.
 - 4. Adjustments.
 - 5. Troubleshooting.
 - 6. Maintenance.
 - 7. Repair.

3.2 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Remove labels that are not permanent.
 - g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - h. Replace parts subject to unusual operating conditions.
 - i. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01770

SECTION 02140 – STORMWATER/DEWATERING RUNOFF AND FLUIDS CONTROL

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Work shall include, but not necessarily be limited to, the following:
 - 1. Control, collection, and storage of discharge from dewatering operations generated during construction.
 - 2. Prepare, file and obtain all necessary permits to construct and operate all required recovery, control treatment and discharge facilities.

1.2 RELATED SECTIONS

- A. Documents affecting the work of this section include, but are not necessarily limited to:
 - 1. Section 02300 - Earthwork
 - 2. Section 02430 - Soil Erosion and Sediment Control

1.3 QUALITY ASSURANCE

- A. Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts and are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- B. “New Jersey Stormwater Best Management Practices Manual” April 2004.

1.4 SUBMITTALS

- A. Supplemental to the general requirements for excavation as set forth in other portions of this document, provide a plan for the collection, storage and disposal of dewatering effluent.
- B. Provide a plan for the collection, testing and disposal of all decontamination waste fluids and solid wastes.
- C. Provide manufacturer’s data sheets for all materials and equipment used to pump, transfer or store fluids and waste solids.

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- D. Copies of all permit applications, copies of all draft and final permit documents.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforced polyethylene sheeting to be Griffolyn TX-1200 Black or approved equal (Reef Industries, Inc., Houston, TX. 1-800-231-6074).
- B. 55-gallon drums and/or large storage tanks suitable for storage of contaminant liquids.
- C. Health and Safety barrier materials.

PART 3 - EXECUTION

3.1 STORMWATER RUNOFF AND DEWATERING CONTROL

- A. As required by the general requirements for excavation as set forth in other portions of this document and the Health and Safety Plan (HASp), the Contractor shall keep excavations and site construction area free of water and shall capture, store and prevent the uncontrolled discharge of said water.
- B. The Contractor shall manage earthwork grades and provide temporary basins, trenches, sumps, transfer pumping, piping, etc. to prevent stormwater from flowing onto disturbed areas from other areas and to capture, store and prevent the uncontrolled discharge of stormwater falling directly onto disturbed areas.
- C. The Contractor shall collect, store, and coordinate the disposal of storm water accumulations and dewatering fluids during periods of site disturbance, work shall include the furnishing of tanks and all appurtenant piping, valves, supports and controls. The storage vessels shall include devices to control overfills. Any onsite treatment and discharge of collected water will be performed in accordance with local, state and federal laws.

3.2 WASTE FLUID AND SOLIDS CONTROL

- A. The Contractor shall collect, store and coordinate the proper dispose of all waste fluids and waste solids generated as a result of all HASP activities, stormwater and dewatering control activities and equipment, debris or work area decontamination activities in accordance with all federal, state and local laws and regulation.
- B. The Contractor shall collect, store, and dispose of leachate from soil and debris stockpiles if required as directed by the Engineer.
- C. The Contractor shall prior to disposal of any waste fluids or waste solids, submit to the owner or owner's environmental consultant waste classification test results and the identity of the properly licensed disposal facility contracted to receive the waste. The Contractor shall not dispose of any waste fluids or waste solids without the prior written approval of the owner. The owner has the right to reject any disposal facility and require an alternate without an increase in the contract price. The Contractor shall provide the owner with completed waste manifest and transportation forms within five days of disposal.

3.3 BASINS, TRENCHES

- A. If the Contractor constructs basins and/or trenches at the Site for the control, transfer or storage of stormwater or dewatering effluent they shall be constructed of materials free of chemical contamination and lined with reinforced polyethylene sheeting which is installed, anchored and maintained in accordance with the manufacturer's recommendations. The discharge point from any trench or basin shall be provided with an absorbent boom to prevent the discharge of floating product sheen. All measures shall be continuously maintained free of leakage and overflow.
- B. The materials utilized to construct all temporary measures employed under this section shall be removed and disposed of prior to final acceptance of the Work.

END OF SECTION 02140

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SECTION 02160 - MONITORING WELL RECONSTRUCTION

I. PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Reconstruction of existing groundwater monitoring wells from steel cased flush mounts to flush mount manholes specifically designed for use within artificial turf fields at locations as specified on design drawings. Specifications for the flush mount manholes are provided on detail sheet SP-3.

1.2 QUALITY ASSURANCE

- A. If the well head needs to be raised or lowered the use a New Jersey Licensed Well Driller who is thoroughly trained and experienced in the necessary craft and are completely familiar with the specified requirements and methods will needed for proper performance of the work.
- B. Work to be conducted in accordance with N.J.A.C. 7:9D and the NJDEP Field Sampling Procedures Manual (last revised April 11, 2011).

1.3 MEASUREMENT AND PAYMENT

- A. All work required by this section is included in the lump sum bid.

II. PART 2 PRODUCTS

2.1 MATERIALS

- A. 3500.5 ComBox reflush mount monitoring well manhole (with infill retainer system) by Sports Field Specialities, or approved equal.
- B. Concrete (to seat manholes)

III. PART 3 EXECUTION

3.1 WORK ZONE DEFINITION

- A. The Contractor shall be familiar with, and adhere to, the requirements for each of the work zones established for the Site. The Contractor Health and

Safety Plan shall specifically develop detailed requirements and layouts of the necessary areas and control measures.

3.2 SITE ACCESS AND CONTROL MEASURES

- A. Install and maintain sufficient control measures to prevent newly installed manholes from being disturbed prior to any concrete curing (if applicable).
- B. Properly cover concrete prior to curing from precipitation.
- C. All generated soils or debris shall be reused or properly disposed.

END OF SECTION

SECTION 02230 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Removal of turf and other vegetation.
2. Topsoil stripping.
3. Clearing and grubbing.
4. Disconnecting, capping or sealing, and abandoning site utilities in place..
5. Disconnecting, capping or sealing, and removing site utilities.

- B. Related Sections include the following:

1. Division 1 Section "Temporary Facilities and Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures during site operations.
2. Division 1 Section "Selective Demolition" for demolition of structures.

1.3 PROJECT CONDITIONS

- A. Traffic: Conduct site-clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.
- B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.
 1. Protect improvements on adjoining properties and on Owner's property.
 2. Restore damaged improvements to their original condition, as acceptable to property owners.

1.4 MATERIALS OWNERSHIP

- A. Except for materials indicated to be stockpiled or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

1.5 EXISTING SERVICES

- A. General: Indicated locations are approximate; determine exact locations before commencing Work.
- B. Arrange and pay for disconnecting, removing, capping, and plugging utility services. Notify affected utility companies in advance and obtain approval before starting this Work.
- C. Place markers to indicate location of disconnected services. Identify service lines and capping locations on Project Record Documents.

1.6 SUBMITTALS

- A. Photographs or videotape sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damaged caused by site clearing.
- B. Record Drawings according to Division 1 Section "Project Closeout".
 - 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earthwork."
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange to shut off indicated utilities with utility companies.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
- C. Excavate for and remove underground utilities indicated to be removed.

3.3 SITE CLEARING

- A. General: Remove trees, shrubs, grass, and other vegetation, improvements, or obstructions, as indicated, to permit installation of new construction.
- B. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.
 - 1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove top layer (2" - 3" depth) growths of grass from areas before stripping topsoil (4" - 6" depth).
 - 2. Topsoil is to be stockpiled and stabilized as per Hudson Essex Passaic Soil Conservation District (HEPSCD) requirements.
 - 3. Dispose of unsuitable topsoil as specified for disposal of waste material.

- C. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except for those indicated to be left standing.
 - 1. Completely remove stumps, roots, and other debris protruding through ground surface.
 - 2. Use only hand methods for grubbing inside drip line of trees indicated to remain.
 - 3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - a. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.
- D. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction. Fill voids left from removal of foundations with engineered fill to subgrade level.
- E. Abandonment or removal (with resetting as required) of certain underground pipe or conduits may be required during excavation of new site utilities. Removal of abandoned underground piping or conduit 'interfering' with construction is included under this section, at no additional cost to the City.
- F. When new construction crosses existing utilities that are abandoned (irrigation and storm drain piping), the contractor shall cap all ends with concrete fill plug, no less than twice pipe diameter or 12" which ever is greater.

3.4 DISPOSAL OF WASTE MATERIALS

- A. Burning on Owner's Property: Burning is not permitted on Owner's property.
- B. Removal from Owner's Property: Remove waste materials and unsuitable or excess topsoil from Owner's property.

END OF SECTION 02230

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section as if written out herein full.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preparing and grading subgrades for slabs-on-grade, walks, pavements, and synthetic surfacing.
 - 2. Excavating and backfilling for concrete curbs and structures.
 - 3. Excavating and backfilling for underground storm and water utilities.
 - 4. Dewatering of trenches during excavation activities.
 - 5. Subbase course for concrete walks and pavements.
 - 6. Shoring and bracing requirements for safe trench conditions.
 - 7. Soil compaction required for backfill operations or suitable subbase for paving improvements.
 - 8. Warning tape installations for underground utilities.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - Section 02230. Site Clearing
 - Section 02920. Lawns and Grasses
 - Section 02925. Synthetic Turf
 - Section 02926. Synthetic Turf (Stone and Drainage Pipe Base Preparation)
 - Section 03300. Cast-in-place Concrete

1.3 DEFINITIONS

- A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
- B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

- C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
- D. Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.
- E. Base Course: The layer placed between the subbase and surface pavement in a paving system.
- F. Drainage Fill: Course of washed granular material supporting play surface placed to cut off upward capillary flow of pore water. (See Section 02630, Field Drainage System, for free draining stone base.)
- G. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Architect. Unauthorized excavation, as well as remedial work directed by the Architect, shall be at the Contractor's expense.
 - 1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Architect.
 - 2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect.
- H. Additional Excavation: When excavation has reached required subgrade elevations, notify Architect, who will make an inspection of conditions. If Architect determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Architect. The contract sum may be adjusted by an appropriate contract modification.
 - 1. Removal of unsuitable material and its replacement as directed will be paid based on conditions of the contract relative to changes in work or by unit prices established in the bid proposal.
- I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.
- J. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material 3/4 cu. yd. (0.57 cu. m) or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2 inches (97 blows/50 mm).
- K. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.4 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for the following:
 - 1. Each type of plastic warning tape.
 - 2. Filter fabric.
- C. Test Reports: Submit the following reports directly to the Architect, from the testing services, with copy to the contractor:
 - 1. If borrow material is needed including topsoil, contractor shall retain an independent testing laboratory, approved by the architect to test borrow material for composition, place of origin and hard metal contaminants. All material brought onto site shall meet the DEPE standards NJAC 7:26-D for Direct Contact Soil Cleanup Criteria, latest edition. The material will be deemed unacceptable if any contaminant listed in the standard meets or exceeds the values of said criteria..
 - 2. Any material brought on site without testing shall be rejected and removed from the site at contractor's expense.
- D. Samples: For the following:
 - 1. 30-lb (14-kg) samples, sealed in airtight containers, of each proposed soil material from on-site or borrow sources.
 - 2. 12-by-12-inch (300-by-300-mm) sample of drainage fabric.
 - 3. 12-by-12-inch (300-by-300-mm) sample of separation fabric.

1.5 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials testing (compaction, proof roll observations, etc.) herein specified, as documented according to ASTM D 3740 and ASTM E 548.
- B. Licensed Land Surveyor: Surveying work specified herein shall be performed by a N.J. licensed land surveyor.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection

during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 2. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.
 - a. Provide minimum of 48-hour notice to Architect, and receive written notice to proceed before interrupting any utility.
 3. Inactive or abandoned utilities encountered during excavation, whether or not indicated, shall be removed, or capped and plugged by the general contractor, as part of the work of this contract. No extra compensation will be awarded beyond the contract price for this work.
 4. The plug shall conform to Jersey City Standards. It shall be twice as deep as the diameter of the pipe or 12", whichever is greater and consist of one part Portland Cement and two parts sand; or the Contractor shall use a vitrified clay or concrete disc plug which shall be placed in the hub with the entire area cemented over.
- B. Use of Explosives: Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.
- C. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
1. Operate warning lights as recommended by authorities having jurisdiction.
 2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 3. Perform excavation by hand within dripline of large trees to remain. Protect root systems from damage or dry out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap. All work in areas of root systems shall be performed under supervision of the City Arborist.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide approved borrow soil materials from off-site for areas designated on drawings.
- B. Satisfactory Soil Materials: ASTM D 2487 soil classification groups GW, GP, GM, SW, and SP; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.
- C. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups GC, SM, SC, ML, MH, CL, CH, OL, OH, and PT.
- D. Backfill and Fill Materials: Satisfactory soil materials. Existing soils may be re-used if they are satisfactory soil materials and are screened to remove items larger than 2 inches.
- E. Subbase and Base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, ASTM D 2940, with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve. (N.J.D.O.T. Dense Graded Aggregate acceptable.)
- F. Engineered Fill: Subbase or base materials.
- G. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate grading size 57, with 100 percent passing a 1 1/2" sieve and not more than 5 percent passing a No. 8 sieve.
- H. Topsoil defined as fertile, friable, natural loam, surface soil that is reasonably free of subsoil and clay.
- I. Class "B" Bedding: Shall consist of sand or sandy soil, all of which shall pass a 3/8 inch sieve and not more than 10 per cent of which shall pass a No. 200 sieve.

2.2 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
 1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.
- B. Geotextile Fabric in pipe trench (See details in back of Section): Nonwoven geotextile, specifically manufactured as a drainage geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
 1. Grab Tensile Strength: 110 lbf (490 N); ASTM D 4632.

2. Tear Strength: 40 lbf (178 N); ASTM D 4533.
3. Puncture Resistance: 50 lbf (222 N); ASTM D 4833.
4. Water Flow Rate: 150 gpm per sq. ft. (100 L/s per sq. m); ASTM D 4491.
5. Apparent Opening Size: No. 50 (0.3 mm); ASTM D 4751.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 EXCAVATION

- A. Classified Excavation: Excavation is classified and includes excavation to required subgrade elevations. Excavation will be classified as earth excavation or rock excavation as follows:
 1. Earth Excavation: Excavation shall consist of the removal of all pavement, earth, boulders, brick, stone, curb, sidewalk, concrete masonry, piles, timber, small structures, sheeting, railroad materials, timber crib, garbage, rock and other materials encountered, as required for the construction of storm drainage utility lines, structures and appurtenances as shown on the Plans. Excavation shall be performed in accordance with this Specification and the various sections of this specification. All earth excavation shall be performed as part of the lump sum contract.
 - a. Intermittent drilling, or ripping to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
 2. Rock excavation includes removal and disposal of rock material and obstructions encountered that cannot be removed by the following heavy-duty rock excavation equipment without systematic drilling, blasting, or ripping.
 - a. Rock material includes boulders 1 cu. yd. or more in volume and rock in beds, ledges, unstratified masses, and conglomerate deposits.
 3. Rock excavating equipment for footings, trenches, and pits shall be equivalent to Caterpillar Model No. 215D LC track-mounted hydraulic excavator, equipped with a 42-inch-wide short-tip radius rock bucket, rated at not less than 120-hp flywheel power with bucket-curling force of not less than 25,000 lb and stick-crowd force of not less than 18,700 lb, measured according to SAE Standard J1179.

4. Rock-excavating equipment for open excavations shall be equivalent to Caterpillar Model No. 973, heavy-duty, track-mounted loader, rated at not less than 210-hp flywheel power and developing minimum of 45,000-lb breakout force, measured according to SAE Standard J732c-69.
- B. Uncontaminated debris, empty tanks that are free of contaminated residue and other deleterious materials such as wood, old timber piles, abandoned utility pipes, etc. from the excavation shall be disposed of off-site in areas provided by the Contractor as per Section 02110 - Site Clearing.
 - C. Special care must be taken in area where organic or soft soils are encountered at the bottom of the excavation. In such areas, the teeth of the bucket of the excavating equipment shall be shielded with a screed plate or bar to minimize the disturbance of the organic or soft materials.
 - D. The Contractor shall provide sufficient survey control such that it can be verified at all times that construction is being accomplished at the proper location and grade. The elevations of the in-place field drainage system, curb, subgrade for turf shall not vary more than one-half ($\frac{1}{2}$) of an inch from the elevations shown on the Plans/Details.
 - E. All obstructions, old foundations, abandoned utilities, etc. encountered during excavations shall be removed to provide a minimum clearance of at least six (6) inches below the bedding material or as directed by the Architect. Any old piles shall be cut off rather than pulled out. The cutting of the old piles shall be done at a 45 degree chamfer with a saw in a careful manner so as to minimize the disturbance of the underlying soil. Hitting or breaking of the piles with heavy equipment is not permitted.
 - F. If any adjustments to pipe/structure location or invert elevations are necessary due to conflicts with existing utilities, etc., such adjustments to the Plans shall be made by the Architect. The Contractor shall carry out such adjustments during construction at no additional cost to the City provided they are within the range of plus or minus (+/-) one (1) foot from the Plan elevations and three (3) feet from the Plan location.

3.3 STABILITY OF EXCAVATIONS

- A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.
- B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

1. Provide permanent steel sheet piling or pressure-croosoted timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Cut off tops a minimum of 2'-6" below final grade and leave permanently in place.

3.4 DEWATERING

- A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
 1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
 2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.5 STORAGE OF EXCAVATED MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.
 1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
 2. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.
- B. Where material stockpiled is to remain for more than 7 days, comply with soil stabilization standards within specification Section 02450.

3.6 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.
 1. Excavations for Footings and Curbs: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Excavation for Drainage or Electrical Appurtenances: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot. Do not disturb bottom of excavations intended for bearing surface.

3.7 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.
- B. Excavations within existing pavements to remain shall commence with a clean, straight saw cut joint through material stratum. No exceptions will be permitted. Prepare edge of existing paving as per drawing detail attached to the back of this Section.

3.8 EXCAVATION FOR UTILITY TRENCHES

- A. Trench Excavation: Excavate perimeter drainage collector trenches 18" wide and 20" deep (minimum). The trenches should be excavated with a minimum of 0.5% slope starting from the low point of the drainage system at the outlet extending toward the high point(s). Design of the collector trenches should incorporate the following:
 1. All loose debris shall be removed from the trenches.
 2. The trenches shall be backfilled using permeable drainage base aggregate or other porous premium materials and compacted by hand tamping (or equivalent machinery) to a minimum 95% of the maximum density.
- B. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit as detailed on drawings.

3.9 APPROVAL OF SUBGRADE

- A. Finished Grading: The finished surface of the subgrade shall have a finished grade in accordance with the Plans and Specifications. Final subgrade shall be established to within a tolerance of +/- 1/4" (.02') or as recommended by manufacturer (whichever is most stringent) of the designed subgrade elevation.
- B. Grade Verification: A certified survey shall be performed at 25-foot centers to verify grade and elevation of the subgrade.
- C. Proof roll and mark "soft spots" for additional compaction or correction. Use loaded tandem or tri-axle dump truck fully loaded with minimum total load of 20 tons. Proof rolling operations must be performed in the presence of a Testing Company's Soils Engineer. Any soft or yielding areas shall be re-compacted or removed and replaced with engineered fill material to meet required compaction requirements.

- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Architect.

3.10 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Architect.
 - 1. Fill unauthorized excavations under other construction as directed by the Architect.
- B. Where indicated widths of utility trenches are exceeded, provide stronger pipe, or special installation procedures, as required by the Architect.

3.11 EXCAVATION IN ROCK AREAS

- A. Should rock be encountered above contract levels, all rock surfaces shall be uncovered and the Contractor shall at his expense, hire a licensed surveyor (approved by the Architect) who shall prepare a survey at scale of 1/8" = 1 foot indicating the outline and contour levels of rock surface on a 10 foot square grid. The survey shall be submitted to the Architect for computing the rock quantity to be excavated. The Contractor shall be paid based on quantity and unit price established in the bid proposal.
- B. Where rock is encountered, it shall be excavated by line drilling, or as may be otherwise found necessary, and all irregularities of surface on lines under pavement areas shall be carefully examined and all loose or shaken rock removed down to a solid horizontal bearing by the Contractor at his expense. Permits and licenses must be shown to the Architect on request. The methods of drilling and blasting shall be as prescribed in the Supplementary Specifications of the N.J. Standard Specifications for Road and Bridge Construction Amended Addition.
- C. The method of choice for rock removal shall be line drilling. Should it become impractical, as deem by the Architect, blasting may be considered. Blasting shall be performed in accordance with all local and state regulations and as outlined below.
- D. Explosives must be carefully transported, stored, handled and used. The Contractor will keep in the job only such quantities of explosives as may be needed for the work underway and only during such time as they are being used. Explosives shall be stored separately from other materials. When the need for explosives is ended, all such material remaining on the job shall be promptly removed from the premises. Care must be taken that no explosives, caps or detonators are stolen or get into the hands of unauthorized persons or left unguarded where they may cause accidents.

- E. An accurate blasting log must be maintained continuously for the duration of the Contract. The log shall record, for each shot, the location, amount of holes, depth, spacing, amount of explosive per hole, number of caps used and the exact date and time of the blast. In addition, a sketch showing displacement of direct and delay caps for each shot shall be recorded.
- F. Explosives shall be of such power and placed and used in such quantities and positions as will not make the excavation unduly large, nor shatter unnecessarily the rock upon or against which the structure is to be built, nor injure adjacent persons or property, those portions of the new work as may already be in place or other adjacent pipes, or other structures. The quantity of explosives fired at one blast must be small enough and the time for blasting selected to avoid undue annoyance to persons owning or occupying premises near the work.
- G. The rock must be completely matted when blasts are fired to prevent damage or injury to persons or property of the scattering of broken fragments on the adjacent ground. Adequate warning shall be given to all persons in the vicinity before any blast is discharged.
- H. When blasting is required, the operation shall be conducted with such care as not to cause damage to any of the existing underground utilities. Should such occur, the cost of repairs shall be the sole responsibility of the Contractor.
- I. In areas where the proposed construction is built against the face of rock excavation, all loosened or shattered portions of the rock must be completely removed by barring, wedging or other approved means so the concrete can be poured firmly in contact with solid rock.
- J. The Contractor shall notify each public utility or others having structures in proximity to the site, and others who may be affected of his intention to use explosives. Said notice shall be given in accordance with the applicable regulations therefore and sufficiently in advance to enable the involved agencies/companies/persons and the Contractor to take such steps as may be necessary to protect life and property. Such notice shall not in any way relieve the Contractor of responsibility for any damage resulting from his blasting operations.
- K. When in sufficiently close proximity to existing gas, water, sanitary, storm, or other utilities and structures and all services connected thereto, the contractor shall remove the rock by methods other than blasting, if necessary, in order to protect said utilities and their services from damage. Approved methods other than blasting are barring and wedging, jack hammer, drilling, rock jacks or other such hand or machinery methods which will not damage the adjacent utility.
- L. No explosives shall be brought into, stored or used on the site of any job by the contractor unless and until he shall have furnished the architect with a satisfactory certificate of insurance showing that the risks arising from the presence of and use of explosives and from blasting are included within the insurance provide by the contractor to secure his obligations to the city. Insurance should also cover damage to any underground utilities or other underground facilities.

- M. Vertical pay line for computing yardage of rock excavation is hereby established at 6" outside of and parallel to the vertical sides of the footings of the walls or piers and pipes . At piers or walls having no footings, the vertical pay line shall be 6" outside of, and parallel, to the vertical sides of the wall or piers at their lowest level.
- N. No additional compensations will be allowed for excavation or foundation work carried below the levels shown on plans unless same has been authorized in writing by the architect.

3.12 BACKFILL

- A. Backfill excavations promptly, but not before completing the following:
 1. Acceptance of construction below finish grade.
 2. Surveying locations of underground utilities for record documents.
 3. Testing, inspecting, and approval of underground utilities.
 4. Concrete formwork removal.
 5. Removal of trash and debris from excavation.
 6. Removal of temporary shoring and bracing, and sheeting.

3.13 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18 inches of footings. Place concrete to level of bottom of footings.
- C. Provide 4-inch-thick concrete base slab support for piping or conduit where top is less than 2'-6" below surface of roadways. After installation and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.
- D. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.
 1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- E. Coordinate backfilling with utilities testing.

- F. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.
- G. Place and compact final backfill of satisfactory soil material to final subgrade.
- H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.14 FILL

- A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.
 - 1. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface.
- B. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and recompact to required density.
- C. Place fill material in layers to required elevations for each location listed below.
 - 1. Under grass, use satisfactory excavated or borrow soil material.
 - 2. Under walks and pavements, use subbase or base material.
 - 3. Under steps and ramps, use subbase material.
 - 4. Under play surface, use drainage fill material.
 - 5. Under footings and foundations, use engineered fill.

3.15 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.
 - a. Stockpile or spread and dry removed wet satisfactory soil material.

3.16 COMPACTION

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.
- C. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D 1557:
 - 1. Under structures, building slabs, steps, and pavements, compact the top 12 inches below subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
 - 2. Under walkways, compact the top 6 inches below subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
 - 3. Under synthetic field: The subgrade shall be constructed using approved select fill material. This material shall be placed in lifts not greater than 8" in depth. Each lift (layer or course) shall be compacted to at least 95% of maximum dry density at optimum moisture content per ASTM D698 Standard Proctor method. The moisture in the soil, at the time of compaction, shall be uniformly distributed and should be within 90 and 120% range of the optimum.

3.17 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between existing adjacent grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.
- B. Site Grading: Slope grades to direct water into catch basins and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 0.10 foot.
 - 2. Walks: Plus or minus 0.10 foot.
 - 3. Pavements: Plus or minus ½".

3.18 SUBBASE AND BASE COURSES

- A. Under pavements and walks, place subbase course material on prepared subgrades. Place base course material over subbases to pavements.
 - 1. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections and thickness to not less than 95 percent of ASTM D 4254 relative density.
 - 2. Shape subbase and base to required crown elevations and cross-slope grades.
 - 3. When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.
 - 4. When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.
- B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders at least 12 inches wide of acceptable soil materials and compact simultaneously with each subbase and base layer.

3.19 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall employ and pay for a qualified independent geotechnical engineering testing agency to perform all field quality-control testing herein specified.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements. All test results are to be submitted signed and sealed by a N.J. licensed engineer.
- C. Foundation Subgrade: At foundation subgrades (building, dugouts, scoreboard, flagpole, light poles etc.), at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft.(186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.
 - 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet (30 m) or less of wall length, but no fewer than two tests.

3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each (150 feet (46 m) or less of trench length, but no fewer than two tests.
 4. Athletic Field: At subgrade and top of free draining stone base, at least one test for each 2,500 s.f. or less of field area.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace material to depth directed by the Architect; reshape and recompact at optimum moisture content to the required density.
- C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Contractor responsible for all testing characterization required by disposal facility. For the purposes on this bid, the surplus soil materials are considered non-RCRA hazardous, non-DOT regulated material.
- B. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 02300

SECTION 02450 - SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. General Conditions and all supplementary articles as contained in Division 1 are hereby included in this section to the same extent as though written out herein full. All work of this section shall be performed in accordance with the requirements of the Contract Documents and in accordance with Hudson Essex Passaic Soil Erosion and Sediment Control Conservation District.

1.2 SCOPE OF WORK

- A. The work of this section shall include all necessary labor, materials, tools and appliances required to complete, in a first quality, workmanlike manner, the work as specified in this section and as shown on the drawings.
- B. The contractor shall perform all work, furnish all materials and install all measures required to reasonably control soil erosion resulting from construction operations and prevent excessive flow of sediment from the construction site. Such work may include the installation of water diversion structures, and seeding, mulching or sodding critical areas to provide temporary protection. The contractor shall review the details attached at the end of this section for controlling erosion during construction. When no work will be performed on critical areas for more than 30 days, they shall be protected by temporary seeding, mulching, or sodding.
- C. Permanent soil protection, streets and drainage facilities should be completed as early as practicable, particularly intercepting channels and similar controls that will divert runoff from unprotected soil. The area of exposed soil and the length of exposure should be minimized by proper scheduling. Temporary protection such as fiber mats, plastic, straw and fast-growing grasses may be required. Partially completed drainage structures should be inspected carefully during construction to prevent erosion.
- D. The permanent restoration of vegetative cover such as seeding or sodding on all areas shall be accomplished within 10 days after final grading operations have been completed. Time extensions beyond the 10 days requirement may be requested in writing and are subject to written approval by the Architect.
- E. Seeding, mulching and sodding of critical area shall be in accordance with the attached vegetative standards.
- F. The contractor shall comply with applicable State and local regulations regulating to the prevention and abatement of pollution.

- G. The contractor shall protect existing trees from environmental and mechanical injury in areas affected by the construction work under this contract.
- H. All soil erosion control measures and tree protection shall comply with the standards for Soil Erosion and Sediment Control in New Jersey, latest edition.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.1 EROSION CONTROL MEASURES FOR LAND GRADING:

- A. Erosion control measures should be designed and installed in accordance with the applicable standards contained herein.
- B. Installations Requirements

Timber, logs, brush, rubbish, rocks, stumps and vegetable matter which will interfere with the grading operation or affect the planned stability or fill areas shall be removed and disposed of according to the plan.

Topsoil is to be stripped and stockpiled for excavated areas only in amounts necessary to complete finish grading of all exposed areas currently on-site requiring topsoil.

Fill material is to be free of brush, rubbish, timber, logs, vegetable matter and stumps in amounts that will be detrimental; to construction stable fills. See Section 02300 - EARTHWORK for borrow material fill.

All fills shall be compacted sufficiently for their intended purposes and as required to reduce slipping, erosion or excess saturation.

All disturbed areas shall be left with a neat and finished appearance and shall be protected from erosion.

Traffic during wet weather should be minimized.

Provisions should be made to prevent tracking or flowing of mud onto public right-of way.

The following methods may be among those considered:

1. Exit ramp surfaced with materials such as large size gravel or stone, wood chips, timber, or other material. See detail at end of section.
2. Inspection and cleaning of vehicles before entering public right-of-way.

3.2 DUST CONTROL

A. Definition

The control of dust on construction sites and roads.

B. Purpose

To prevent blowing and movement of dust from exposed soil surfaces, reduce on and off site damage, health hazards and improve traffic safety.

C. Where Applicable

This practice is applicable to areas subject to dust blowing and movement where on and off site damage is likely without treatment.

D. Planning Criteria

The following methods should be considered for controlling dust:

1. Mulches - See standards for stabilization with mulches only.
2. Vegetative Cover - See standards for: temporary vegetative cover, permanent vegetative cover and permanent stabilization.
3. Spray-On Adhesives - On mineral soils (not effective on muck soils). Keep traffic off these areas.

Anionic asphalt emulsion	7:1	Course of Spray	1,200
Latex emulsion	12-1/2:1	Fine Spray	235
Resin in water	4:1	Fine Spray	300

4. Sprinkling - Site is sprinkled until the surface is wet.
5. Barriers - Solid board fences, snow fences, burlap fences, crate walls, bales of hay and similar material can be used to control air currents and soil blowing.

END OF SECTION 02450

SECTION 02920 - LAWNS AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Site Preparation – core-aeration.
- 2. Seeding, slit-seeding (overseeding).

B. Related Sections:

- 1. Division 2 Section "Site Clearing" for topsoil stripping and stockpiling.
- 2. Division 2 Section "Earthwork" for excavation, filling and backfilling, and rough grading.
- 3. Division 2 Section "Subdrainage" for subsurface drainage.
- 4. Division 2 Section "Exterior Plants" for border edgings.

C. Topsoil, 4” thick shall be provided in all disturbed areas.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.
- E. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
- C. Product Certificates: For **soil amendment and fertilizers**, from manufacturer.
- D. Material Test Reports: For **existing surface soil and imported topsoil**.
- E. Planting Schedule: Indicating anticipated planting dates for each type of planting.
- F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of lawns during a calendar year. Submit before expiration of required initial maintenance periods.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn establishment.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Topsoil Analysis: Furnish soil analysis of existing soil and proposed imported topsoil by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; **sodium absorption ratio**; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
 - 1. Report suitability of topsoil for lawn growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
- D. Preinstallation Conference: Conduct conference at **Project site**.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

1.7 PROJECT CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of **planting completion**.
 - 1. Spring Planting: 3/1 – 4/30.
 - 2. Fall Planting: 8/15 – 11/15.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: Seed of grass species as follows, with not less than **95** percent germination, not less than **85** percent pure seed, and not more than **0.5** percent weed seed:
 - 1. Sun and Partial Shade: Proportioned by weight as follows:
 - a. 50 percent Kentucky bluegrass (*Poa pratensis*).
 - b. 30 percent chewings red fescue (*Festuca rubra* variety).
 - c. 10 percent perennial ryegrass (*Lolium perenne*).
 - d. 10 percent redtop (*Agrostis alba*).
 - 2. Shade: Proportioned by weight as follows:
 - a. 50 percent chewings red fescue (*Festuca rubra* variety).
 - b. 35 percent rough bluegrass (*Poa trivialis*).
 - c. 15 percent redtop (*Agrostis alba*).

2.2 TOPSOIL

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of **6** percent organic material content; free of stones 1/2 inch (12 mm) or larger in any dimension and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

2.3 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected, and in accordance with SESC Permit.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect grade stakes set by others until directed to remove them.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 LAWN PREPARATION

- A. Core-aerate all lawn areas, holes to be 2-3” apart and 2-3” minimum depth.
- B. Limit lawn subgrade preparation to areas to be planted.
- C. Newly Graded Subgrades: Loosen subgrade to a minimum depth of **4 inches (100 mm)**. Remove stones larger than **1/2 inch (12 mm)** in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply **superphosphate** fertilizer directly to subgrade before loosening.
 - 2. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.

- b. Mix lime with dry soil before mixing fertilizer.
3. Spread planting soil mix to a depth of **4 inches (100 mm)** but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
 - a. Spread approximately 1/2 the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top **2 inches (50 mm)** of subgrade. Spread remainder of planting soil mix.
- D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
- E. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- F. Before planting, restore areas if eroded or otherwise disturbed after finish grading.

3.4 SEEDING

- A. Sow seed with drill or slit seeder machine. Do not broadcast or drop seed. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 1. Do not use wet seed or seed that is moldy or otherwise damaged.
 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow seed at a total rate of **5 to 8 lb/1000 sq. ft. (2.3 to 3.6 kg/92.9 sq. m)**.
- C. Rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of **2 tons/acre (42 kg/92.9 sq. m)** to form a continuous blanket **1-1/2 inches (38 mm)** in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.
 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

3.5 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris, created by lawn work, from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

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- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.
- C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 02920

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SECTION 02925 - SYNTHETIC TURF

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Furnishing all labor, materials, tools and equipment necessary to install, in place, all synthetic turf and infill materials as indicated on the plans and as specified herein. **Supplied by the Owner.** The installation of all new materials shall be performed in strict accordance with the manufacturers written installation instructions, and in accordance with all approved shop drawings. See Section 02920 Lawns and Grasses.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details for synthetic turf.
- B. Sample Warranty: Provide a sample third party pre paid (full term) insured warranty which exhibits the specified minimum requirements as stated in paragraph I below..Policy must be in force at time of bid.
- C. Warranties: The Contractor shall provide a warranty to the Owner that covers defects in materials and workmanship of the turf for a period of eight (8) years from the date of substantial completion. The turf manufacturer must verify that their representative has inspected the installation and that the work conforms to the manufacturer's requirements. The manufacturer's warranty shall include general wear and damage caused from UV degradation. The warranty shall specifically exclude vandalism, and acts of God beyond the control of the Owner or the manufacturer. The warranty shall be fully insured by a third party meeting the criteria set forth within this section. The warranty policy must be pre paid for the entire warranty term in advance and be non-prorated. The Contractor shall provide a warranty to the Owner that covers defects in the installation workmanship, and further warrant that the installation was done in accordance with both the manufacturer's recommendations and any written directives of the manufacturer's representative. Prior to final payment for the synthetic turf, the Contractor shall submit to owner an insurance policy, guaranteeing the warranty to the Owner. Minimum threshold of warranty shall reflect no maximum per warranty or occurrence up to the 13 million

dollar annual policy limit. Insurance must be from an “A” rated or better carrier as rated by AM Best. Any policy that includes self insured participation, deductible amounts, excess insurance or umbrella policies shall not be considered. Policy must be in force at time of bid.

- D. Synthetic turf system shall be approved as ADA Handicap accessible as determined by Test Method - ASTM 1951-99 (Standard Specification for determination of accessibility of surface under and around playground equipment). Proof of passing test report must be submitted with the bid.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of synthetic turf manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain synthetic turf through one source from a single manufacturer.
- C. All components and their installation method shall be designed and manufactured for use on outdoor athletic fields. The materials as hereinafter specified, should be able to withstand full climatic exposure in Northeast United States, be resistant to insect infestation, rot, fungus and mildew; to ultra-violet light and heat degradation, and shall have the basic characteristic of flow through-drainage allowing free movement of surface run-off through turf and directly into the prepared granular base and into the field drainage system.
- D. The synthetic turf and all components shall be of national reputation. The turf fabric shall be produced by the manufacturer and installed by factory-authorized distributors directly employing the installation crew. Manufacturing "jobbers" or installation "subcontractors" shall not be permitted.
- E. The turf manufacturer must be experienced in the manufacture and installation of this specific type of synthetic infilled grass system (comply w/ materials section of this specification) with completed installations in the United States, for at least three (3) years, and have completed at least twenty five (25) installations of this specific type (must comply with description of system under materials section of this specification) within the last three (3) years within the Continental United States.
- F. The turf manufacturer must have 25 soccer specific installations of 65,000 sf or more of this specific type infill system and fiber that have been in use for a minimum of two years all being located in the Continental United States in locations similar in climate to Northeast USA. These fields shall not have been constructed over an E-Layer or a formed under pad.
- G. Prior to the beginning of installation, the manufacturer/ installer of the synthetic turf shall inspect the sub base and supply a Certificate of Subbase Acceptance for the purpose of obtaining manufacturer's warranty for the finished synthetic playing surface.

1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit synthetic turf to be performed according to manufacturers' written instructions and warranty requirements.

- B. Field Measurements: Indicate measurements on Shop Drawings.

1.6 WARRANTY

- A. Warranty Period: Eight (8) years from date of Substantial Completion. Third Party Insured, pre paid for entire warranty term.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: **The Owner/City has procured the following product to be installed by the Contractor:**

Fieldturf Elite Series Revvolution by Fieldturf USA, Inc.

2.2 MATERIALS

- A. Synthetic Grass System: A complete synthetic grass system consisting of minimum 2.0 inch long polyethylene-blended slit film fiber, tufted to a double primary porous backing and a porous secondary backing. The fiber shall be a minimum of 8,000 denier, low friction fiber, measuring minimum 2.0 inches high. The low friction fiber shall be specifically designed to virtually eliminate abrasion.
 1. The tufted fiber weight shall not be less than 32 ounces per square yard. The low friction fiber shall be custom blended polyethylene parallel slit film fiber, the fiber shall be treated with UV inhibitors. The tufted rows of fiber are to be spaced $\frac{3}{4}$ " apart.
 2. The carpet's primary backing shall be a layered polypropylene fabric treated with UV inhibitors. The secondary backing shall consist of an application of porous, heat-activated material to permanently lock the fiber tufts in place. PERFORATED-BACKED CARPET SHALL NOT BE ACCEPTABLE.
 3. The carpet shall be delivered in 15 feet wide rolls. The rolls shall be of sufficient length to go from sideline to sideline. Head seams, other than at sidelines, will not be acceptable. Cord for sewing seams of turf shall be as recommended by the synthetic turf manufacturer. Perimeter edge details required for the system shall be as detailed and recommended by the manufacturer, and as approved by the manufacturer.
- B. Resilient Layered Infill: A resilient layered infill system consisting of specifically formulated rounded silica sand and cryogenically processed rubber. The infill installation consists of a base layer of sand followed by a homogenous mixture of the sand and the cryogenically processed rubber. A final application of specifically sized cryogenically processed rubber completes the system. SYSTEMS WITHOUT CRYOGENICALLY PROCESSED RUBBER OR A FINISH APPLICATION OF STRAIGHT RUBBER CRYOGENICALLY PROCESSED WILL NOT BE ACCEPTABLE. The sand infill component must represent the majority percentage of the total infill (55% minimum) by weight. The total infill amount shall be no less than 6.0 lbs. Per

sq.ft.. The reuse of infill materials that have been used elsewhere is strictly prohibited. All infill materials must be new and sent to site directly from sand provider quarry and tire recycling manufacturers.

- C The following requirement is in addition to required experience standards as identified within, but not subject to historical qualification requirements. A final topdressing of special fire-retardant infill shall be applied to ensure the turf system passes the Class I certification of the ASTM E648 fire test. Fire Retardant top dressing infill shall be green in color and partially made from recycled turf content.
- D **Turf Grooming Equipment:** The Contractor shall use specified turf grooming equipment (provided by owner) to be used to perform the required maintenance of the synthetic turf field system in strict accordance with the manufacturers recommended guidelines for the care of the field system.

The turf manufacturers project foreman shall perform a training session immediately following the completion of the turf system installation. This training session should be attended by any owner designated personnel that may be involved with the future care of the field system. Additionally, the foreman will discuss all general recommended field care requirements per the synthetic turf manufacturers guidelines.

The synthetic turf manufacturer shall be required to perform three general grooming sessions on each of the synthetic turf fields installed during the first year of usage. The dates for the performance of these grooming sessions shall be as requested by the owner.

2.3 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. The surface to receive the synthetic turf shall be inspected and certified by the manufacturer as ready for the installation of the synthetic turf system and must be perfectly clean as installation commences and shall be maintained in that condition throughout the process. The installation shall be performed in full compliance with approved shop drawings. Only factory-trained technicians skilled in the installation of athletic caliber synthetic turf systems, working under the direct supervision of the manufacturer's supervisors, shall undertake the placement of the system. The designated Supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the infill mixture. The manufacturer shall certify the installation and warranty compliance. The surface to receive the synthetic turf shall be inspected and certified by the manufacturer as ready for the installation of the synthetic turf system and must be perfectly clean as installation commences and shall be maintained in that condition throughout the process.

2.4 INSTALLATION

A. Synthetic Turf

1. The carpet rolls are to be installed directly over the properly prepared base stone. Extreme care should be taken to avoid disturbing the base stone, both in regard to compaction and planarity. A 2-5 ton static roller shall be on site and available to repair and properly compact any disturbed areas of the base stone.
2. The full width rolls shall be laid out across the field. Utilizing standard state of the art sewing procedures, each roll shall be attached to the next. Each seam will be double sewn. When all of the rolls of the playing surface have been installed, the sideline areas shall be installed at right angles to the playing field turf. **GLUING OF ROLLS SHALL NOT BE ACCEPTABLE.** This is a 99% sewn installation. Minimum gluing will only be permitted to repair problem areas, and corner completions.
3. Turf panel seams shall be sewn. All turf panel seams shall be sewn with high strength thread. All seams shall be transverse to the field direction; i.e., run perpendicularly across the field. Seams shall be flat, tight, and permanent with no separation or fraying.
4. Synthetic turf shall be installed across the field and attached to the perimeter edge detail. Turf shall be of sufficient length to permit full cross-field installation. No head or cross seams will be allowed.

B. Resilient Layered Infill

1. The blending infill material shall be spread evenly with a large spreader, (minimum 5-foot wide). Between applications the infill area shall be brushed with a motorized rotary nylon broom. Infill depth shall be such that a maximum of $\frac{3}{4}$ inch of fiber is exposed.
2. The infill system shall be the only acceptable cushioning system. E-layers and formed rubber pads shall be deemed unacceptable as enhancements to meet the necessary safety requirements.

2.5 FINAL ACCEPTANCE

- A. Prior to Final Acceptance, the Contractor shall submit to the owner three (3) copies of Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance of the synthetic turf system, including painting and striping.
- B. The Contractor shall provide evidence that the turf can be plowed with conventional rubber bladed snow removal equipment.
- C. The finished playing surface shall appear as mowed grass with no irregularities and shall afford excellent traction for conventional athletic shoes of all types. The finished surface shall resist abrasion and cutting from normal use.

END OF SECTION 02925

SECTION 02926 – SYNTHETIC TURF (STONE AND DRAINAGE PIPE BASE PREPARATION)

Drainage Base Construction – please refer to project drawings

- A. Base Stone sieve requirements: use one of the two base stone specifications for 4 inch course with 2 inch finishing stone course.

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<u>Sieves</u>	<u>Base Stone Type 1</u>	<u>Base Stone Type 2</u>	<u>Finishing Stone</u>
3" or 75mm			
2" or 50mm	100		
1½" or 38mm	90-100		
1" or 25mm	75-100	100	
¾" or 19mm	65-95	90-100	
½" or 12.5mm	55-85	80-100	100
3/8" or 9.5mm	40-75	70-100	85-100
¼" or 6.3mm	25-65	60-90	75-100
US #4 or 4.75mm	15-60	50-85	60-90
US #8 or 2.36mm	0-40	30-65	35-75
US #16 or 1.18mm	0-20	10-50	10-55
US #30 or 600mm	0-10	0-35	0-40
US #60 or 250mm	0-8	0-15	0-15
US #100 or 150mm	0-6	0-8	0-8
US #200 or 75mm	0-5	0-2	0-2

RESTRICTIONS:

- To ensure structural stability: $D_{60}/D_{10} > 5$ and $1 < \frac{D_{30}^2}{D_{10} D_{60}} < 3$
Fragmentation must be 100%.
- To ensure separation of both stones: $\frac{D_{85} \text{ of finishing stone}}{D_{15} \text{ of base stone}} > 2$
and $3 < \frac{D_{50} \text{ of base stone}}{D_{50} \text{ of finishing stone}} < 6$
- To ensure proper drainage: Permeability of base stone > 50 in/hr (3.5×10^{-2} cm/sec)
Permeability of finishing stone > 10 in/hr (7.0×10^{-3} cm/sec)
Porosity of both stones $> 25\%$ (When stone is saturated and compacted to 95% Proctor.)

- B. Perimeter Edge: 9” x 18” concrete curb and 2 x 4 pressure treated nailer.
- C. Underdrain System
 - 1. ADS AdvanEdge
 - a. 1 inch by 12 inch flat drain.
 - b. ADS AdvanEdge end connector with 4 inch ADS pipe.
 - c. 6 inch diameter perforated collector drain pipe.
 - d. 6 inch diameter solid wall HDPE cleanout with 8 inch by 8 inch by 8 gauge aluminum plate with synthetic surface glued directly to plate.
 - 2. Approved equivalent.

PART 2 - EXECUTION

2.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. The surface to receive the synthetic turf shall be inspected and certified by the manufacturer as ready for the installation of the synthetic turf system and must be perfectly clean as installation commences and shall be maintained in that condition throughout the process. The final subbase surface shall be surveyed by the contractor by means of a laser level with a minimum 500 shots taken (10-foot grid). Based on the contractor’s topological survey, the contractor shall fine grade the subbase suitably - including properly rolling and compacting the base. The contractor shall survey the areas that were fine graded and shall submit the final topological survey to the turf installer and the Landscape Architect for approval. **CONTRACTOR SHALL NOT APPROVE THE SUBBASE FOR TOLERANCE TO GRADE WITHOUT OBTAINING THE TOPOLOGICAL SURVEY.**

2.2 PREPARATION

- A. Preparation of Subgrade: All topsoil, organic, and non-compactable materials need to be removed.
- B. The soil bed must have a minimum slope of 0.5% or more, depending on the soil analysis, from the longitudinal center of the field towards the sidelines.
- C. The soil bed must be compacted in both directions to attain the specified compaction rate of 95% standard Proctor.

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- D. The soil bed must be prepared to tolerances of not more than 1/2" from design grade to allow for even drainage.
- E. A geotextile fabric is required to cover the soil bed; Mirafi 18ON, or approved equal.

2.3 INSTALLATION

- A. Underdrain System: Install as detailed on the drawings and as recommended by the manufacturer of the synthetic turf system.
- B. Concrete Curbing: Perimeter Edge: Install at entire perimeter of synthetic turf system where synthetic turf abuts the adjacent grade. Construct in accordance with curb detail on plans.
- C. Base Stone
 - 1. The base stone must be laid without damaging the soil bed, geotextile liner or drains. It is very important to not create any depressions with heavy equipment. The specified stone or aggregate supplied must conform to the recommended specifications. The finished crushed stone or aggregate base supplied must be stable and permeable.
 - 2. If the required compacted depth of the base course exceeds 6", the base shall be constructed in 2 or more layers or lifts of approximate equal thickness. Each layer must be compacted in both directions to attain the specified compaction rate.
 - 3. The base course must be sloped 0.5% from the center longitudinal axis towards the sidelines or as specified.
 - 4. The grade of the base course shall not vary from the specified grade by more than 1/2" from design grade.
 - 5. The base course must be compacted in both directions to attain the specified compaction rate of 95% standard Proctor.
- D. Finishing Stone
 - 1. The final grade aggregate layer should not be more than 2" deep.
 - 2. The final grade material must be sloped 0.5% from the center longitudinal axis towards the side lines unless otherwise specified.
 - 3. The final grade must be compacted in both directions to attain the specified compaction rate of 95% standard Proctor.
 - 4. The final grade of the finishing stone shall not vary from the specified grade by more than 1/2" from design grade, nor by more than 1/4" in 10ft. Laser guided grading is highly recommended.
 - 5. Synthetic turf shall be installed across the field and attached to the perimeter edge detail. Turf shall be of sufficient length to permit full cross-field installation. No head or cross seams will be allowed.

END OF SECTION 02926

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.
- B. Related Sections include the following:
 - 1. Division 2 Section "Earthwork" for drainage fill under slabs-on-grade.

1.3 SPECIAL REQUIREMENTS

- A. The design shall strive to maintain dimensions as shown in order to fit into the design and existing conditions.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mix water to be withheld for later addition at Project site.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- E. ACI Publications: Comply with the following, unless more stringent provisions are indicated:
 - 1. ACI 301, "Specification for Structural Concrete."
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.
 - 1. Avoid damaging coatings on steel reinforcement.
 - 2. Repair damaged epoxy coatings on steel reinforcement according to ASTM D 3963/D 3963M.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
 - 1. Fly Ash: ASTM C 618, Class F.

- B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
 - 1. Class: Severe weathering region, but not less than 4S.
 - 2. Nominal Maximum Aggregate Size: 1-1/2 inches (38 mm).
 - 3. Nominal Maximum Aggregate Size: 3/4 inch (19 mm) at concrete monument location.
- C. Water: Potable and complying with ASTM C 94.

2.2 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- E. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
- F. Curing and Sealing Materials.

2.3 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

- F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Clear, Waterborne, Membrane-Forming Curing Compound:
 - a. Aqua-Cure VOX; Euclid Chemical Co.

2.4 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
 - 1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Play Equipment Footings and Other Concrete Pavement: Proportion normal-weight concrete mix as follows:
 - 1. Compressive Strength (28 Days): 3500 psi (24.1 MPa).
 - 2. Minimum Cementitious Materials Content: 540 lb/cu. yd. (320 kg/cu. m).
 - 3. Maximum Slump: 3 inches (75 mm).
- D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash: 25 percent.
- E. Maximum Water-Cementitious Materials Ratio: 0.44 for concrete exposed to deicers or subject to freezing and thawing while moist, including all footings and new splash pad.
- F. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:
 - 1. Air Content: 6 percent for 1-inch- (25-mm-) nominal maximum aggregate size.
- G. Do not air entrain concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.
- H. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

- I. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
 - 4. Use corrosion-inhibiting admixture in concrete mixes where indicated.

2.5 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.6 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.
 - 1. Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch will not be permitted.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch (3 mm) at concrete exposed to view.
 - 2. Class C, 1/2 inch (13 mm) at all other locations.
- D. Construct forms tight enough to prevent loss of concrete mortar.

- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
 - 1. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor bolts, accurately located, to elevations required.
 - 2. Install piping and waterstops prior to concrete placement.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete provided concrete is hard

enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- D. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
 - 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
 - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.5 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch (3 mm) in height.
1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.

- C. Rubbed Finish: Apply the following to smooth-formed finished concrete:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.6 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

3.7 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:

- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.8 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than ½ inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25) mm in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 5. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

6. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix up to 25 cu. yd. (19 cu. m), plus one set for each additional 25 cu. yd. (19 cu. m) or fraction thereof.
 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 6. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.

- a. Cast and field cure one set of four standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
- a. Test two field-cured specimens at 7 days and two at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
- C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
- F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

END OF SECTION 03300

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

- A. VFC: Variable frequency controller.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- B. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2 and Type XHHW-2.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger, except VFC cable, which shall be extra flexible stranded.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Feeders: Type THHN-2-THWN-2, single conductors in raceway or Type XHHW-2, single conductors in raceway.
- B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Armored cable, Type AC.
- C. Exposed Branch Circuits: Type THHN-2-THWN-2, single conductors in raceway.

- D. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Armored cable, Type AC.
- E. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

- A. Testing Agency Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.
 - a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
 - b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

- c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

- D. Test and Inspection Reports: Prepare a written report to record the following:
 - 1. Procedures used.
 - 2. Results that comply with requirements.
 - 3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

- E. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment.
- B. Section includes grounding and bonding systems and equipment, plus the following special applications:
 - 1. Underground distribution grounding.
 - 2. Ground bonding common with lightning protection system.
 - 3. Foundation steel electrodes.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. As-Built Data: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1. Test wells.
 - 2. Ground rods.
 - 3. Ground rings.
 - 4. Grounding arrangements and connections for separately derived systems.
- B. Qualification Data: For testing agency and testing agency's field supervisor.
- C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Instructions for periodic testing and inspection of grounding features at test wells based on NFPA 70B.
 - 1) Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - 2) Include recommended testing intervals.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. Burndy; Part of Hubbell Electrical Systems.
 2. Dossert; AFL Telecommunications LLC.
 3. ERICO International Corporation.
 4. Fushi Copperweld Inc.
 5. Galvan Industries, Inc.; Electrical Products Division, LLC.
 6. Harger Lightning & Grounding.
 7. ILSCO.
 8. O-Z/Gedney; a brand of Emerson Industrial Automation.
 9. Robbins Lightning, Inc.
 10. Siemens Power Transmission & Distribution, Inc.
 11. Thomas & Betts Corporation, A Member of the ABB Group.
 12. Topaz Electric; a division of Topaz Lighting Corp.

2.2 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.5 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
 - 1. Bury at least 24 inches below grade.
 - 2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
 - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.
- E. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide

No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.

- C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
 - 7. Armored and metal-clad cable runs.
- C. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.
- D. Metallic Fences: Comply with requirements of IEEE C2.
 - 1. Grounding Conductor: Bare, tinned copper, not less than No. 8 AWG.
 - 2. Gates: Shall be bonded to the grounding conductor with a flexible bonding jumper.
 - 3. Barbed Wire: Strands shall be bonded to the grounding conductor.

3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
 - 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.
 - 1. Test Wells: Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- F. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

- G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install [tinned]bonding jumper to bond across flexible duct connections to achieve continuity.
- H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 - 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 - 4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- E. Grounding system will be considered defective if it does not pass tests and inspections.

- F. Prepare test and inspection reports.
- G. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 - 2. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
 - 3. Manhole Grounds: 10 ohms.
- H. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits, tubing, and fittings.
 - 2. Nonmetal conduits, tubing, and fittings.
 - 3. Metal wireways and auxiliary gutters.
 - 4. Nonmetal wireways and auxiliary gutters.
 - 5. Surface raceways.
 - 6. Boxes, enclosures, and cabinets.
 - 7. Handholes and boxes for exterior underground cabling.

1.3 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid steel conduit.
- C. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. LEED Submittals:
 - 1. Product Data for Credit IEQ 4.1: For solvent cements and adhesive primers, documentation including printed statement of VOC content.
 - 2. Laboratory Test Reports for Credit IEQ 4: For solvent cements and adhesive primers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- C. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Qualification Data: For professional engineer.
- C. Seismic Qualification Certificates: For enclosures, cabinets, and conduit racks and their mounting provisions, including those for internal components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - 4. Detailed description of conduit support devices and interconnections on which the certification is based and their installation requirements.
- D. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. AFC Cable Systems; a part of Atkore International.
 - 2. Allied Tube & Conduit; a part of Atkore International.
 - 3. Anamet Electrical, Inc.
 - 4. Calconduit.
 - 5. Electri-Flex Company.
 - 6. FSR Inc.
 - 7. Opti-Com Manufacturing Network, Inc (OMNI).
 - 8. O-Z/Gedney; a brand of Emerson Industrial Automation.

9. Patriot Aluminum Products, LLC.
 10. Picoma Industries, Inc.
 11. Republic Conduit.
 12. Robroy Industries.
 13. Southwire Company.
 14. Thomas & Betts Corporation, A Member of the ABB Group.
 15. Topaz Electric; a division of Topaz Lighting Corp.
 16. Western Tube and Conduit Corporation.
 17. Wheatland Tube Company.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. ARC: Comply with ANSI C80.5 and UL 6A.
- E. IMC: Comply with ANSI C80.6 and UL 1242.
- F. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
1. Comply with NEMA RN 1.
 2. Coating Thickness: 0.040 inch, minimum.
- G. EMT: Comply with ANSI C80.3 and UL 797.
- H. FMC: Comply with UL 1; zinc-coated steel.
- I. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- J. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
 2. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: compression.
 3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- K. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to

lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. AFC Cable Systems; a part of Atkore International.
 2. Anamet Electrical, Inc.
 3. Arnco Corporation.
 4. CANTEX INC.
 5. CertainTeed Corporation.
 6. Condux International, Inc.
 7. Electri-Flex Company.
 8. Kraloy.
 9. Lamson & Sessions.
 10. Niedax Inc.
 11. RACO; Hubbell.
 12. Thomas & Betts Corporation, A Member of the ABB Group.
- B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. ENT: Comply with NEMA TC 13 and UL 1653.
- D. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- E. LFNC: Comply with UL 1660.
- F. Rigid HDPE: Comply with UL 651A.
- G. Continuous HDPE: Comply with UL 651B.
- H. Coilable HDPE: Preassembled with conductors or cables, and complying with ASTM D 3485.
- I. RTRC: Comply with UL 1684A and NEMA TC 14.
- J. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- K. Fittings for LFNC: Comply with UL 514B.

- L. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- M. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. B-line, an Eaton business.
 - 2. Hoffman; a brand of Pentair Equipment Protection.
 - 3. MonoSystems, Inc.
 - 4. Square D.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.
 - 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 NONMETALLIC WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Allied Moulded Products, Inc.
 - 2. Hoffman; a brand of Pentair Equipment Protection.
 - 3. Lamson & Sessions.
 - 4. Niedax Inc.

- B. Listing and Labeling: Nonmetallic wireways and auxiliary gutters shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Description: Fiberglass polyester, extruded and fabricated to required size and shape, without holes or knockouts. Cover shall be gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections shall be flanged and have stainless-steel screws and oil-resistant gaskets.
- D. Description: PVC, extruded and fabricated to required size and shape, and having snap-on cover, mechanically coupled connections, and plastic fasteners.
- E. Fittings and Accessories: Couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings shall match and mate with wireways as required for complete system.
- F. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- G. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.5 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Adalet.
 - 2. Crouse-Hinds, an Eaton business.
 - 3. EGS/Appleton Electric.
 - 4. Erickson Electrical Equipment Company.
 - 5. FSR Inc.
 - 6. Hoffman; a brand of Pentair Equipment Protection.
 - 7. Hubbell Incorporated.
 - 8. Kraloy.
 - 9. Milbank Manufacturing Co.
 - 10. MonoSystems, Inc.
 - 11. Oldcastle Enclosure Solutions.
 - 12. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - 13. RACO; Hubbell.
 - 14. Robroy Industries.
 - 15. Spring City Electrical Manufacturing Company.
 - 16. Thomas & Betts Corporation, A Member of the ABB Group.

17. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
 - C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
 - D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, [errous alloy, Type FD, with gasketed cover.
 - E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
 - F. Metal Floor Boxes:
 - 1. Material: Cast metal.
 - 2. Type: Fully adjustable.
 - 3. Shape: Rectangular.
 - 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - G. Nonmetallic Floor Boxes: Nonadjustable, rectangular.
 - 1. Listing and Labeling: Nonmetallic floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - H. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
 - I. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb.
 - 1. Listing and Labeling: Paddle fan outlet boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - J. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
 - K. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
 - L. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
 - M. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
 - N. Gangable boxes are allowed.

- O. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Plastic.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

- P. Cabinets:
 - 1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.
 - 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.6 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. General Requirements for Handholes and Boxes:
 - 1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
 - 2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Carson Industries LLC.
 - b. NewBasis.
 - c. Oldcastle Precast, Inc.
 - d. Quazite: Hubbell Power Systems, Inc.
 - e. Synertech Moulded Products.
 - 2. Standard: Comply with SCTE 77.
 - 3. Configuration: Designed for flush burial with closed bottom unless otherwise indicated.
 - 4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.

5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 6. Cover Legend: Molded lettering, "ELECTRIC."
 7. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
 8. Handholes 12 Inches Wide by 24 Inches Long and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.
- C. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with frame and covers of polymer concrete.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Armorcast Products Company.
 - b. Carson Industries LLC.
 - c. NewBasis.
 - d. Nordic Fiberglass, Inc.
 - e. Oldcastle Precast, Inc.
 - f. Quazite: Hubbell Power Systems, Inc.
 - g. Synertech Moulded Products.
 2. Standard: Comply with SCTE 77.
 3. Color of Frame and Cover: Gray.
 4. Configuration: Designed for flush burial with closed bottom unless otherwise indicated.
 5. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
 6. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 7. Cover Legend: Molded lettering, "ELECTRIC."
 8. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
 9. Handholes 12 Inches Wide by 24 Inches Long and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.7 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

- A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
1. Tests of materials shall be performed by an independent testing agency.
 2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
 3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012 and traceable to NIST standards.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC.
2. Concealed Conduit, Aboveground: EMT.
3. Underground Conduit: RNC, Type EPC-40-PVC.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - d. Gymnasiums.
4. Concealed in Ceilings and Interior Walls and Partitions: ENT or RNC.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: IMC.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 nonmetallic in institutional and commercial kitchens and damp or wet locations.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.

4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- G. Install surface raceways only where indicated on Drawings.
- H. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- H. Support conduit within 12 inches of enclosures to which attached.
- I. Stub-ups to Above Recessed Ceilings:
 1. Use EMT, IMC, or RMC for raceways.
 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

- K. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- L. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- M. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- N. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- P. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- Q. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- R. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- S. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Where otherwise required by NFPA 70.
- T. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- U. Expansion-Joint Fittings:
 - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is

- located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- V. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- W. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- X. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- Y. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- Z. Locate boxes so that cover or plate will not span different building finishes.
- AA. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

- BB. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- CC. Set metal floor boxes level and flush with finished floor surface.
- DD. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Section 312000 "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
6. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits but a minimum of 6 inches below grade. Align planks along centerline of conduit.
7. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- D. Install handholes with bottom below frost line, below grade.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.
- F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Identification for raceways.
 - 2. Identification of power and control cables.
 - 3. Identification for conductors.
 - 4. Underground-line warning tape.
 - 5. Warning labels and signs.
 - 6. Instruction signs.
 - 7. Equipment identification labels.
 - 8. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and IEEE C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.

- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER AND CONTROL RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- C. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.
- D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4-inch-wide black stripes on 10-inch centers diagonally over orange background that extends full length of raceway or duct and is 12 inches wide. Stop stripes at legends.

- G. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- H. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.
- B. Colors for Cables Carrying Circuits at 600 V and Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- C. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.
- D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.
- E. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tube with machine-printed identification label. Sized to suit diameter of and shrinks to fit firmly around cable it identifies. Full shrink recovery at a maximum of 200 deg F. Comply with UL 224.

2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.
- B. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.
- C. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3-mil-thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the cable diameter such that the clear shield overlaps the entire printed legend.

- D. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tube with machine-printed identification label. Sized to suit diameter of and shrinks to fit firmly around cable it identifies. Full shrink recovery at a maximum of 200 deg F. Comply with UL 224.
- E. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- F. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.
- G. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of cable it identifies and to stay in place by gripping action.
- H. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of cable it identifies and to stay in place by gripping action.

2.4 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3-mil-thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the conductor diameter such that the clear shield overlaps the entire printed legend.
- C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of conductor it identifies and to stay in place by gripping action.
- D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve with diameter sized to suit diameter of conductor it identifies and to stay in place by gripping action.
- E. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tube with machine-printed identification label. Sized to suit diameter of and shrinks to fit firmly around conductor it identifies. Full shrink recovery at a maximum of 200 deg F. Comply with UL 224.
- F. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

- G. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 2. Labels for Tags: Self-adhesive label, machine-printed with permanent, waterproof, black ink recommended by printer manufacturer, sized for attachment to tag.

2.5 FLOOR MARKING TAPE

- A. 2-inch-wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

2.6 UNDERGROUND-LINE WARNING TAPE

- A. Tape:
 - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - 3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- B. Color and Printing:
 - 1. Comply with ANSI Z535.1 through ANSI Z535.5.
 - 2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
- C. Tag: Type I:
 - 1. Pigmented polyolefin, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - 2. Thickness: 4 mils.
 - 3. Weight: 18.5 lb/1000 sq. ft..
 - 4. 3-Inch Tensile According to ASTM D 882: 30 lbf, and 2500 psi.
- D. Tag: Type II:
 - 1. Multilayer laminate consisting of high-density polyethylene scrim coated with pigmented polyolefin, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - 2. Thickness: 12 mils.
 - 3. Weight: 36.1 lb/1000 sq. ft..

4. 3-Inch Tensile According to ASTM D 882: 400 lbf, and 11,500 psi.

E. Tag: Type ID:

1. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
2. Overall Thickness: 5 mils.
3. Foil Core Thickness: 0.35 mil.
4. Weight: 28 lb/1000 sq. ft..
5. 3-Inch Tensile According to ASTM D 882: 70 lbf, and 4600 psi.

F. Tag: Type IID:

1. Reinforced, detectable three-layer laminate, consisting of a printed pigmented woven scrim, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
2. Overall Thickness: 8 mils.
3. Foil Core Thickness: 0.35 mil.
4. Weight: 34 lb/1000 sq. ft..
5. 3-Inch Tensile According to ASTM D 882: 300 lbf, and 12,500 psi.

2.7 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.

- E. Warning label and sign shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.8 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.
 - 1. Engraved legend with black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
 - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.
- C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

2.9 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.
- B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.
- C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
- D. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
- E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.10 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black except where used for color-coding.

- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black.

- C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
 - 3. UL 94 Flame Rating: 94V-0.
 - 4. Temperature Range: Minus 50 to plus 284 deg F.
 - 5. Color: Black.

2.11 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.

- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

- C. Apply identification devices to surfaces that require finish after completing finish work.

- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- F. Attach plastic raceway and cable labels that are not self-adhesive type with clear vinyl tape with adhesive appropriate to the location and substrate.
- G. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- I. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.
- J. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches overall.
- K. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

- A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl label. Install labels at 10-foot maximum intervals.
- B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. Emergency Power.
 - 2. Power.
 - 3. UPS.

- C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
 - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
 - b. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - c. Colors for 480/277-V Circuits:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- E. Conductors to Be Extended in the Future: Attach [write-on tags] [marker tape] to conductors and list source.
- F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
1. Limit use of underground-line warning tape to direct-buried cables.

2. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- H. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
1. Comply with 29 CFR 1910.145.
 2. Identify system voltage with black letters on an orange background.
 3. Apply to exterior of door, cover, or other access.
 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.
 - b. Controls with external control power connections.
- J. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- K. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
1. Labeling Instructions:
 - a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
 - b. Outdoor Equipment: Stenciled legend 4 inches high.
 - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 2. Equipment to Be Labeled:

- a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
- b. Enclosures and electrical cabinets.
- c. Access doors and panels for concealed electrical items.
- d. Switchgear.
- e. Switchboards.
- f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
- g. Substations.
- h. Emergency system boxes and enclosures.
- i. Motor-control centers.
- j. Enclosed switches.
- k. Enclosed circuit breakers.
- l. Enclosed controllers.
- m. Variable-speed controllers.
- n. Push-button stations.
- o. Power transfer equipment.
- p. Contactors.
- q. Remote-controlled switches, dimmer modules, and control devices.
- r. Battery-inverter units.
- s. Battery racks.
- t. Power-generating units.
- u. Monitoring and control equipment.
- v. UPS equipment.

END OF SECTION 260553

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Time switches.
2. Photoelectric switches.
3. Indoor occupancy sensors.
4. Lighting contactors.

B. Related Requirements:

1. Section 262726 "Wiring Devices" for wall-box dimmers, wall-switch occupancy sensors, and manual light switches.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Interconnection diagrams showing field-installed wiring.
2. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

- A. Electronic Time Switches: Solid state, programmable, with alphanumeric display; complying with UL 917.
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Contact Configuration: SPST.
 3. Contact Rating: 30-A inductive or resistive, 240-V ac.
 4. Programs: Eight on-off set points on a 24-hour schedule and an annual holiday schedule that overrides the weekly operation on holidays.
 5. Programs: Eight channels; each channel is individually programmable with eight on-off set points on a 24-hour schedule.
 6. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program on selected channels.
 7. Astronomic Time: All channels.
 8. Automatic daylight savings time changeover.
 9. Battery Backup: Not less than seven days reserve, to maintain schedules and time clock.
- B. Electromechanical-Dial Time Switches: Comply with UL 917.
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Contact Configuration: SPST.
 3. Contact Rating: 30-A inductive or resistive, 240-V ac.
 4. Circuitry: Allows connection of a photoelectric relay as a substitute for the on-off function of a program.
 5. Astronomic time dial.
 6. Eight-Day Program: Uniquely programmable for each weekday and holidays.
 7. Skip-a-day mode.
 8. Wound-spring reserve carryover mechanism to keep time during power failures, minimum of 16 hours.

2.2 INDOOR OCCUPANCY SENSORS

- A. General Requirements for Sensors: Wall- or ceiling-mounted, solid-state indoor occupancy sensors with a separate power pack.
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.

3. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor is powered from the power pack.
 4. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
 5. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 6. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
 7. Bypass Switch: Override the "on" function in case of sensor failure.
 8. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present.
- B. PIR Type: Ceiling mounted; detect occupants in coverage area by their heat and movement.
1. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in..
 2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. when mounted on a 96-inch-high ceiling.
 3. Detection Coverage (Corridor): Detect occupancy within 90 feet when mounted on a 10-foot-high ceiling.
- C. Ultrasonic Type: Ceiling mounted; detect occupants in coverage area through pattern changes of reflected ultrasonic energy .
1. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
 2. Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. when mounted on a 96-inch-high ceiling.
 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch-high ceiling.
 4. Detection Coverage (Large Room): Detect occupancy anywhere within a circular area of 2000 sq. ft. when mounted on a 96-inch-high ceiling.
 5. Detection Coverage (Corridor): Detect occupancy anywhere within 90 feet when mounted on a 10-foot-high ceiling in a corridor not wider than 14 feet.
- D. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of

technologies that control on-off functions is selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch-high ceiling.

2.3 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

A. General Requirements for Sensors: Automatic-wall-switch occupancy sensor, suitable for mounting in a single gang switchbox.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.
3. Switch Rating: Not less than 800-VA fluorescent at 120 V, 1200-VA fluorescent at 277 V, and 800-W incandescent.

B. Wall-Switch Sensor Tag WS1:

1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 900 sq. ft..
2. Sensing Technology: Dual technology - PIR and ultrasonic.
3. Switch Type: SP, field selectable automatic "on," or manual "on" automatic "off."
4. Voltage: Match the circuit voltage; type.
5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc. The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Concealed "off" time-delay selector at 30 seconds, and 5, 10, and 20 minutes.
8. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

C. Wall-Switch Sensor Tag WS2:

1. Standard Range: 210-degree field of view, with a minimum coverage area of 900 sq. ft..
2. Sensing Technology: PIR.
3. Switch Type: SP, field selectable automatic "on," or manual "on" automatic "off."
4. Voltage: Match the circuit voltage; type.

5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc. The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Concealed "off" time-delay selector at 30 seconds, and 5, 10, and 20 minutes.
8. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

2.4 LIGHTING CONTACTORS

- A. Description: Electrically operated and electrically held, combination-type lighting contactors with fusible switch, complying with NEMA ICS 2 and UL 508.
 1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
 2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
 3. Enclosure: Comply with NEMA 250.
 4. Provide with control and pilot devices as indicated on Drawings, matching the NEMA type specified for the enclosure.

2.5 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

- B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 CONTACTOR INSTALLATION

- A. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

- A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.
- B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate lighting control devices and perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Lighting control devices will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
 - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
 - 2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.
 - 3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.7 DEMONSTRATION

- A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control systems specified in Section 260943.13 "Addressable-Fixture Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls."
- B. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 260923

SECTION 264313 - SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes field-mounted SPDs for low-voltage (120 to 600 V) power distribution and control equipment.

1.3 DEFINITIONS

- A. Inominal: Nominal discharge current.
- B. MCOV: Maximum continuous operating voltage.
- C. Mode(s), also Modes of Protection: The pair of electrical connections where the VPR applies.
- D. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.
- E. OCPD: Overcurrent protective device.
- F. SCCR: Short-circuit current rating.
- G. SPD: Surge protective device.
- H. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

2. Copy of UL Category Code VZCA certification, as a minimum, listing the tested values for VPRs, Inominal ratings, MCOVs, type designations, OCPD requirements, model numbers, system voltages, and modes of protection.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For SPDs to include in maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to replace or replace SPDs that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL SPD REQUIREMENTS

- A. SPD with Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Comply with UL 1449.
- D. MCOV of the SPD shall be the nominal system voltage.

2.2 SERVICE ENTRANCE SUPPRESSOR

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. ABB USA.
 2. Advanced Protection Technologies Inc. (APT).
 3. ALLTEC.

4. Atlantic Scientific.
 5. Current Technology Inc.
 6. Danaher Power Solutions.
 7. Eaton.
 8. General Electric Company.
 9. Intermatic, Inc.
 10. LEA International.
 11. Leviton Manufacturing Co., Inc.
 12. Liebert; a brand of Emerson Electric Co.
 13. Northern Technologies, Inc.
 14. Raycap, Inc.
 15. Schneider Electric USA, Inc.
 16. Siemens Industry, Inc.
 17. Square D; by Schneider Electric.
 18. Staco Energy Products Co.
 19. Surge Suppression Incorporated.
- B. SPDs: Comply with UL 1449, Type 1.
- C. SPDs: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449, Type 1.
1. SPDs with the following features and accessories:
 - a. Integral disconnect switch.
 - b. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
 - c. Indicator light display for protection status.
 - d. Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.
 - e. Surge counter.
- D. Comply with UL 1283.
- E. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than 240kA. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.
- F. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277 V, three-phase, four-wire circuits shall not exceed the following:
1. Line to Neutral: 1200 V for 480Y/277 V.
 2. Line to Ground: 1200 V for 480Y/277 V.
 3. Line to Line: 2000 V for 480Y/277 V.

- G. Protection modes and UL 1449 VPR for 240/120 V, single-phase, three-wire circuits shall not exceed the following:
 - 1. Line to Neutral: 700 V.
 - 2. Line to Ground: 700 V.
 - 3. Line to Line: 1000 V.
- H. SCCR: Equal or exceed 200 kA.
- I. Inominal Rating: 20 kA.

2.3 ENCLOSURES

- A. Indoor Enclosures: NEMA 250, Type 1.
- B. Outdoor Enclosures: NEMA 250, Type 3R.

2.4 CONDUCTORS AND CABLES

- A. Class 2 Control Cables: Multiconductor cable with copper conductors not smaller than No. 18 AWG.
- B. Class 1 Control Cables: Multiconductor cable with copper conductors not smaller than No. 14 AWG.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Install an OCPD or disconnect as required to comply with the UL listing of the SPD.
- C. Install SPDs with conductors between suppressor and points of attachment as short and straight as possible, and adjust circuit-breaker positions to achieve shortest and straightest leads. Do not splice and extend SPD leads unless specifically permitted by manufacturer. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.
- D. Use crimped connectors and splices only. Wire nuts are unacceptable.
- E. Wiring:
 - 1. Power Wiring: Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

2. Controls: Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative.
 1. Compare equipment nameplate data for compliance with Drawings and Specifications.
 2. Inspect anchorage, alignment, grounding, and clearances.
 3. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
- B. An SPD will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.3 STARTUP SERVICE

- A. Complete startup checks according to manufacturer's written instructions.
- B. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests, and reconnect them immediately after the testing is over.
- C. Energize SPDs after power system has been energized, stabilized, and tested.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to operate and maintain SPDs.

END OF SECTION 264313

SECTION 265668 - EXTERIOR ATHLETIC LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes lighting for the following outdoor sports venues:
 - 1. Baseball fields.
 - 2. Softball fields.
 - 3. Football fields.
 - 4. Soccer fields.
 - 5. Outdoor tennis courts.
- B. Related Sections:
 - 1. Section 260923 "Lighting Control Devices" for automatic and remote control of lighting, including time switches, photoelectric relays, and multipole lighting relays and contactors.
 - 2. Section 260943.13 "Addressable-Fixture Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls" for manual or programmable control systems with low-voltage wiring or data communication circuits for lighting.

1.3 DEFINITIONS

- A. CV: Coefficient of variation; a statistical measure of the weighted average of all relevant illumination values for the playing area, expressed as the ratio of the standard deviation for all illuminance values to the mean illuminance value.
- B. Delegated-Design Submittals: Documents, including drawings, calculations, and material and product specifications prepared as a responsibility of Contractor to obtain acceptance by Owner and authorities having jurisdiction.
- C. Illuminance: The metric most commonly used to evaluate lighting systems. It is the density of luminous flux, or flow of light, reaching a surface divided by the area of that surface.

1. Horizontal Illuminance: Measurement in foot-candles, on a horizontal surface 36 inches above ground unless otherwise indicated.
 2. Target Illuminance: Average maintained illuminance level, calculated by multiplying initial illuminance by LLF.
 3. Vertical Illuminance: Measurement in foot-candles, in four directions on a vertical surface, at an elevation coinciding with plane height of horizontal measurements.
- D. LC: Lighting Certified.
- E. Light Trespass: Light spill into areas and properties outside the playing areas, which is either annoying or unwanted.
- F. LLD: Lamp lumen depreciation, which is the decrease in lamp output as the lamp ages.
- G. LLF: Light loss factor, which is the product of all factors that contribute to light loss in the system.
- H. Luminaire: Complete lighting fixture, including ballast housing if integral.
- I. UG: Uniformity gradient; the rate of change of illuminance on the playing field, expressed as a ratio between the illuminances of adjacent measuring points on a uniform grid.

1.4 PERFORMANCE REQUIREMENTS

- A. Facility Type: Recreational or social facility.
- B. Illumination Criteria:
1. Minimum average target illuminance level for each lighted area for each sports venue and for the indicated class of play according to IESNA RP-6.
 2. CV and maximum-to-minimum uniformity ratios for each lighted area equal to or less than those listed in IESNA RP-6 for the indicated class of play.
 3. UG levels within each lighted area equal to or less than those listed in IESNA RP-6 for the indicated speed of sport.
- C. Illumination Calculations: Computer-analyzed point method complying with IESNA RP-6 to optimize selection, location, and aiming of luminaires.
1. Grid Pattern Dimensions: For playing areas of each sport and areas of concern for spill-light control, correlate and reference calculated parameters to the grid areas. Each grid point represents the center of the grid area defined by the length and width of the grid spacing.
 2. Spill-Light Control: Minimize spill light for each playing area on adjacent and nearby areas.

- a. Prevent light trespass on properties near Project.
 - b. Calculate the horizontal and vertical illuminance due to spill light for points spaced 20 feet apart in areas indicated on Drawings as "spill-light critical," to ensure that design meets the above limits.
3. Glare Control: Design illumination for each playing area to minimize direct glare in adjacent and nearby areas.
 - a. Design source intensity of luminaires that may be observed at an elevation of 60 inches above finished grade from nearby properties to be less than 20,000 candela when so observed.
 4. Determine LLF according to IESNA RP-6 and manufacturer's test data.
 - a. Use LLD at 100 percent of rated lamp life. LLF shall be applied to initial illumination to ensure that target illumination is achieved at 100 percent of lamp life and shall include consideration of field factor.
 - b. LLF shall not be higher than 70 percent, and may be lower when determined by manufacturer after application of the ballast output and optical system output according to IESNA RP-6.
 5. Luminaire Mounting Height: Comply with IESNA RP-6.
 6. Luminaire Placement: Luminaire clusters shall be outside the glare zones defined by IESNA RP-6.
- D. Soccer Fields:
1. IESNA RP-6, Class of Play: IV.
 2. Speed of Sport: Fast.
 3. Grid Pattern Dimensions: 30 by 30 feet.
- E. Egress Lighting: In case of power failure, provide a minimum of 1.0-fc illumination, within 30 seconds, measured at grade in spectator and spectator egress areas.
1. Duration of emergency illumination shall be not less than 15 minutes.
 2. Momentary Power Interruptions: Provide emergency illumination immediately following restoration of power to the lighting circuits. Emergency illumination shall automatically extinguish after 15 minutes.
- F. Lighting Control: Manual, low voltage, or digital; providing the following functions, integrated into a single control station, with multiple subcontrol stations as indicated:
1. Control Station: Key-operated master switch, manual push-button controls, and system status indicator lights. Test switch of egress lighting system.
 2. Light Levels: Two levels of control - 100/50 percent of minimum target illumination.

G. Electric Power Distribution Requirements:

1. Electric Power: 480 V; three phase.
 - a. Include roughing-in of service indicated for nonsports improvements on Project site.
 - b. Balance load between phases. Install wiring to balance three phases at each support structure.
 - c. Include required overcurrent protective devices and individual lighting control for each sports field or venue.
 - d. Include indicated feeder capacity and panelboard provisions for future lighted sports field construction.

H. Maximum Total Load:

1. Maximum Total Voltage Drop from Source to Load: 5 percent, including voltage drops in branch circuit, subfeeder, and feeder.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of lighting product indicated. Include the following:

1. Lamp life, output, and energy-efficiency data. Lamp data certified by NVLAP or NRTL; comply with IESNA LM-47.
2. Photometric data based on laboratory tests of each luminaire type, complete with lamps, ballasts, and accessories; comply with IESNA LM-5.
 - a. Photometric data shall be certified by a qualified independent testing agency.
 - b. Photometric data shall be certified by manufacturer's laboratory with a current accreditation under the NVLAP for Energy Efficient Lighting Products.

B. Delegated-Design Submittal: For exterior athletic lighting indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Drawings and specifications for construction of lighting system.
2. Manufacturer's determination of LLF used in design calculations.
3. Lighting system design calculations for the following:
 - a. Target illuminance.
 - b. Point calculations of horizontal and vertical illuminance, CV, and UG at minimum grid size and area.
 - c. Point calculations of horizontal and vertical illuminance in indicated areas of concern for spill light.

- d. Calculations of source intensity of luminaires observed at eye level from indicated properties near the playing fields.
4. Electrical system design calculations for the following:
 - a. Short-circuit current calculations for rating of panelboards.
 - b. Total connected and estimated peak-demand electrical load, in kilowatts, of lighting system.
 - c. Capacity of feeder required to supply lighting system.
5. Wiring requirements, including required conductors and cables and wiring methods.
6. Structural analysis data and calculations used for pole selection.
 - a. Manufacturer Wind-Load Strength Certification: Submit certification that selected total support system, including poles, complies with AASHTO LTS-4-M for location of Project.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For sports lighting system components to include in emergency, operation, and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Lamps: Equal to 10 percent of amount installed for each size indicated, but no fewer than 2 units.
 2. Ballasts: Equal to 10 percent of amount installed for each size indicated, but no fewer than 2 units.
 3. Fuses: Equal to 10 percent of amount installed for each size indicated, but no fewer than 2 units.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Luminaire Photometric Data Testing Laboratory: By manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- C. Luminaire Photometric Data Testing Laboratory: By an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL.

- D. Field Testing Agency Qualifications: A qualified independent professional engineer not associated with Contractor or lighting equipment manufacturer, who is additionally LC by the National Council on Qualifications for the Lighting Professions.
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel" and AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
- F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of luminaires, lamps, and luminaire alignment products and to correct misalignment that occurs subsequent to successful acceptance tests. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, and unauthorized repairs and alterations from special warranty coverage.
 - 1. Luminaire Warranty: Luminaire and luminaire assembly (excluding fuses and lamps) shall be free from defects in materials and workmanship for a period of five years from date of Substantial Completion.
 - 2. Lamp Warranty:
 - a. Replace lamps and fuses that fail within 12 months from date of Substantial Completion.
 - b. Provide replacement lamps for lamps that fail within the second 12 months from date of Substantial Completion.
 - 3. Alignment Warranty: Accuracy of alignment of luminaires shall remain within specified illuminance uniformity ratios for a period of five years from date of successful completion of acceptance tests.
 - a. Realign luminaires that become misaligned during the warranty period.
 - b. Replace alignment products that fail within the warranty period.
 - c. Verify successful realignment of luminaires by retesting as specified in "Field Quality Control" Article.

PART 2 - PRODUCTS

2.1 LUMINAIRES, LAMPS, AND BALLASTS

- A. Luminaires: Listed and labeled, by an NRTL acceptable to authorities having jurisdiction, for compliance with UL 1598 for installation in wet locations.

1. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without using tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent their accidental falling during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lens.
 2. Exposed Hardware: Stainless-steel latches, fasteners, and hinges.
 3. Spill-Light Control Devices: Internal louvers and external baffles furnished by manufacturer and designed for secure attachment to specific luminaire.
- B. Ballast Mounting: At location of associated luminaires unless otherwise indicated.

2.2 SUPPORT STRUCTURES

- A. Support-Structure Wind-Load Strength: Poles and other support structures, brackets, arms, appurtenances, bases, anchorages, and foundations shall comply with AASHTO LTS-4-M and shall be certified by manufacturers to withstand winds up to 100 mph without permanent deflection or whipping.
- B. Support-Structure Seismic Strength: Poles or other support structures, brackets, arms, appurtenances, bases, anchorages, and foundations shall be designed to prevent separation of components or fracture of poles, luminaire supports, or pole foundations during a seismic event.
- C. Mountings, Fasteners, and Appurtenances:
1. Corrosion resistant, compatible with support components, and which shall not cause galvanic action at contact points.
 - a. Steel Components: Hot-dip galvanized after fabrication, complying with ASTM A 123/A 123M.
 - b. Mounting Hardware Fasteners: Hot-dip galvanized, complying with ASTM A 153/A 153M, or minimum 18-8 grade stainless steel.
 2. Accommodate attachments and wiring of other indicated systems.
- D. Concrete for Pole Foundations: 3000-psi, 28-day minimum compressive strength. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete."
- E. Direct-buried steel structures or poles shall not be used.

2.3 POWER DISTRIBUTION AND CONTROL

- A. Wiring Method for Feeders, Subfeeders, Branch Circuits, and Control Wiring: Underground nonmetallic raceway; No. 10 AWG minimum conductor size for power wiring.

- B. Overhead-, pole-, or structure-supported wiring and transformers are not permitted.
- C. Electrical Enclosures Exposed to Weather: NEMA 250, Type 3R enclosure constructed from stainless steel, with hinged doors fitted with padlock hasps or lockable latches.

2.4 SURGE PROTECTION

- A. Surge Protection: Comply with requirements in Section 264313 "Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits".

2.5 POLE AND BASE PROTECTION

- A. Pole Pads: Wraparound pad, with 4 inches of extra-firm polyfoam, 360-degree coverage of ground-mounted poles and supports, continuous hook-and-loop fastening, and not less than 72 inches high.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use web fabric slings (not chain or cable) to raise and set structural members. Protect equipment during installation to prevent corrosion.
- B. Install poles and other structural units level, plumb, and square.
- C. Except for embedded structural members, grout void between pole base and foundation. Use nonshrinking or expanding concrete grout firmly packed in entire void space. Use a short piece of 1/2-inch-diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.
- D. Install pole pads at all poles inside playing field boundaries and when located within 20 feet of the field boundary.
- E. Extend cast-in-place bolted base foundations 36 inches above grade, minimum.
- F. Install protective pipe bollards on three sides of each embedded pole installed in paved areas.
- G. Install controls and ballast housings in cabinets mounted on support structure at least 10 feet above finished grade.

3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests, inspections, and analysis.
- B. Perform tests, inspections, and analysis according to IESNA RP-6 and IESNA LM-5 where applicable.
- C. Tests and Inspections:
 - 1. After installing sports lighting system and after electrical circuits have been energized, perform proof-of-performance field measurements and analysis for compliance with requirements.
 - 2. Playing and Other Designated Areas: Make field measurements at intersections of grids, dimensioned and located as specified in "Performance Requirements" Article and as described below:
 - a. Soccer Fields: Lighted area is 210 by 370 feet. Measure at least 91 points.
 - 3. Make field measurements at established test points in areas of concern for spill light and glare.
 - 4. Perform analysis to demonstrate correlation of field measurements with specified illumination quality and quantity values and corresponding computer-generated values that were submitted with engineered design documents. Submit a report of the analysis. For computer-generated values, use manufacturer's lamp lumens that are adjusted to lamp age at time of field testing.
- D. Correction of Illumination Deficiencies for Playing Areas: Make corrections to illumination quality or quantity, measured in field quality-control tests, that varies from specified illumination criteria by plus or minus 10 percent.
 - 1. Add or replace luminaires, or change mounting height, revise aiming, or install louvers, shields, or baffles.
 - 2. If luminaires are added or mounting height is changed, revise aiming and recalculate and modify or replace support structures if indicated.
 - 3. Do not replace luminaires with units of higher or lower wattage without Architect's approval.
 - 4. Retest as specified above after repairs, adjustments, or replacements are made.
 - 5. Report results in writing.
- E. Correction of Excessive Illumination in Spill-Light-Critical Areas: If measurements indicate that specified limits for spill light are exceeded, make corrections to illumination quantity, measured in field quality-control tests, that reduce levels to within specified maximum values.
 - 1. Replace luminaires, or change mounting heights, revise aiming, or install louvers, shields, or baffles.

2. Obtain Architect's approval to replace luminaires with units of higher or lower wattage.
3. If mounting height is changed, revise aiming and recalculate and modify or replace support structures if indicated.
4. Retest as specified above after repairs, adjustments, or replacements are made.
5. Report results in writing.

F. Sports lighting will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

3.3 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain exterior athletic lighting.

END OF SECTION 265668

BID PROPOSAL

CITY OF JERSEY CITY
DEPARTMENT OF ADMINISTRATION
DIVISION OF ARCHITECTURE, ENGINEERING,
TRAFFIC AND TRANSPORTATION

Date _____

Project No. 2014-025

DO NOT REMOVE THESE PROPOSAL PAGES. SUBMIT THE ENTIRE BOUND DOCUMENT IN A SEALED ENVELOPE MARKED ON BOTH SIDES WITH THE PROJECT TITLE. ALSO SUBMIT SEPARATE COPY OF COMPLETED BID PROPOSAL WITH BID PACKAGE.

Proposal of _____ (hereinafter called "Bidder" organized and existing under the laws of the State of _____ doing business as _____
*)

Gentlemen:

The Bidder, in compliance with your invitation for bids for the:

CAVEN POINT - SOCCER FIELD NEW ARTIFICIAL TURF AND LIGHTING

JERSEY CITY, N.J.

having examined the plans and specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies, and to construct the project in accordance with the Contract Documents; within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents of which this proposal is part.

Bidder hereby agrees to commence work under this contract on or before a date to be specified in written "Notice to Proceed" of the City and to fully complete the project within 45 consecutive calendar days thereafter as stipulated in the specifications. Furthermore, it is understood and agreed in accordance with Article GC-36 "Time for Completion, Liquidated Damages and Extension of Time," that liquidated damages in the amount set forth in Article GC-36 will be charged to the Bidder for each consecutive calendar day of delay until the work is completed and accepted.

Bidder acknowledges receipt of the following addendum:

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

*Insert "a corporation, "a partnership", or "an individual" as applicable.

BID PROPOSAL CHECK LIST

The following documents are to be completed and submitted with the bid proposal. Compliance shall be indicated by placing initials on the line preceding each item attached:

- _____ *List of Prices
- _____ *Grand Total Bid Price
- _____ Alternate(s), if applicable, with supporting documentation, if applicable.
- _____ Substitutions, if applicable, are attached in conformance with the Information to Bidders, Article 21, Substitutions
- _____ *Certificate of Experience of General Contractor
- _____ Certificate of Experience for subcontractors required to be named pursuant to N.J.S.A. 40A:11-16
- _____ *Plant and Equipment Questionnaire completed by General Contractor
- _____ Plant and Equipment Questionnaire completed by subcontractors required to be named pursuant to N.J.S.A. 40A:11-16
- _____ Non-Collusion Affidavit
- _____ *Corporation or Partnership Statement
- _____ Form MWB-3 - Minority/Women Business Compliance Plan (3 Forms)
- _____ Exhibit B: Mandatory Equal Employment Opportunity Language (N.J.S.A. 10.5-31 et seq.) (N.J.A.C. 17:27) Construction Contracts **must be signed.**
- _____ State of New Jersey, Division of Contract Compliance Equal Employment Opportunity in Public Contracts' Initial Project Workforce Report Construction (Form AA-201). **Must be submitted after notification of award but prior to signing a construction contract.** Form AA-201 maybe obtained and must be submitted to Jersey City's Public Agency Compliance Officer (P.A.C.O.) at Office of EEO/AA, 280 Grove Street, Room - 103, Jersey City, NJ 07302, Telephone 201-547-4533 and Fax 201-547-5088.
- _____ *Bid Bond
- _____ *Consent of Surety
- _____ Public Works Contractor Registration Certificates for General Contractor and all Subcontractors listed on page **P-11**.
- _____ New Jersey Business Registration Certificates of General Contractor and all Subcontractors listed on page **P-11**.
- _____ *Written acknowledgment of addendum (if issued), on Page P-1 of the Bid Form, pursuant to N.J.S.A. 40A:11-23.2(e).

Failure to include the bid documents listed immediately above that are marked with an asterisk (*) shall result in automatic rejection of the bid at the time of the bid reception.

BID PROPOSAL
Continued

TOTAL BASE BID PRICE:

Item No. 1: The Bidder agrees to perform and provide all labor, materials, equipment and services required to complete all work as described in the Specifications and shown on the Drawings for the Lump Sum Price of:

(In Writing)

(In Figures)

UNIT PRICES:

The Specifications and Drawings represent the Base Bid, and contain specific quantities of work based on good faith estimates. If during project construction, the quantities contained in the specifications and drawings are exceeded, payment for excess quantities shall be based on the prices set forth below:

Item No. 2: Unforeseen excavation and replacement with engineered fill in accordance with Section 02300 - Earthwork

50 C.Y. @ \$ _____ Per C.Y. for a Total Cost of \$ _____
(Unit Price in Figures) (Total Cost Item 2 in Figures)

_____ Per C.Y. _____
(Write Unit Price) (Write Total Cost - Item 2)

Item No. 3: Rock removal in accordance with Section 02300 - Earthwork. Removal shall be based on line drilling method.

10 C.Y. @ \$ _____ Per C.Y. for a total cost of \$ _____
(Unit Price) (Total Cost Item 3 in Figures)

_____ Per C.Y. _____
(Write Unit Price) (Write Total Cost - Item 3)

BID PROPOSAL
Continued

The Unit Price bid shall cover all costs of whatever nature, incidental to that item. In explanation but not in limitation thereof, these costs shall include the cost of all work, labor, material, equipment, transportation and all else necessary to execute the Contract, and all incidental expenses in connection therewith, including all costs on account of loss by damage or destruction encountered for settlement of damages, and including all cost for replacement of defective materials.

The Estimate of material quantities specified is approximate only and is given solely to be used as a uniform basis for comparison of basis. The minimum quantity for any item shall be zero (0). The maximum quantity shall be as stated in the Bid Proposal for each item.

Should the final quantity be less than the maximum quantity stated in the Bid Proposal for any item, the Supplier shall have no claim for loss incurred by him/her for commitments made by him/her in anticipation of the work contemplated, or for loss of anticipated profits, or for work done prior to his/her having been authorized to proceed therewith.

GRAND TOTAL BID PRICE: (Item 1 - 3 above)

(In Writing)

(In Figures)

The Contract will be awarded based on the Grand Total Bid Price. However, it is understood that the Total Cost for quantities are based upon a good faith estimate of the quantity of materials needed; therefore, the actual contract price, which cannot be determined until the completion of the project may be a sum either greater than or less than the Grand Total Bid Price above in accordance with the above Unit Price(s).

BID PROPOSAL

Continued

ALTERNATES:

Indicate below the amount that will be added to or deducted from the lump sum base bid for each of the following alternates, if any are accepted by the City:

ALTERNATE #A:

(Add or Deduct please indicate with check mark

ALTERNATE #A: SPORTS LIGHTING FOUNDATION CONSTRUCTION INDICATED ON THE DRAWINGS AND WITHIN THE SPECIFICATIONS.

Under the Base Bid: Contractor to construct all specified electrical modifications specified within the existing field house including (but not limited to) main panel replacement, sub-panel replacement and all associated rewiring to re-energize all existing circuits, and energize the new electrical service rewiring to the scoreboard.

Contractor to provide underground conduit to all specified pull boxes and all proposed sports lighting foundation locations. Contractor to provide underground conduit and specified electrical wiring from electrical source to scoreboard foundation.

Under this Alternate: Contractor to construct new sports lighting foundations as detailed and specified utilizing details, specifications as well as the “Report of Geotechnical Investigation for Ed Ford Athletic Complex Soccer Lighting Standards” using the “slurry and replace” method to minimize dewatering.

Contractor responsible for dewatering and obtaining all permits and Frac Tank Containment Treatment and Disposal of ground water that is know to have trace amounts of Benzene. (Reference Appendix B Ground Water Sampling Results).

Additional calendar days added to the contract time period: 14

(In Writing)

(In Figures)

PROCEDURE FOR ALTERNATE BIDS

Each bidder shall submit on the Proposal Form, Alternate Bids stating the difference in price, additions to or deductions from the Grand Total Bid Price for the substitution, omission, or addition of the following materials, items or construction from that shown and specified.

Each Bidder shall carefully check the Drawings and Specifications to determine the extent of each Alternate Bid required.

Alternate Bids shall include all overhead and profit applicable thereto.

Alternate Bids shall reflect the increase or decrease in cost of all work of every name and nature which may be affected thereby and not subsequent claims for extras by reason of the Contractor's failure to observe this requirement will be considered.

Except as otherwise described or approved, materials and workmanship of the Alternate Bids shall conform to the requirements specified under the various Sections of the Specifications for similar items of work.

Where methods of construction, materials, finishes or details of installation required by the various Alternate Bids differ from the requirements shown on drawings or specified for corresponding items, the Alternate construction, material, etc., will be subject to approval by the Architect.

The Contractor shall submit shop drawings and samples for the work under each accepted Alternate Bid for approval in conformance with general conditions.

SCHEDULE OF PRICE
(FOR ALTERNATE)

Grand Total Bid Price plus Alternate #A

(In Writing)

(In Figures)

NOTE: If the Grand Total Bid Price is within the amount of funds available to finance the Contract and the City wishes to accept Bids on the Alternate(s), then the Contract award will be made to that responsible Bidder submitting the lowest combined Bid, consisting of the Grand Total Bid Price plus Alternate Bid(s) (applied in the alphabetical order in which they are listed in the Schedule of Prices). Under this procedure, if the City wishes to award on only the Grand Total Bid Price, then the Contract will be awarded to that responsible Bidder submitting the lowest Grand Total Bid Price.

It is understood and agreed that the total price stated by the undersigned in the "Schedule of Prices" is based on estimated quantities and will only control in the awarding of the contract. It is further understood that the quantities stated in the "Schedule of Prices" for the items are estimated only and may be increased or decreased as provided in the specifications.

Attached herewith is a (cashier's check) (certified check) (Check one)
(bid bond)

in the amount of \$ _____ representing 10% of the total amount bid, but not exceeding \$20,000.00 as stated in Article 8, Page 4.

The undersigned agrees that this check or bond is to be forfeited as liquidated damages and not as a penalty, if the contract is awarded to the undersigned and he shall fail to execute the contract for the project or forward the bond required within the stipulated time. Otherwise, the check or bond will be returned to the undersigned.

Choice of Retainage:

If the Total Price bid for the Contract Work exceed \$100,000. the undersigned elects the following option for retainage in accordance with the General Conditions: (check one only)

- 2% Cash from each payment
- 2% of Contract amount deposited as approved negotiable securities

The undersigned is (an individual) (a corporation) (a partnership) under the laws

of the State of _____ having offices at _____.

Signed _____

Name _____

Title _____

Company _____

Address _____

Phone (____) _____

Fax (____) _____

(Seal if Bid is by a Corporation)

1. CERTIFICATE OF EXPERIENCE

_____ hereby certifies that _____ has performed the following work within the past three (3) years:

Name of Owner	Amount of Contract	Type of Work	Owner's Representative in charge of Work (Inc. Address and Phone)	Approximate Dates

Name of Bidder

By

Witness

Title

IMPORTANT: THIS FORM MUST BE FILLED IN BY BIDDER.

2. PLANT AND EQUIPMENT QUESTIONNAIRE

Submitted to City of Jersey City

By _____
A Corporation
A Co-partnership
An Individual

Principal Office _____

The signatory of this questionnaire guarantees the truth and accuracy of all statements and of all answers to interrogatories hereinafter made.

a. In what manner have you inspected the proposed work? Explain in detail.

b. Explain your plan or layout for performing the proposed work.

c. The work, if awarded to you, will have the personal supervision of whom?

d. Do you intend to do the grading on the proposed work with your own forces? _____ If so, give type of equipment to be used.

- e. Do you intend to sublet any portions of the work? _____
 If so, it is mandatory pursuant to N.J.S.A. 40A:11-16 that you list the names of those subcontractors under each discipline below, failure to do so will automatically result in rejection of the bid.

<u>Trade</u>	<u>Name of Subcontractor</u>	<u>Address</u>
Plumbing and Gas Fitting and all kindred work	Not Applicable to this project	
Steam Power Plants, Steam and Hot Water Heating and Ventilating and Refrigeration Apparatus and all kindred work	Not Applicable to this project	
Electrical Work, including any Electrical Power Plants, Tele-data, Fire Alarm, or Security System		
Structural Steel and Ornamental Iron Work		

Each subcontractor listed above shall fill out and submit a Certificate of Experience (as shown in this Bid Proposal) and items a, b, c, f, g, h, I and the remaining affidavit, duly executed, on the last page of the "Plant and Equipment Questionnaire". The General Contractor shall supply each subcontractor with duplicate pages of this proposal to be filled out by the subcontractor and then submitted with the bid proposal.

Whenever a bid sets forth more than one subcontractor for any of the specialty trade categories listed above, the bidder shall submit to the contracting unit a certificate signed by the bidder listing each subcontractor named in the bid for that category. The certificate shall set forth the scope of work for which the subcontractor has submitted a price quote and which the bidder has agreed to award to each subcontractor should the bidder be awarded the contract. The certificate shall be submitted to the contracting unit simultaneously with the list of the subcontractors. The certificate may take the form of a single certificate listing all subcontractors or, alternatively, a separate certificate may be submitted for each subcontractor. If a bidder does not submit a certificate or certificates to the contracting unit, the contracting unit shall award the contract to the next lowest responsible bidder.

g. What equipment do you own that is available for and intended to be used on the proposed project?

QTY	ITEM	DESCRIPTION, SIZE, CAPACITY, ETC.	COND.	YRS. OF SERVICE	PRESENT LOCATION

h. What equipment do you intend to purchase or lease for use on the proposed project?

QUANTITY	ITEM	DESCRIPTION, SIZE, CAPACITY, ETC	APPROXIMATE COST	
			PURCHASE	LEASE

I. Have you made contracts or received firm offers for all materials within prices used in preparing your proposal? Do not give name of dealers or manufacturers.

The undersigned hereby declare(s) _____ that the items of equipment in Table 1 are owned by _____, and are available for and intended to be used on the Project, if _____ awarded the Contract, and that he/they propose(s) to purchase or lease for the Project the additional items of equipment stated in Table 2.

Dated at _____ this _____ day of _____, 20_____

Name of Organization

By _____

Title of Person Signing

STATE OF _____

ss:

COUNTY OF _____

_____, Being duly sworn, deposes and says that he is _____ of the above _____
Name of Organization

and that the answers to the foregoing questions and all statements therein contained are true and correct.

Sworn to before me this _____ day of _____, 20_____

Notary Public

My commission expires _____

PROJECT TITLE: CAVEN POINT - SOCCER FIELD NEW ARTIFICIAL TURF AND LIGHTING

3. NON-COLLUSION AFFIDAVIT

STATE OF NEW JERSEY)

ss:

COUNTY OF HUDSON)

I, _____ of the City of _____, in the County of _____ and the State of _____, of full age, being duly sworn according to law, upon my oath depose and say that:

I am _____ of the firm of _____ the bidder making the Proposal for the above named project and that I executed the said Proposal with full authority so to do; that said bidder has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free, competitive bidding in connection with the above named project; and that all statements contained in said Proposal and in this affidavit are true and correct, and made with full knowledge that the City of Jersey City relies upon the truth of the statements contained in said Proposal and in the statements contained in this affidavit in awarding the contract for the said project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by:

(Name of Contractor

(Also type or print name of affiant
under signature)

ATTEST:

Secretary

(Affix Corporate Seal)

Sworn and subscribed to before me
this _____ day of _____, 20_____

NOTARY PUBLIC
My commission expires on: _____

CITY OF JERSEY CITY

COUNTY OF HUDSON

STATE OF NEW JERSEY

4. CORPORATION OR PARTNERSHIP STATEMENT

Chapter 33 of the Public Laws of 1977 provides that no corporation or partnership shall be awarded any State, County, Municipal or School Districts contract for purposes of any work or the furnishing of any materials or supplies unless prior to the receipt of the bid or accompanying the bid of said corporation or partnership there is submitted a statement. The statement shall set forth the names and addresses of all stockholders in the corporation or partnership who own ten (10) percent of its stock of any class or of all individual partners in the partnership who own a ten (10) percent or greater interest therein.

Date: _____ 20____

Legal Name of Bidder: _____

Incorporated _____ Partnership _____

Business Address:

Street _____

City _____

State & Zip Code _____

Telephone _____

Listed below are the names and addresses of all stockholders in the corporation or partnership who own ten (10) percent or more of its stock of any class, or of all individual partners in the partnership who own a ten (10) percent or greater interest therein.

Name: _____ Address: _____

Name: _____ Address: _____

Name: _____ Address: _____

Name: _____ Address: _____

We have no one person who owns ten (10) percent or more of the corporation or partnership.

Signed: _____

Title: _____

If extra space is required, add sheets as necessary.

1/2015

**EQUAL EMPLOYMENT OPPORTUNITY (EEO)/
AFFIRMATIVE ACTION (AA) REQUIREMENTS
FOR CONSTRUCTION CONTRACTS**

Questions in reference to EEO/AA requirements for Construction
Contracts should be directed to:

Jeana F. Abuan
EEO/AA Officer, P.A.C.O.
Department of Administration
Office of EEO/AA
280 Grove Street Room-103
Jersey City NJ 07302
Tel. # 201-547-4533
Fax# 201-547-5088
E-Mail Address: abuanj@jcnj.org

Minority/Women Business Participation
In City Construction Contracts
City of Jersey City
Department of Administration
Office of Equal Opportunity/Affirmative Action

I Policy

The City of Jersey City has a policy of equal opportunity and nondiscrimination in public contracting based on race, national origin or gender. Further, the City's policy is to encourage increased participation of minority owned businesses in city contracts. This is in accordance with N.J.S.A. 10:5-32, which provides that public works contracts shall provide for equality in opportunity by any contractor engaged in a public works project.

The City has determined that a "responsible" bidder does not engage in unlawful race or gender discrimination in its awarding of subcontracts or the purchase of supplies used in construction, and does make reasonable efforts to solicit and award subcontracts to minority and female businesses.

II Purpose

The city has adopted regulations to assure that bidders receiving City Constructions are not engaged in unlawful discrimination and make reasonable good faith to include persons of color and women owned businesses as subcontractors. The intent and purpose of these procedures is not to require that a specific proportion of every contract be allocated to minority and women owned businesses, but to assure that they are included in the competitive process and have opportunities to participate in the city's publicly contracted projects. Pursuant to this policy, contractor is expected to include minority/women owned businesses in all formal or informal invitations to quote, etc, and to make every reasonable effort to provide subcontracting opportunities to qualified minority and women owned businesses.

The purpose of the "participation levels" referred to herein is to help the city determine whether the contractor has met the requirements of nondiscrimination and of good faith efforts to make subcontracting opportunities available to minority and woman owned businesses. These regulations presume that contractors who have attained or exceeded the suggested participation levels for minority and female subcontractor participation on particular City construction contracts are not engaging in unlawful sex or racial discrimination and have engaged in reasonable efforts to involve minority and female subcontractors. A contractor who is unable to attain or exceed such levels may have its subcontracting practices examined by the city to determine if it is engaging in unlawful discrimination in subcontracting practices or has failed to engage in reasonable outreach efforts.

III Suggested participation level for minority and women owned subcontractors:

- A. Suggested levels of participation for minority owned subcontractors and women owned subcontractors are determined based on estimates of the dollar value of the work in the various disciplines which may be subcontracted and the availability of minority and woman owned prospective subcontractors in the applicable work areas as reflected in the "SAVI II" database maintained by the State of new Jersey, Department of Commerce & Economic Development, Division of Small, Women & Minority Businesses. The Office of the Minority & Women Business Enterprise Program maintains and updates a listing of minority and women owned businesses (M/WB's) providing various categories of goods and services. Minority and/ or women owned businesses (M/WB's) are those registered as such with the State of New Jersey, Department of Commerce & Economic Development, Division of Small, Women & Minority Businesses (SAVI II database). In addition, bona fide minority or women owned businesses that are not so registered will be accepted as such pending completion of the registration process, on recommendation of the Minority/ Women Business Enterprise Development Program (MWBE Director).
- B. In the event the contractor who is awarded the contract elects to perform in-house, with its own personnel and resources, parts of the job included in the subcontracting estimate, the participation levels will be adjusted accordingly.
- C. Suggested participation levels for this project are:

Minority Owned20% of the total dollar amount of the contract

Woman owned20% of the total dollar amount of the contract

IV Availability of information/referral lists of minority/women businesses

- A. To assist the successful bidder in identifying prospective M/WB subcontractors for various areas of work included in the project, after notification that the City Council has awarded the contract but prior to the execution of the contract, the successful bidder should contact the M/WBE Director with regard to meeting the City's suggested participation levels of M/WB contractors in the specific disciplines involved in the project.

Identification and/or establishment of prospective subcontractors in various specialties by the M/WBE Director or any City employee are not to be construed as making any representation as to the qualification of any such contractor to perform. Such identification/establishment are made for the sole purpose of identifying minority and women owned businesses in the required areas of work. Determination of qualifications for the particular project remains the responsibility of the contractor. Nothing in these requirements is to be construed as changing in

any way the provision that "bidder will be required to establish to the satisfaction of the Architect (Engineer) the reliability and responsibility of the proposed subcontractors to furnish and perform the work . . . ", or any other provision of these specifications.

V. Bidders will submit with bid proposal:

1. Plan for outreach to and utilization of minority and/or women owned businesses as subcontractors, including bidder's anticipated level for M/WB's in each specialty, which parts of the contract bidder plans to subcontract, and which parts of the contract bidder anticipates subcontracting to M/WB's (Form MWB-3)
2. As to subcontractors required to be submitted with the bid proposal pursuant to NJSA 40A:11-16, or any additional subcontractors requested for bid submission by the architect Engineer, bidder will indicate, on Form WMB-3, if any, are minority or woman owned, and what efforts were made to offer subcontracting opportunities to MWB's in these disciplines, including "solicitation list" of contractors solicited to quote on the job and "commitment lists" of those awarded or to be awarded subcontracts.
3. Bidders will provide a separate copy of items 1 and 2 above, which the Purchasing Agent will forward to the MWB director for review.

VI. The following applies to the apparent lowest responsive bidder, or three lowest responsive bidders, after results of bid reception have been announced by the Purchasing Agent:

- A. MWBE director will review forms/information submitted by apparent lowest responsible bidder (or three lowest responsible bidders) as part of the bid/proposal, for compliance with nondiscrimination and minority/ women business outreach requirements. These will be preliminary findings, subject to receipt and review of further information/documentation indicated below.
- B. MWBE Director may communicate with apparent lowest responsible bidder (or three lowest) requesting further information about subcontractors solicited and subcontractors engaged, and which if any are minority or woman owned, and if appropriate, offering assistance in identifying prospective minority/women subcontractors. (See Form MWB-5). Contractor will have one week to respond. If contractor fails to respond this may resulted in the bid being found non-responsive, on recommendation of the MWBE Director in consultation with the Corporation Counsel.
- C. MWBE review will include

1. Verifying that proposed subcontractors listed as M/WB's are listed in the State of NJ SAVI II database or other recognized MWBE listings, e.g., New Jersey Transit, Port Authority, etc. If not, director will attempt to ascertain whether said subcontractors are in fact person of color and/or woman owned and controlled, and provide assistance to proposed subcontractors in registering with SAVI II If MWBE Director has reason to believe the proposed subcontractor is not a bona fide or woman owned and operated business he/she will inform the bidding contractor and the city officials referred to in this section, and may require further verification.
2. Verifying whether bidder has achieved the suggested levels of MWB participation.
3. If not, reviewing the contractor's efforts as documented and the contractor's reasons for not achieving such levels.

D. Findings/Recommendations as to compliance

1. If the bidder's MWB targeted participation levels are achieved, bidder will be presumed not to be engaging in unlawful racial and gender discrimination in the selection of subcontractors and suppliers and will be presumed to have engaged in reasonable outreach efforts.

If the participation levels are not achieved by the bidder, the MWBE director in consultation with the Corporation Counsel will review the contractor's outreach efforts and subcontracting practices to determine if it has engaged in reasonable efforts to provide subcontracting opportunities to minority owned businesses, or if it has engaged or is engaging in unlawful race or sex discrimination.

3. If said review indicates that the bidder has made reasonable efforts to include minority as subcontractors and suppliers and has not engaged in unlawful race and sex discrimination, the bidder will be in compliance with the requirements of these provisions.
4. If said review indicates that the bidder has failed to make reasonable efforts to provide opportunities to minority businesses as subcontractors and suppliers, has or has engaged in unlawful race and sex discrimination, the bidder will be deemed not responsible under the provisions of these regulations and the provisions of the specifications. Such recommendation will be made by the MWBE director to the Purchasing Agent in consultation with the Corporation Counsel. Any bidder whose bid is rejected based on finding of discrimination may request and receive a hearing in accordance with applicable law (local, state and federal).
5. The review and recommendation process referred to in sections C and D should be completed within two weeks.

VII Awarding of contract

- A. The contract will include a provision that Contractor will continue to comply with the provisions of the Minority/Women Business Program requirements and the MWB participation levels agreed upon.
- B. The MWBE Director will monitor contractor's compliance. In the event that additional or other subcontracting awards become necessary during the course of the project, the MWBE Director will continue to assist in identification of prospective minority/ women subcontractors as appropriate.

(REVISED 4/13)

EXHIBIT B
MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq. (P.L. 1975, C. 127)
N.J.A.C. 17:27
CONSTRUCTION CONTRACTS

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

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Dept. of LWD, Construction EEO Monitoring Program may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B and C, as long as the Dept. of LWD, Construction EEO

EXHIBIT B (2 of 4)

Monitoring Program is satisfied that the contractor or subcontractor is employing workers provided by a union which provides evidence, in accordance with standards prescribed by the Dept. of LWD, Construction EEO Monitoring Program, that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C. 17:27-7.2. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

(A) If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et. seq., as supplemented and amended from time to time and the Americans with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

(B) If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:

(1) To notify the public agency compliance officer, the Dept. of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Dept. of LWD, Construction EEO Monitoring Program pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;

(2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;

(3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;

EXHIBIT B (3 of 4)

(4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;

(5) If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and non-discrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;

(6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:

(i) The contractor or subcontractor shall interview the referred minority or women worker.

(ii) If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Dept. of LWD, Construction EEO Monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.

(iii) The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Dept. of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.

(iv) If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Dept. of LWD, Construction EEO Monitoring Program.

(7) To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Dept. of LWD, Construction EEO Monitoring Program and submitted promptly to the Dept. of LWD, Construction EEO Monitoring Program upon request.

EXHIBIT B (4 of 4)

(C) The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Dept. of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA 201) electronically provided to the public agency by the Dept. of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Dept. of LWD, Construction EEO Monitoring Program and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on the job and/or off the job programs for outreach and training of minorities and women.

(D) The contractor and its subcontractors shall furnish such reports or other documents to the Dept. of LWD, Construction EEO Monitoring Program as may be requested by the Dept. of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Dept. of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to **Subchapter 10 of the Administrative Code (NJAC 17:27)**.

The undersigned vendor certifies on their company's receipt, knowledge and commitment to comply with:

EXHIBIT B

**N.J.S.A. 10:5-31 et seq. (P.L. 1975, C. 127) and N.J.A.C. 17:27
MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
Construction Contracts**

The undersigned vendor further agrees to furnish the required forms of evidence and understands that their contract/company's bid shall be rejected as non-responsive if said contractor fails to comply with the requirements of N.J.S.A. 10:5-31 et seq. (P.L. 1975, C. 127) and N.J.A.C. 17:27 .

Representative's Name/Title (Print): _____

Representative's Signature: _____

Name of Company: _____ Tel. No.: _____ Date: _____

STATE OF NEW JERSEY
 DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
 CONSTRUCTION EEO COMPLIANCE MONITORING PROGRAM

FORMAA-201
 Revised 12/11

INITIAL PROJECT WORKFORCE REPORT CONSTRUCTION

Official Use Only

Assignment _____

Code _____

For instructions on completing the form, go to: http://www.state.nj.us/treasury/contract_compliance/pdf/aa201ins.pdf

1. FID NUMBER		2. CONTRACTOR ID NUMBER		5. NAME AND ADDRESS OF PUBLIC AGENCY AWARDCG CONTRACT						
3. NAME AND ADDRESS OF PRIME CONTRACTOR				Name:						
				Address:						
(Name)				CONTRACT NUMBER DATE OF AWARD DOLLAR AMOUNT OF AWARD						
(Street Address)				6. NAME AND ADDRESS OF PROJECT						
(City) (State) (Zip Code)				Name:						
				Address:						
				7. PROJECT NUMBER						
4. IS THIS COMPANY MINORITY OWNED () OR WOMAN OWNED ()		COUNTY		8. IS THIS PROJECT COVERED BY A PROJECT LABOR AGREEMENT (PLA)? YES <input type="checkbox"/> NO <input type="checkbox"/>						
9. TRADE OR CRAFT	PROJECTED TOTAL EMPLOYEES				PROJECTED MINORITY EMPLOYEES				PROJECTED PHASE-IN DATE	PROJECTED COMPLETION DATE
	MALE		FEMALE		MALE		FEMALE			
	J	AP	J	AP	J	AP	J	AP		
1. ASBESTOS WORKER										
2. BRICKLAYER OR MASON										
3. CARPENTER										
4. ELECTRICIAN										
5. GLAZIER										
6. HVAC MECHANIC										
7. IRONWORKER										
8. OPERATING ENGINEER										
9. PAINTER										
10. PLUMBER										
11. ROOFER										
12. SHEET METAL WORKER										
13. SPRINKLER FITTER										
14. STEAMFITTER										
15. SURVEYOR										
16. TILER										
17. TRUCK DRIVER										
18. LABORER										
19. OTHER										
20. OTHER										

I hereby certify that the foregoing statements made by me are true. I am aware that if any of the foregoing statements are willfully false, I am subject to punishment.

 (Signature)

10. (Please Print Your Name)

(Title)

(Area Code)

(Telephone Number)

(Ext.)

(Date)

Sample Initial Project Workforce Report Form AA201

Instructions

INSTRUCTIONS FOR COMPLETING THE INITIAL PROJECT WORKFORCE REPORT - CONSTRUCTION (AA201)

DO NOT COMPLETE THIS FORM FOR GOODS AND/OR SERVICE CONTRACTS

1. Enter the Federal Identification Number assigned to the contractor by the Internal Revenue Service, or if a Federal Employer Identification Number has been applied for but not yet issued, or if your business is such that you have not or will not receive a Federal Identification Number, enter the social security number assigned to the single owner or one partner, in the case of a partnership.
2. Note: The Department of Labor & Workforce Development, Construction EEO Monitoring Program will assign a contractor ID number to your company. This number will be your permanently assigned contractor ID number that must be on all correspondence and reports submitted to this office.
3. Enter the prime contractor's name, address and zip code number.
4. Check box if Company is Minority Owned or Woman Owned
5. Enter the complete name and address of the Public Agency awarding the contract. Include the contract number, date of award and dollar amount of the contract.
6. Enter the name and address of the project, including the county in which the project is located.
7. Note: A project contract ID number will be assigned to your firm upon receipt of the completed Initial Project Workforce Report (AA201) for this contract. This number must be indicated on all correspondence and reports submitted to this office relating to this contract.
8. Check "Yes" or "No" to indicate whether a Project Labor Agreement (PLA) was established with the labor organization(s) for this project.
9. Under the Projected Total Number of Employees in each trade or craft and at each level of classification, enter the total composite workforce of the prime contractor and all subcontractors projected to work on the project. Under Projected Employees enter total minority and female employees of the prime contractor and all subcontractors projected to work on the project. Minority employees include Black, Hispanic, American Indian and Asian, (J=Journeyworker, AP=Apprentice). Include projected phase-in and completion dates.
10. Print or type the name of the company official or authorized Equal Employment Opportunity (EEO) official include signature and title, phone number and date the report is submitted.

This report must be submitted to the Public Agency that awards the contract and the Department of Labor & Workforce Development, Construction EEO Compliance Monitoring Program after notification of award, but prior signing the contract.

THE CONTRACTOR IS TO RETAIN A COPY AND SUBMIT COPY TO THE PUBLIC AGENCY AWARDDING THE CONTRACT AND FORWARD A COPY TO:

NEW JERSEY DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
CONSTRUCTION EEO COMPLIANCE MONITORING UNIT
P.O. BOX 209
TRENTON, NJ 08625-0209
(609) 292-9550

Sample Monthly Project Workforce Report Form AA202

Instructions

INSTRUCTIONS FOR COMPLETING MONTHLY PROJECT WORKFORCE REPORT- (AA202)

1. Enter the prime contractor's name, address and zip code number.
2. Enter the **CONTRACTOR ID NUMBER** assigned by the Dept. of Labor & Workforce Development Construction EEO Compliance Monitoring Program.
3. Enter the Federal Identification Number assigned to the contractor by the Internal Revenue Service, or if a Federal Employer Identification Number has not been applied for or issued, or if your business is such that it will not receive a Federal Identification Number, enter the Social Security Number of the owner or of one partner, in the case of a partnership.
4. Reporting Period - enter the beginning and ending dates of the month for the report being submitted. (i.e., 1/1/00 - 1/31/00).
5. Enter the complete name of the public agency awarding the contract. Include the date of contract award.
6. Enter the name and location of the project, including the county in which the project is located.
7. Enter the **PROJECT NUMBER** assigned by the Dept. of Labor & Workforce Development Construction EEO Compliance Monitoring Program.
8. Enter the company name(s) of the contractor(s) performing work at the construction site. List the prime contractor first with subcontractor(s) following.
9. Enter the total percent (%) of project work the contractor or subcontractor has completed, to date.
10. Identify the trades or crafts applicable to the prime contractor and each subcontractor listed in column #8. Use a single line for each trade or craft.
11. Enter the total number of employees for each contractor at each level of classification (J-Journeyworker, AP=Apprentice) and the total number of each minority group - Black, Hispanic, American Indian, Asian and Female. Note: Column A shall include Total Number of employees. Columns B-E shall also include minority females. Column F shall include both non-minority and minority females.
12. Enter the total number of minority employees for each employer at each level of classification. Note: This shall be the sum of columns B-E.
13. Enter the Total Monthly work hours for all employees in each craft at each level of classification.
(A) Enter the Total Monthly minority work hours for each craft at each level of classification (Columns B-E).
(B) Enter the Total Monthly female work hours for each craft at each level of classification (Column F).
14. (A) Enter the Total Monthly PERCENT of minority work hours for each craft at each level of classification.
(B) Enter the Total Monthly PERCENT of female work hours for each craft at each level of classification.
15. Enter the Total Cumulative work hours for each craft at each level of classification.
(A) Enter the Total Cumulative minority work hours for each craft at each level of classification.
(B) Enter the Total Cumulative female work hours for each craft at each level of classification.
16. (A) Enter the Cumulative Percent of minority work hours for each craft at each level of classification.
(B) Enter the Cumulative Percent of female work hours for each craft at each level of classification.
17. Print or type the name of the company official submitting the report; include signature, title, telephone number, and date the report is submitted.

THE CONTRACTOR SHOULD RETAIN ONE COPY AND SUBMIT A COPY TO THE PUBLIC AGENCY WHICH AWARDED THE CONTRACT. ANOTHER COPY MUST BE FORWARDED TO:

New Jersey Department of Labor & Workforce Development
Construction EEO Compliance Monitoring Program
PO Box 209
Trenton, NJ 08625-0209
609 292-9550

APPENDIX A
AMERICANS WITH DISABILITIES ACT OF 1990
Equal Opportunity for Individuals with Disability

The contractor and the _____ of _____, (hereafter "owner") do hereby agree that the provisions of Title 11 of the Americans With Disabilities Act of 1990 (the "Act") (*42 U.S.C. 5121 01 et seq.*), which prohibits discrimination on the basis of disability by public entities in all services, programs, and activities provided or made available by public entities, and the rules and regulations promulgated pursuant there unto, are made a part of this contract. In providing any aid, benefit, or service on behalf of the owner pursuant to this contract, the contractor agrees that the performance shall be in strict compliance with the Act. In the event that the contractor, its agents, servants, employees, or subcontractors violate or are alleged to have violated the Act during the performance of this contract, the contractor shall defend the owner in any action or administrative proceeding commenced pursuant to this Act. The contractor shall indemnify, protect, and save harmless the owner, 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 the alleged violation. The contractor shall, at its own expense, appear, defend, and pay any and all charges for legal services and any and all costs and other expenses arising from such action or administrative proceeding or incurred in connection therewith. In any and all complaints brought pursuant to the owner's grievance procedure, the contractor agrees to abide by any decision of the owner which is rendered pursuant to said grievance procedure. If any action or administrative proceeding results in an award of damages against the owner, or if the owner incurs any expense to cure a violation of the ADA which has been brought pursuant to its grievance procedure, the contractor shall satisfy and discharge the same at its own expense.

The owner shall, as soon as practicable after a claim has been made against it, give written notice thereof to the contractor along with full and complete particulars of the claim. If any action or administrative proceeding is brought against the owner or any of its agents, servants, and employees, the *owner shall* expeditiously forward or have forwarded to the contractor every demand, complaint, notice, summons, pleading, or other process received by the owner or its representatives.

It is expressly agreed and understood that any approval by the owner of the services provided by the contractor pursuant to this contract will not relieve the contractor of the obligation to comply with the Act and to defend, indemnify, protect, and save harmless the owner pursuant to this paragraph.

It is further agreed and understood that the owner assumes no obligation to indemnify or save harmless the contractor, its agents, servants, employees and subcontractors for any claim which may arise out of their performance of this Agreement. Furthermore, the contractor expressly understands and agrees that the provisions of this indemnification clause shall in no way limit the contractor's obligations assumed in this Agreement, nor shall they be construed to relieve the contractor from any liability, nor preclude the owner from taking any other actions available to it under any other provisions of the Agreement or otherwise at law.

Representative's Name/Title Print): _____

Representative's Signature: _____

Name of Company: _____

Tel. No.: _____ Date: _____

SAMPLE LETTER TO THE UNION

(CONTRACTOR'S LETTER HEAD)

Date:

Local Union: _____

Re: _____ Project, Jersey City, NJ

This company is about to enter into a contract with the City of Jersey City for the above project. A condition of the contract is compliance with the state approved affirmative action program, which requires that we make a good faith effort to use minority workers in each construction trade to the extent of ____% of the total work hours, and female workers to the extent of 6.9% of total work hours.

We are further required to submit a statement from an authorized union official, that the union will take such actions as may be necessary with respect to the referral and employment of minority group persons in order to enable this contractor to meet its obligations under the affirmative action plan.

We solicit your help and cooperation, by engaging in aggressive recruitment of minority workers, providing us with the statement requested, and advising whether the union will be able to fulfill our work force needs as indicated.

Very Truly Yours,

Minority/Woman Business Enterprise (MWBE) Questionnaire for Bidders

Jersey City Ordinance C-829 establishes a goal of awarding 20% of the dollar amount of total city procurement to minority and woman owned business enterprises.

To assist us in monitoring our achievement of this goal, please indicate below whether your company is or is not a minority owned and/or woman owned business, and return this form with your bid proposal.

Business Name : _____

Address : _____

Telephone No. : _____

Contact Name: _____

Please check applicable category :

_____ Minority Owned Business (MBE)

_____ Minority & Woman Owned
Business (MWBE)

_____ Woman Owned business (WBE)

_____ Neither

Definitions:

Minority Business Enterprise

Minority Business Enterprise means a business which is a sole proprietorship, partnership or corporation at least 51% of which is owned and controlled by persons who are African American, Hispanic, Asian American, American Indian or Alaskan native, defined as follows:

African American: a person having origins in any of the black racial groups of Africa

Hispanic: a person of Mexican, Puerto Rican, Central or South American or other non-European Spanish culture or origin regardless of race.

Asian: a person having origins in any of the original peoples of the Far East, South East Asia, Indian subcontinent, Hawaii or the Pacific Islands.

American Indian or Alaskan Native: a person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition.

Woman Business Enterprise

Woman Business Enterprise means a business which is a sole proprietorship, partnership or corporation at least 51% of which is owned and controlled by a woman or women.

OFFICE OF EQUAL EMPLOYMENT OPPORTUNITY/AFFIRMATIVE ACTION COPY

Minority/Woman Business Enterprise (MWBE) Questionnaire for Bidders

Jersey City Ordinance C-829 establishes a goal of awarding 20% of the dollar amount of total city procurement to minority and woman owned business enterprises.

To assist us in monitoring our achievement of this goal, please indicate below whether your company is or is not a minority owned and/or woman owned business, and return this form with your bid proposal.

Business Name : _____

Address : _____

Telephone No. : _____

Contact Name: _____

Please check applicable category :

_____ Minority Owned Business (MBE)

_____ Minority & Woman Owned
Business (MWBE)

_____ Woman Owned business (WBE)

_____ Neither

Definitions:

Minority Business Enterprise

Minority Business Enterprise means a business which is a sole proprietorship, partnership or corporation at least 51% of which is owned and controlled by persons who are African American, Hispanic, Asian American, American Indian or Alaskan native, defined as follows:

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Hispanic: a person of Mexican, Puerto Rican, Central or South American or other non-European Spanish culture or origin regardless of race.

Asian: a person having origins in any of the original peoples of the Far East, South East Asia, Indian subcontinent, Hawaii or the Pacific Islands.

American Indian or Alaskan Native: a person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition.

Woman Business Enterprise

Woman Business Enterprise means a business which is a sole proprietorship, partnership or corporation at least 51% of which is owned and controlled by a woman or women.

DIVISION OF PURCHASING COPY

Form MWBE Contractor's Compliance Plan to be submitted with bid document.
CONTRACTOR: PROVIDE TWO (2) COMPLETED COPIES OF THIS FORM WITH YOUR PROPOSAL (or within 24 hours thereafter)

**City of Jersey City
 Department of Administration
 Office of Equal Opportunity/Affirmative Action**

Project: _____ # _____

Contractor: _____ Bid Amt. \$ _____

Please list what portions of the work, if any you intend to sublet, the approximate value of the same, and whether you anticipate subletting it to a minority or woman owned contractor, or neither.

Trade	Approx. \$ Value	Minority or Woman Owned Business Check appropriate column		
		Minority	Woman	Neither

Receipt of this report by the City does not constitute acceptance by the City of minority business participation goals less than 20% or women business participation goals less than 20% unless specifically agreed to by the Office of Equal Opportunity/Affirmative Action

CONTINUED ON NEXT PAGE

OFFICE OF EQUAL EMPLOYMENT OPPORTUNITY/AFFIRMATIVE ACTION COPY

2. As to subcontracted trade mandated to be included in proposal pursuant to N.J.S.A. 40A:11-16, please list name of proposed subcontractor, trade, and whether minority woman, or not:

Trade	Contractor Name & Address	Approx \$ Value	Minority or Woman Owned Business Check appropriate column		
			Minority	Woman	Neither

3. What is your policy and practice with respect to outreach and consideration of minority and women-owned vendors/contractors as contractors and/or suppliers?

Name of Contractor _____

By: Signature _____

Type or print name/title: _____

Telephone No: _____ Date _____

.....
For City Use:

Acceptable M/W Business Participation levels for this Project: _____

By _____ Date: _____

2. As to subcontracted trade mandated to be included in proposal pursuant to N.J.S.A. 40A:11-16, please list name of proposed subcontractor, trade, and whether minority woman, or not:

Trade	Contractor Name & Address	Approx. \$ Value	To Minority or Woman Owned Business		
			Check appropriate column		
			Minority	Woman	Neither

3. What is your policy and practice with respect to outreach and consideration of minority and women-owned vendors/contractors as contractors and/or suppliers?

Name of Contractor _____

By: Signature _____

Type or print name/title: _____

Telephone No: _____ Date _____

.....
For City Use:

Acceptable M/W Business Participation levels for this Project: _____

By _____ Date: _____

PURCHASING COPY

"New Jersey Business Registration Requirements" For Construction Contracts

The contractor shall provide written notice to its subcontractors of the responsibility to submit proof of business registration to the contractor.

Before final payment on the contract is made by the contracting agency, the contractor shall submit an accurate list and the proof of business registration of each subcontractor or supplier used in the fulfillment of the contract, or shall attest that no subcontractors were used.

For the term of the contract, the contractor and each of its affiliates and a subcontractor and each of its affiliates [N.J.S.A. 52:32-44(g)(3)] shall collect and remit to the Director, New Jersey Division of Taxation, the use tax due pursuant to the Sales and Use Tax Act on all sales of tangible personal property delivered into this State, regardless of whether the tangible personal property is intended for a contract with a contracting agency.

A business organization that fails to provide a copy of a business registration as required pursuant to section 1 of P.L.2001, c.134 (C.52:32-44 et al.) or subsection e. or f. of section 92 of P.L.1977, c.110 (C.5:12-92), or that provides false business registration information under the requirements of either of those sections, shall be liable for a penalty of \$25 for each day of violation, not to exceed \$50,000 for each business registration copy not properly provided under a contract with a contracting agency."

STATE OF NEW JERSEY
BUSINESS REGISTRATION CERTIFICATE
FOR STATE AGENCY AND CASINO SERVICE CONTRACTORS

TAXPAYER NAME:
TAX REGISTRATION TEST ACCOUNT
TAXPAYER IDENTIFICATION:
TRADE NUMBER:
CLIENT REGISTRATION:
SEQUENCE NUMBER:
ISSUANCE DATE:

[Signature]

STATE OF NEW JERSEY
BUSINESS REGISTRATION CERTIFICATE

Employer Name: TAX REG TEST ACCOUNT
Trade Number:
Address: 547 ROKHILLING AVE
TRENTON, NJ 08611
City and State:
Date of Registration: October 14, 2004
For Office Use Only:
204-166-4712/2813533



**EARTH
ENGINEERING
INCORPORATED**

Geotechnical Engineers & Geologists

REPORT OF GEOTECHNICAL INVESTIGATION

ED FORD ATHLETIC COMPLEX SOCCER LIGHTING STANDARDS

**JERSEY CITY
ESSEX COUNTY, NEW JERSEY**

**Prepared For: City of Jersey City
Dept. of Arch., Eng., Traff., & Trans.
575 Route 440
Jersey City, New Jersey 08049**

EEl Project No. 27317.J0

October 3, 2014

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APPENDIX

SITE LOCATION MAP
BORING LOCATION PLAN
TEST BORING PROFILES
LABORATORY TEST RESULTS
TEST BORING LOGS

I. INTRODUCTION

This report was prepared for the Jersey City Department of Architecture, Engineering, Traffic, and Transit and contains the results of a geotechnical engineering investigation conducted for the proposed outdoor lighting standards to be installed for the Soccer Field (Pitch) within the Ed Ford Athletic Complex located in the Jersey City, Essex County, New Jersey. The purpose of this investigation has been to define the subsurface stratification and the engineering properties of materials which will support the proposed lights.

The scope of work for this project included a subsurface field investigation, geologic analysis of site conditions, laboratory testing program, and a geotechnical engineering analysis of the data obtained. This investigation was performed in general accordance with EEI Proposal No. WB-5259 (Revision #2). This report summarizes the results of the work performed and provides recommendations regarding foundation design, soil strength conditions, groundwater conditions, and general foundation installation and earthwork criteria.

II. SITE AND PROJECT DESCRIPTIONS

The project site is situated within a portion of the Ed Ford Athletic Complex located at 1 Chapel Avenue in Jersey City, Essex County, New Jersey. A Site Location Map, included within the *Appendix*, shows the general location of the site on a map in reference to the surrounding area. Access to the project site is obtained off of Chapel Avenue. The topography in the area of the project was found to be generally flat. The project site is bordered to the northeast by the Chapel Avenue, to the northwest by Caven Point Road, to the southwest by a commercial property, with the southeastern portion of the site bordered by a wooded area and a golf course. The location of the test borings in relation to existing site features are presented on the Boring Location Plan, EEI Drawing No. 27317.J0-A-101, located within the *Appendix*.

The proposed construction will consist of erecting four (4) outdoor lighting standards at the four corners of the soccer pitch. Based on available information, the light standards are expected to be situated approximately 70 feet above existing grade and be founded on 30 inch diameter caisson foundations situated approximately 12.0 feet below existing grade.

III. FIELD INVESTIGATION

Two (2) standard earth borings, designated as B-1 and B-2, were performed to complete the proposed scope of work. The test borings were conducted by Uni-Tech Drilling of Franklinville, New Jersey on September 5th, 2014 and extended downward to depths of approximately 49.9 feet below the existing ground surface. The test boring program was supervised by representatives of Earth Engineering Incorporated. The test boring locations were determined by a representative of Jersey City Soccer Association and are shown on the Boring Location Plan.

The test borings were advanced using a truck mounted drill rig equipped with hollow stem augers and split spoon samplers. Split-spoon samples, conducted in accordance with ASTM standard D1586, were taken throughout the entire depth of the borings. Standard Penetration Test (SPT) values were recorded for each sample. The SPT values, which are a measure of soil density and consistency, are the number of blows required to drive a 2-inch (outer diameter) split-barrel sampler one foot using a 140-pound weight dropped 30 inches. The number of blows required to advance the sampler over the 12 inch interval from 6 to 18 inches is considered the "N" value, or the SPT value which is recorded on the Test Boring Profiles, EEI Drawing No. 27317.J0, Sheet 1 of 1, found within the *Appendix*. The Test Boring Logs containing sample depths, descriptions of materials encountered, and SPT values are also included within the *Appendix*. It should be noted that the test borings were backfilled with a cement-grout mix as required by NJDEP regulations.

IV. LABORATORY TESTING

All recovered soil samples were taken to EEI's soils laboratory for examination and testing. All samples were visually analyzed and classified by our engineers. In order to supplement visual classification, two (2) representative soil samples were subjected to Standard Classification Testing which includes Mechanical Gradation Analysis - ASTM D422, Atterberg Limits - ASTM D4318, and Natural Moisture Content - ASTM D2216. The physical properties used for the classification analysis and the definition of the engineering parameters were determined and are presented in Table I. Gradation curves, graphically depicting the results of the particle size analyses are also presented within the *Appendix*.

TABLE I - LABORATORY TEST RESULTS			
Boring Location		B-2	B-1 & B-2
Sample Number		S-7	S-12 & S-13
Sample Depths		19.0' – 21.0'	39.0' – 49.9'
Stratum		Stratum II	Stratum III
Particle Size Distribution			
Percent Passing Sieve	1.5"	100	100
	3/4"	100	100
	3/8"	100	99.8
	No. 4	100	99.4
	No. 10	100	99.2
	No. 40	100	98.8
	No. 100	96.6	98.2
	No. 200	94.4	97.5
Atterberg Limits			
Liquid Limit		63	Non-Plastic
Plastic Limit		42	Non-Plastic
Plasticity Index		21	Non-Plastic
Natural Moisture Content (percent)		51.4	29.1
Unified Soil Classification System (USCS) Group Symbol		MH	ML

TABLE I - LABORATORY TEST RESULTS		
Boring Location	B-2	B-1 & B-2
ASTM Group Name	Elastic Silt	Silt

V. SUBSURFACE CONDITIONS

Geology

According to the 1996 Bedrock Geologic Map of Central and Southern New Jersey, the area investigated is underlain by the Stockton Formation (Geologic Symbol - T_{RS}) which is Upper Triassic in age. This formation consists predominantly of medium to coarse grained, light gray, light grayish brown, or yellowish to pinkish gray arkosic sandstone and medium to fine grained, violet gray to reddish brown arkosic sandstone; with lesser, reddish to purplish brown, silty mudstone, argillaceous siltstone, and shale. Some coarse grained sandstone in lower part contains thick beds of conglomerate (T_{RSC}) which have been mapped in the vicinity of Stockton. Sandstone, deposited in high gradient stream channels, is mostly planar bedded with scoured bases containing pebble lags and mudstone rip-up clasts. Based on the observations made during the field investigation, soils associated with the reddish brown sandstone of the Stockton Formation were encountered within the deeper portions of the test borings completed at the site.

Soils

Each of the soil samples recovered from the test boring investigation were examined and visually classified by EEI, both in the field and in the laboratory. The surface of the site at the two test boring locations was covered by topsoil measuring approximately 4.0 inches in thickness. Underlying this surficial material, the soils at the site have been classified into a profile consisting of one (1) fill layer and three (3) naturally occurring soil strata. Cross-sections of the test borings displaying the soils encountered and other information obtained from the field investigation is included within the *Appendix* on the Boring Profiles. Additional test boring information is also shown on the Boring Logs included within the *Appendix*. A general description of the soils

encountered is as follows:

FILL

The FILL material was encountered in each test boring performed during the investigation immediately below the topsoil layer and extend downward to depths ranging from approximately 7.6 to 8.0 feet below the existing ground surface. The FILL generally consisted of multi-colored (light brown, brown, reddish brown, tan, gray) fine to coarse sand, and to trace silt, trace gravel, brick and wood fragments.

SPT (N) values ranging from 3 to 28 blows on the sampling barrel per foot of penetration were recorded during the sampling of this soil. Based on this range of SPT (N) values, the FILL material exists in a very loose to dense state. Visual classification conducted on representative samples retrieved from the FILL shows this soil to be variable in content and non-plastic. The FILL appears to represent soil placed during previous earthwork activities at the site.

STRATUM I

This soil was encountered in both test borings immediately below the FILL material and extended downward to depths ranging from approximately 19.0 to 34.0 feet below the existing ground surface. The Stratum I soils generally consisted of multi-colored (gray, dark gray, brown, black) fine to medium sand, and to some silt, trace gravel, shell fragments and organics.

SPT (N) values ranging from 1 to 6 blows on the sampling barrel per foot of penetration were recorded during the sampling of this soil. Based on these SPT (N) values, the Stratum I soil was found to exist in a very loose to loose state. Visual classification conducted on representative samples retrieved from Stratum I shows this soil to be highly variable in content and range from slightly plastic to non-plastic.

STRATUM II

This soil was only encountered in test boring B-2 immediately below Stratum I soils and extended downward to a depth of approximately 29.7 feet below the existing ground surface. The Stratum II soils were found to consist of black to bluish gray silt, and to trace clay, trace fine sand and organics.

SPT (N) values ranging from weight of hammer (WOH) to 6 blows on the sampling barrel per foot of penetration were recorded during the sampling of this soil. Based on this range of SPT (N) values, Stratum II exists in a very soft to medium stiff state. Laboratory testing performed on representative samples retrieved from Stratum II shows this soil to be predominately fine grained (silt and clay), highly plastic, and possess a natural moisture content of 51.4 percent. This soil was classified under the Unified Soil Classification System as Elastic Silt, group symbol MH.

STRATUM III

This soil was encountered in both test borings immediately below the Stratum I or Stratum II soils and extended downward to the termination depths of the test borings at approximately 49.9 feet below the existing ground surface. The Stratum III soils generally consisted of reddish brown to brown to bluish gray fine to medium sand, little to trace silt with interlayers of silt and clay.

SPT (N) values ranging from 6 to 36 blows on the sampling barrel per foot of penetration were recorded during the sampling of this soil. Based on these SPT (N) values, Stratum III was found to exist in a loose to dense state. Laboratory testing performed on representative samples retrieved from Stratum III shows this soil to be predominately fine-grained (silt, clay, fine sand), non-plastic, and possess a natural moisture content of 29.1 percent. The soil sample was classified under the Unified Soil Classification System as Silt, group symbol ML.

Bedrock

The bedrock surface, typically defined by auger refusal, was not encountered during the field investigation.

Groundwater

The static groundwater level was encountered in both test borings at depths ranging from approximately 2.6 to 4.0 feet below the existing ground surface. Mottling of the soils, which may be an indication of seasonal high groundwater levels, was not encountered in test borings. It should be noted that these observations were made at the time of the drilling operation and that groundwater table elevations may vary with daily, seasonal, and climatic variations.

Based on the existing site grades and proposed construction, EEI anticipates that foundation installation will extend well below recorded groundwater levels. Consequently, groundwater control measures may be required during site construction activities. Measures to minimize the impact of groundwater during construction are discussed in the *Groundwater Control* section of this report.

VI. CONCLUSIONS AND RECOMMENDATIONS

The results of the field investigation, supported by laboratory testing, revealed that the general geotechnical cross-section underlying the project site is comprised of the variable content, non-plastic, very loose to dense FILL soils; which are underlain by the primarily granular, non-plastic to slightly plastic, very loose to loose soils of Stratum I; which are underlain by the predominately fine-grained (silt, clay), highly plastic, very soft to medium stiff soils of Stratum II; which are ultimately underlain by the generally granular, non-plastic, loose to dense soils of Stratum III. Based on engineering analysis performed on the data collected during this investigation, it is the opinion of EEI that the variable content FILL, very loose to loose soils of Stratum I, and very soft to medium stiff highly plastic soils of Stratum II are not capable of

adequately supporting the foundation loads imposed by the installation of the lighting standard caisson foundations. Given this information, EEI believes that the foundation loads of the structures should be transferred down to the suitably dense soils of Stratum III. The following caisson capacity recommendations for the proposed lighting standards are provided by EEI based on the geotechnical engineering analysis of the data obtained from this investigation, the details of which are found below.

Foundation Design Parameters

Although final designs were not available at the time of this report, preliminary site plans obtained from Musco Lighting indicate the proposed lighting standards will be situated atop a 30 inch diameter reinforced concrete caisson foundation extending approximately 12.0 feet below existing grades.

Visual evaluation performed on the underlying FILL shows this material is variable in content and density. Visual evaluations performed on Stratum I shows these soils are generally granular, non-plastic, and are in a very loose to loose density state. Laboratory testing and visual evaluation of the Stratum II soil show it to be highly plastic, are in a very soft to medium stiff density state, and contain varying amounts of organic material. Based on this information, the FILL, Stratum I, and Stratum II soils are considered unsuitable for adequate support of the lighting standards utilizing a caisson foundation system. Engineering analysis of the site conditions indicates that a potential for settlements above acceptable limits is expected if the lighting standard foundation elements are situated on/in the FILL, Stratum I, and Stratum II soils. In order to prevent settlements in excess of tolerable limits, EEI recommends bypassing the FILL, Stratum I, and Stratum II soils and situating the caisson base in the underlying suitably dense Stratum III soils.

The soils of Stratum III, in their present condition, are considered to be stable and suitable for support of the loads imposed by the installation of the lighting standards utilizing a caisson

foundation system. Based on the data obtained during the field investigation, it is anticipated that installation of the caissons will situate the foundation base at a depths ranging from approximately 34.0 to 38.0 feet below existing grade. Table II below details the anticipated caisson foundation bearing depth for each lighting standard located within the general footprint of the referenced test boring.

- TABLE II - ANTICIPATED FOUNDATION BEARING DEPTHS		
Test Boring Location	Depth to Stratum III Soils (ft)	Anticipated Bearing Depth for Caisson Foundation (ft)
B-1	34.0	38.0
B-2	27.9	34.0

* These depths are provided as a guide only. Overturning moment loads were not considered in this analysis and should be evaluated by the project Structural Engineer of Record prior to final design. Therefore, caisson dimensions and bearing depths may vary based on final designs.

Based on this information, the sign may be supported on a 30 inch diameter caisson foundation system situated on/in the suitable dense Stratum III soils provided that the design allowable soil bearing capacity does not exceed 3000 psf (pounds per square foot).

The caisson excavation should be temporarily cased during installation to avoid collapse and to protect personnel. The excavation should be kept dry and cleaned of loose materials and/or debris immediately prior to inspection and concrete placement.

Given the above recommendations and design parameters, it is anticipated that total settlement of the advertising sign will not exceed the tolerable limits for a structure of this type based on an allowable soil bearing pressure of 3000 PSF. If the loads require an end bearing capacity in excess of 3000 psf or the lateral and uplift loads require a deeper caisson, the foundation base shall extended downward to a depth necessary to provide the allowable bearing capacity and/or lateral capacity. Alternately, the diameter of the caisson can be enlarged to accommodate the required capacity. Once the proposed caisson bottom elevation is achieved concrete may be placed within the caisson using a tremmie or concrete pump. The tremmie or

pump should be advanced to approximately 1.0 feet from the based of the excavation with the tremmie or concrete pump advanced upward as the concrete is placed. The earth pressure coefficients that can be used in the caisson design are provided in the Lateral Earth Pressures and Uplift section of this report. Installation of the foundations should be carried out in accordance with applicable ACI guidelines, under the direction of a licensed professional engineer.

Backfill and Compaction

Fill material which supports foundations, slabs, and pavements, in addition to material used for retaining wall backfill is considered structural fill. Following the performance of the site preparation measures, structural fill required to achieve proposed construction elevations may be placed. Excavation necessary for foundation and utility construction will make available limited quantities of the FILL material and the natural soils of Stratum I and Stratum II for use as structural fill.

Visual classification of the FILL shows this material to be primarily granular and non-plastic. In general, the FILL material encountered in the test borings did not appear to contain significant amounts of organics or other deleterious materials and is therefore considered suitable for reuse as structural fill. EEI recommends the FILL material be further evaluated during site construction activities by the on site Geotechnical Representative during fill placement. FILL material containing significant organics or other deleterious material, if any, should be stockpiled separately and used in non structural areas of the site or disposed of properly. Furthermore, any large diameter demolition materials should be segregated and processed to less than 4.0 inches in diameter and blended with suitable on-site soils prior to use as structural fill.

Visual evaluation performed on Stratum I indicates these soils are generally comprised of granular, non-plastic materials. Based on this information, the Stratum I soils are considered suitable for reuse as structural fill. Please note that the Stratum I soils were located below the measured groundwater levels and thus would require significant drying time prior to achieving

proper compaction percentages.

During deep foundation construction, the soils of Stratum II may become available as spoils. Laboratory testing and visual evaluation performed on Stratum II indicates these soils consist primarily of fine grained, non-plastic soils which also contained elevated moisture contents. Therefore, based on the laboratory testing the soils of Stratum II are considered unsuitable for reuse as structural fill. In general, excessively moist portions of any soil that are suitable for re-use as structural fill will require time for aeration and drying to achieve the required densities and percentage compaction values. Aeration and drying of excessively moist soil are best accomplished during warm dry summer months.

The on-site soils will require careful moisture control as portions are fine-grained and sensitive to moisture changes. Caution should be exercised during construction to not stockpile and/or expose these soils to weather conditions for long periods of time. Materials stockpiled for use as structural fill should be graded to shed water and rolled to maintain the soils. During periods of wet site conditions, travel upon the pad and construction areas should be limited to minimize disturbance of the subgrade which will lead to instabilities.

No other significant sources of structural fill material are present at the site. If necessary, EEI recommends that a borrow source with a granular soil be established, or a modified crushed aggregate, such as NJDOT dense graded aggregate, be utilized for filling purposes at this site. Any structural or load-bearing soil **imported** to the site should meet the following criteria:

- Free of organic matter, ash, cinders, deleterious material, and debris.
- Particle size distribution that is well graded.
- Plasticity index less than 10.
- less than 15 percent by weight rock fragments larger than 3", less than 30 percent by weight larger than 3/4" and less than 30 percent by weight smaller than the No. 200 sieve.

The above criteria are provided as a general guideline for soil materials to be imported to the site. Soil materials available for use as a structural fill should be submitted to the Geotechnical Engineer of Record for evaluation and subsequent consideration prior to its importation to the site.

Structural fill should be placed in lifts not exceeding ten (10) inches in loose thickness and compacted with a smooth-drum vibratory roller having a minimum static weight of 10 tons. Structural fill placed within confined excavations or which will be compacted using hand operated compactors (jumping-jack, heavy-duty plate tamper etc.) should be placed in loose lifts not exceeding six (6) inches in thickness. The optimum lift thickness and number of repetitive passes with compaction equipment necessary to achieve the required percentage compaction values should be determined in the field with test passes of the chosen compaction equipment. All fill should be placed at the optimum moisture content $\pm 3\%$ as determined in accordance with ASTM standard D1557 and compacted to a minimum percentage of the maximum dry density as indicated in Table III.

- TABLE III - COMPACTION CRITERIA	
Fill Area	Percent of Maximum Dry Density as per ASTM Standard D 1557
Foundation Support Fill	95
Foundation Backfill	95
Slab-On-Grade, Parking Areas	95
Non-Structural	92

Excavation

Excavation required for the installation of the proposed light standard caisson foundations are expected to take place in the soils referenced as FILL, Stratum I, Stratum II, and the upper portions of Stratum III. These soils will be able to be removed using conventional

excavation/drilling techniques. It is anticipated that excavation of bedrock will not be required during construction. Excavation for the proposed foundation should be carried out in accordance with the Occupational Safety and Health Administration (OSHA) requirements and specifically OSHA 1926.650.

Dewatering

The static groundwater level was encountered in both of the test borings performed at depths ranging from approximately 2.6 to 4.0 feet below the existing ground surface. Based on the data obtained from the field investigation and anticipated caisson design, the base elevation of the caisson is expected to be situated below encountered groundwater levels within the suitably dense soils of Stratum III. Therefore, dewatering of the excavations during installation will be required.

Visual classification and laboratory testing performed indicates the soils encountered in this investigation are expected to be generally permeable. The coefficient of permeability for these soils is estimated to be on the order of approximately 10^{-3} to 10^{-8} cm/sec. Given this range of permeability, a steady influx of water into the excavation can be expected. Therefore, it is the opinion of EEI that the excavation should be cased during installation of the caisson.

In the event that the excavation can not be cased, EEI recommends that the excavation for the caisson and placement of the concrete be accomplished using the "slurry and replace" method. This method consists of creating a slurry of drilling mud and water that fills the excavation to above the level of groundwater infiltration, thus creating a hydraulic head greater than that of the groundwater, which essentially stops the flow of groundwater into the excavation. This thixotropic solution will also allow for more efficient excavation rates in sand and gravel soil conditions and help to maintain sidewall stability within the excavation. Once the proposed caisson bottom elevation is achieved concrete may be placed within the caisson using a tremmie or concrete pump. The tremmie or pump should be advanced to approximately 1.0 feet from the

based of the excavation with the tremmie or concrete pump advanced upward as the concrete is placed.

Lateral Earth Pressures and Uplift

Design of the proposed sign foundation will require the consideration of lateral earth pressures imposed on this element. The following soil characteristics below in Table IV are provided for use in establishing the design of this item.

- TABLE IV - SOIL PROPERTIES USED FOR COMPUTATION OF LAERAL LOADS				
Soil Characteristics	FILL	Stratum I	Stratum II	Stratum III
Angle of Internal Friction	28°	28°	25°	30°
Saturated Unit Weight	110 pcf	110 pcf	100 pcf	115 pcf
Submerged Unit Weight	48 pcf	48 pcf	38 pcf	53 pcf
Coefficient of Active Earth Pressure - K_A	0.36	0.36	0.40	0.33
Coefficient of Passive Earth Pressure - K_P	2.77	2.77	2.46	3.00
Coefficient of At Rest Earth Pressure - K_O	0.53	0.53	0.58	0.50
Earth Pressure Coefficient Skin Friction - K_S	0.53	0.53	0.58	0.50

Seismic Design Criteria

Based on the data collected during our field investigation, the stratigraphic profile for the site was soil with an average N value (Standard Penetration Resistance) of approximately 10. Given this information and the International Building Code 2009 earthquake criteria, the site class is E. It should also be noted that based on the subsurface conditions encountered across the site, the potential for liquefaction of subsurface soils is believed be minimal based on the soil types encountered within the deeper zones of the test borings.

VII. CONSTRUCTION QUALITY CONTROL

The proposed development of these sites will include earthwork activities, the quality of which directly impacts the validity of the recommendations presented in this report. Based upon

past experience, the most effective and economical earthwork inspection is obtained through the presence of a qualified representative of the Geotechnical Engineer of Record during the installation of the foundation elements. Therefore, verification of the foundation subgrades should be reviewed and confirmed by Earth Engineering Incorporated.

VIII. LIMITATIONS

The conclusions and recommendations contained in this report are based upon the subsurface data collected, details stated in this report, and the assumption that the subsurface conditions do not deviate appreciably from those disclosed by the data acquisition activities performed. Should conditions arise which differ from those specifically stated herein, our office should be notified immediately so that our recommendations can be reviewed and revised, if necessary.

Unless specifically indicated to the contrary in this report, the scope of this report is limited to only investigations and evaluations of the geotechnical aspects of the site conditions and does not include any considerations of potential site pollution or contamination. This report offers no facts or opinions related to potential pollution or contamination on these sites.

The procedures followed during the subsurface exploration, and the analyses and conclusions contained herein, have followed generally accepted practices of geotechnical engineering. EEI provides no other warranties, either expressed or implied, as to the professional advice provided under the terms of EEI's agreement and included in this report. The conclusions and recommendations presented in this report are based on the assumption that recognized, proper, construction practices will be followed throughout construction and that a Professional Engineer qualified in Geotechnical Engineering will be retained to oversee the inspection of site preparation, proof-rolling, foundation construction, and other critical earthwork operations.

It is emphasized that this analysis was made for the proposed outdoor lighting standards to be installed at the Soccer Pitch within the Ed Ford Athletic Facility in the Jersey City, Essex County, New Jersey. EEI does not assume any responsibility in using this report to generate foundation design other than at the specific site addressed.

Respectfully submitted,
Earth Engineering Incorporated



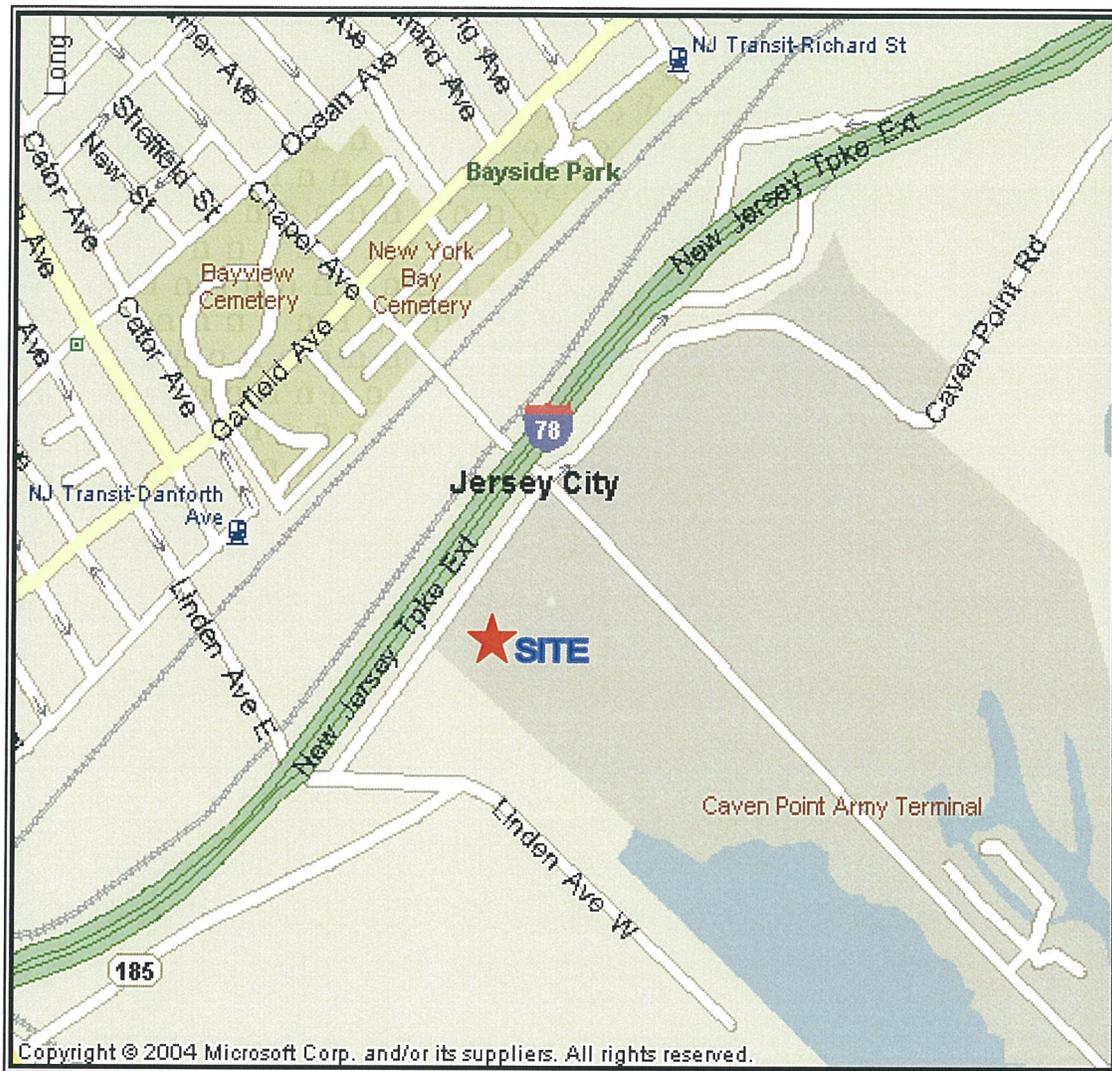
Donato O. DiRocco
Senior Geologist - New Jersey Division



Thomas B. Louis, P.E.
Director - New Jersey Division
New Jersey Professional Engineer
License Number GE 40918

APPENDIX

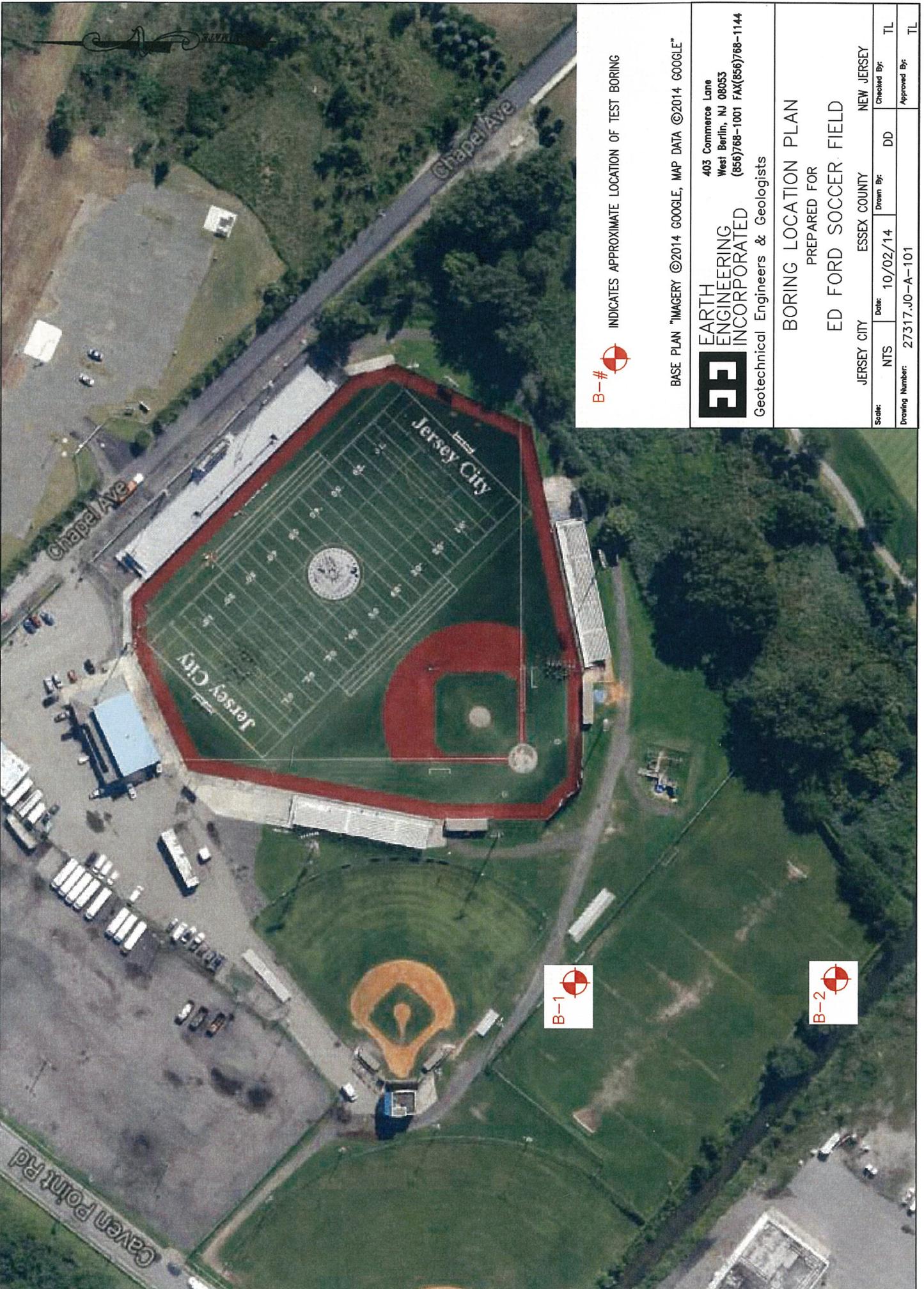
SITE LOCATION MAP
BORING LOCATION PLAN
TEST BORING PROFILES
LABORATORY TEST RESULTS
TEST BORING LOGS



Site Location Map

1 Chapel Ave
Jersey City, Essex County, NJ





B-# INDICATES APPROXIMATE LOCATION OF TEST BORING

BASE PLAN "IMAGERY ©2014 GOOGLE, MAP DATA ©2014 GOOGLE"

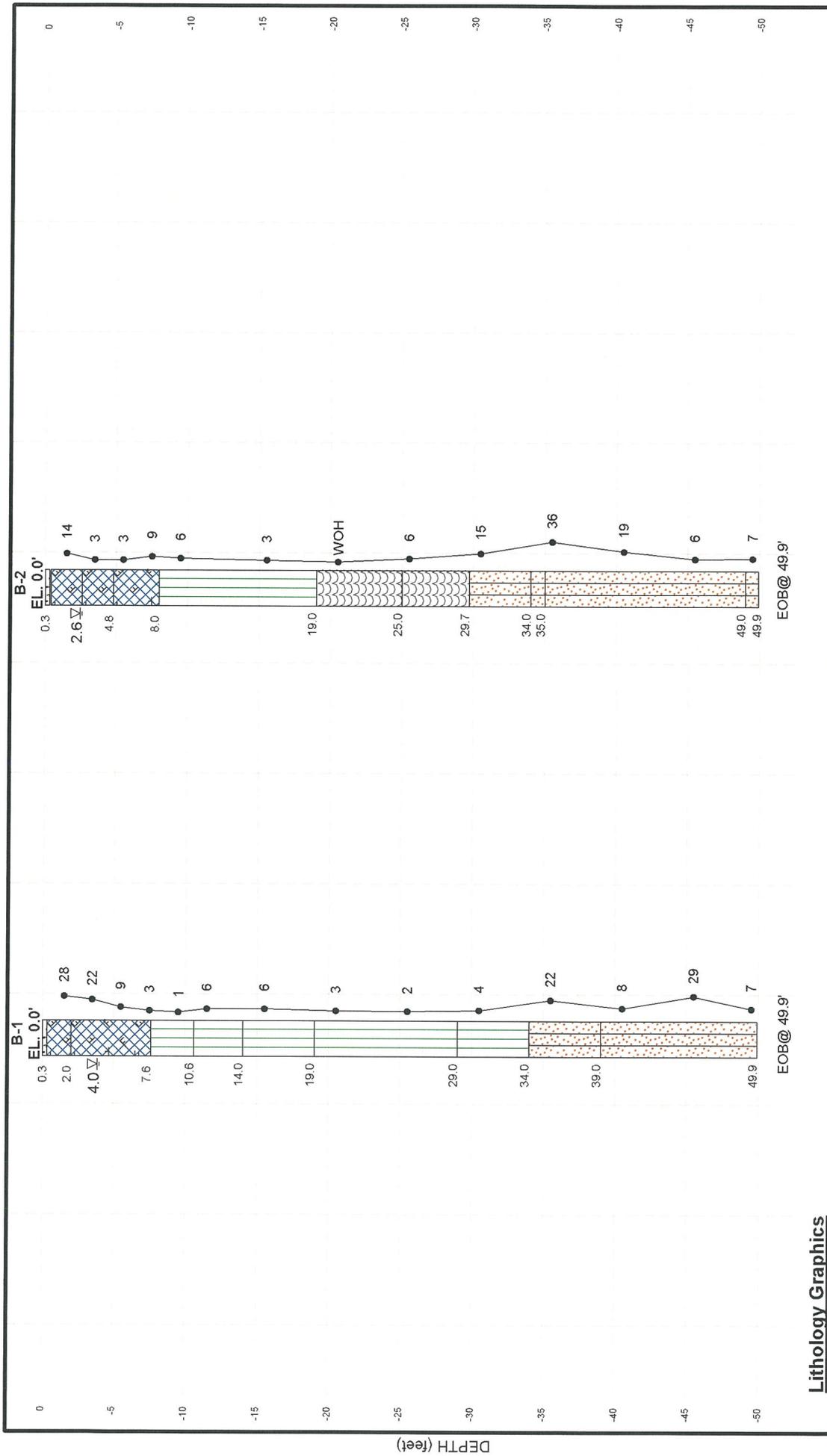


405 Commerce Lane
West Berlin, NJ 08053
(856)768-1001 FAX(856)768-1144

Geotechnical Engineers & Geologists

BORING LOCATION PLAN
PREPARED FOR
ED FORD SOCCER FIELD

Scale:	NTS	Date:	10/02/14	Drawn By:	DD	Checked By:	TL
Drawing Number:	27317.J0-A-101		JERSEY CITY		ESSEX COUNTY	NEW JERSEY	
Approved By: TL							



Lithology Graphics

-  Topsoil
-  FILL - Multicolored Fine to Medium SAND, Some to And Silt, Trace Brick, Gravel, Wood, Rock Fragments
-  Stratum I - Multicolored Fine to Medium SAND, And to Some Silt, Trace Organics, Shells, Gravel with Interlayers of Silt and Clay

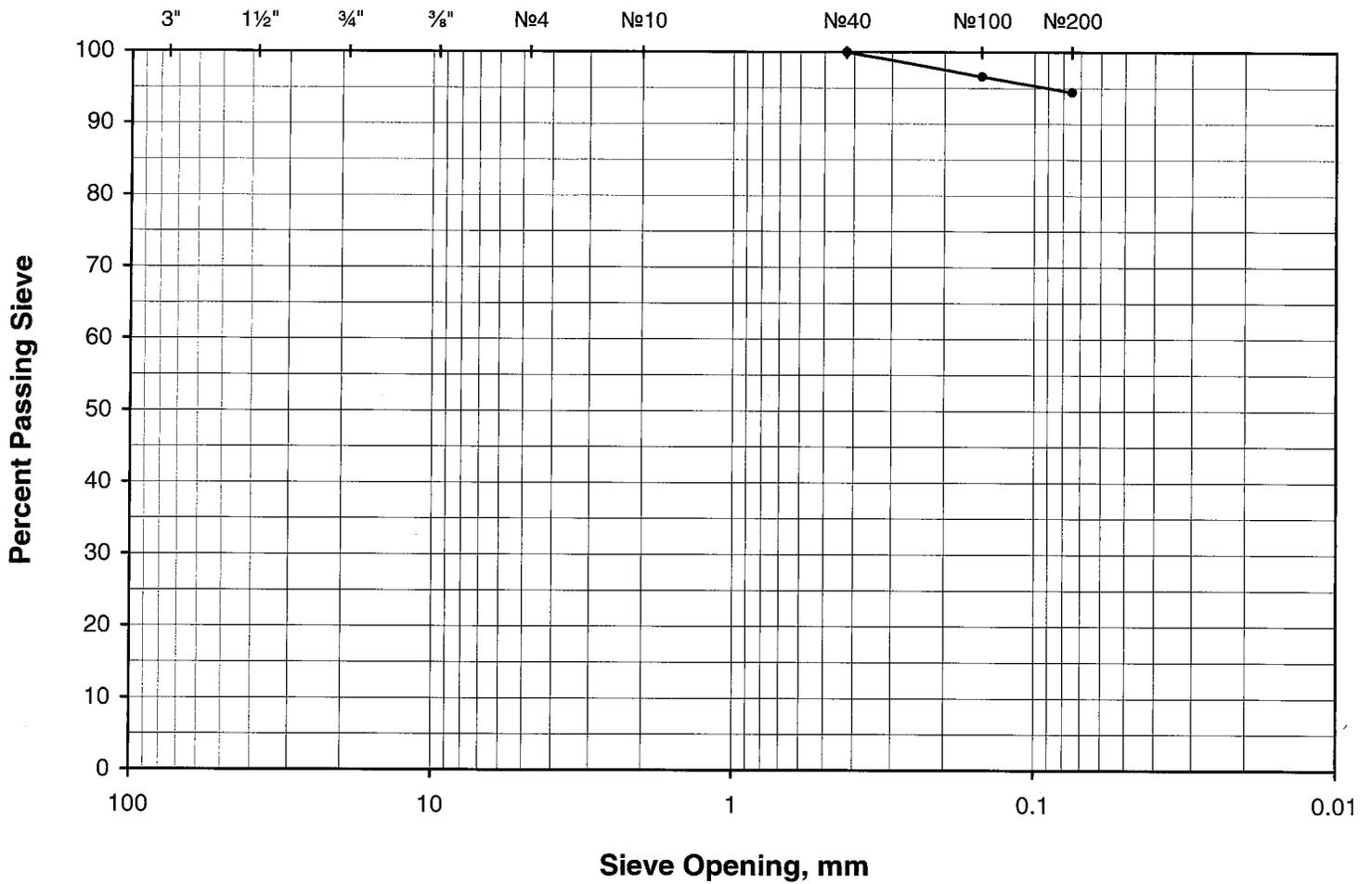
-  Stratum II - Black to Blueish Gray SILT, And to Trace Clay, Some to Trace Organics, Trace Fine Sand
-  Stratum III - Brown to Reddish Brown Fine to Medium SAND, Little to Trace Silt with Interlayers of Silt and Clay
-  Initial Groundwater Level
-  Subsequent Groundwater Level



BORING PROFILES
 PREPARED FOR

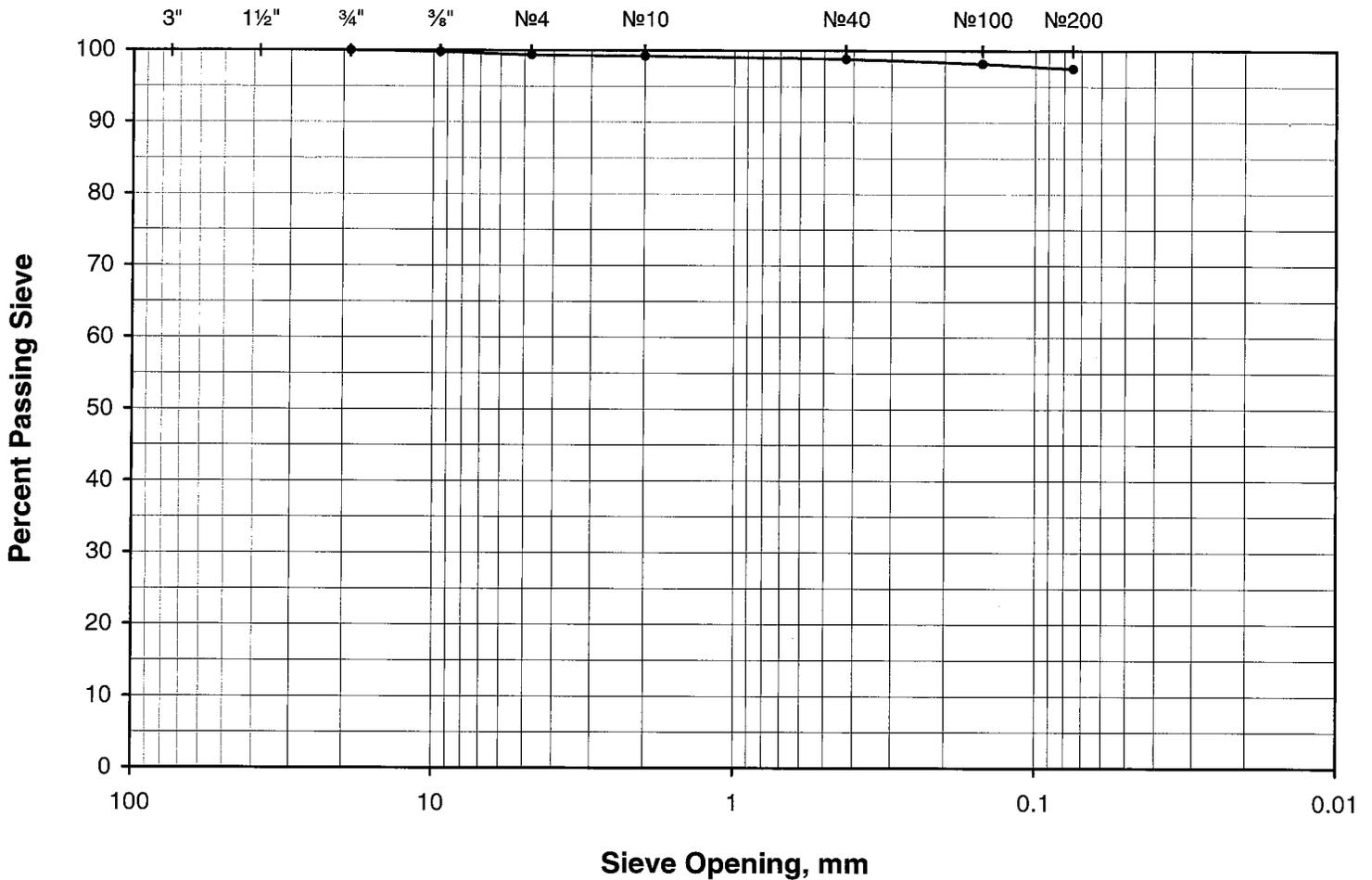
ED FORD SOCCER COMPLEX-LIGHT STANDARDS
 JERSEY CITY, ESSEX COUNTY, NEW JERSEY

Particle Size Analysis of Soils

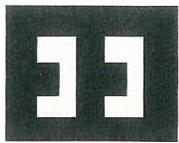


As-rec'd water content: 51.4 moist Odor: NR		Particle Size							
% Gravel: 0.0 Coarse: 0.0 Fine: 0.0		US Standard Sieve Size		Diameter, mm	% Finer				
% Sand: 5.6 Coarse: 0.0 Medium: 0.0 Fine: 5.6		GRAVEL	Coarse	3"	75				
Gravel description:				1 1/2"	38.1				
				3/4"	19.0				
Sand description: gray			Fine	3/8"	9.5				
		No. 4		4.75					
Consistency: soft		Hardness: NR		SAND	Coarse	No. 10	2.00		
Cementation: NR		Dry Strength: NR				Medium	No. 40	0.425	100.0
Structure: homogeneous		Dilatancy: NR				Fine	No. 100	0.150	96.6
Reaction to HCl: NR		Toughness: NR			No. 200		0.075	94.4	
USCS Classification: MH, elastic silt		Hydrometer Analysis		Clay Size	0.005	NR			
AASHTO Classification: A-7-5				Colloids	0.001	NR			
		G_s: NR	C_u: N/A	C_c: N/A					
Project: 27317.J0 - Ed Ford Soccer Lighting		LL: 63	PL: 42	PI: 21					
Client: Jersey City Soccer Association		<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>EARTH ENGINEERING INCORPORATED <i>Geotechnical Engineers & Geologists</i></p> <p>403 Commerce Lane, West Berlin, NJ 08091 tel 856-768-1001 fax 856-768-1144</p> </div> <div style="text-align: right;"> <p>Corp. HQ 610-277-0880</p> <p>Central PA 717-697-5701</p> <p>Lehigh Valley 610-967-4540</p> </div> </div>							
Sample: B-2:S-7									
Depth: 19.0' - 21.0'									
Description: Black silt, trace fine sand									
Remarks:									

Particle Size Analysis of Soils



As-rec'd water content: 29.1 moist		Odor: NR	
% Gravel: 0.6	Coarse: 0.0	Fine: 0.6	
% Sand: 1.9	Coarse: 0.2	Medium: 0.4	Fine: 1.3
Gravel description: pale red, subrounded			
Sand description: very pale red			
Consistency: soft		Hardness: NR	
Cementation: NR		Dry Strength: NR	
Structure: homogeneous		Dilatency: NR	
Reaction to HCl: NR		Toughness: NR	
USCS Classification: ML, silt		AASHTO Classification: A-4	
		Hydrometer Analysis	
		Clay Size	0.005 NR
		Colloids	0.001 NR
		G_s: NR	C_u: N/A
		LL: NP	PI: NP
Project: 27317.J0 - Ed Ford Soccer Lighting		EARTH ENGINEERING INCORPORATED <i>Geotechnical Engineers & Geologists</i> 403 Commerce Lane, West Berlin, NJ 08091 tel 856-768-1001 fax 856-768-1144	
Client: Jersey City Soccer Association			
Sample: B-1:S-12 & B-2:S-13			
Depth: 39.0' - 49.9'			
Description: Reddish brown to gray silt, trace fine sand and gravel		Corp. HQ 610-277-0880 Central PA 717-697-5701 Lehigh Valley 610-967-4540	
Remarks:			



EARTH ENGINEERING INCORPORATED

Geotechnical Engineers & Geologists

BORING LOG

BORING NO.	B-1
SHEET	1 OF 1
DATE: START	9/5/14
END	9/5/14
SURFACE ELEV. (FT)	N/A

PROJECT NAME Ed Ford Soccer Complex-Light Standards

PROJECT LOCATION Jersey City, Essex County, NJ

PROJECT NUMBER 27317.J0

INSPECTOR NAME D. DiRocco

EQUIPMENT USED Truck Mounted Drill Rig

DRILLER NAME/COMPANY Uni-Tech Drilling Company

DRILLING METHODS Hollow Stem Auger/Split Spoon Sampler

AUGER: SIZE: _____ ; AUGER DEPTH: _____ ; WATER: DEPTH: 4.0' TIME: 0.5 hrs DATE: 9/5/2014

CHECKED BY: _____ ; DATE: _____ ; DEPTH: _____ TIME: _____ DATE: _____
 NOT ENCOUNTERED

DEPTH (FT)	SAMPLE NO./TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY (%)	ROD (%)	USCS	AASHTO	H ₂ O CONTENT	GRAPHIC LOG	DEPTH	ELEVATION	DESCRIPTION	REMARKS
0.0	S-1	11	1.4'	-				NA		0.3	Topsoil (4")		
2.0		14								2.0	FILL - Reddish Brown Fine to Medium SAND and SILT, Trace Rock Fragments and Wood		
4.0	S-2	5	1.5'	-				NA			FILL - Brown Fine to Medium SAND, Trace Silt	Moist @ 3.6'	
6.0	S-3	10	1.2'	-				NA				Wet @ 4.0'	
8.0	S-4	4	0.6'	-				NA		7.6			
10.0	S-5	5	0.5'	-				NA			Stratum I - Black to Dark Gray Organic SILT		
12.0	S-6	2	1.1'	-				NA		10.6			
14.0		1								14.0	Stratum I - Multi-colored Fine to Coarse SAND, And to Little Silt, Trace Fine Gravel and Shells		
16.0	S-7	1	0.7'	-				NA			Stratum I - Brown to Dark Gray Fine to Medium SAND, Some Silt	Interlayers of Silt and Clay @ 14.0' - 19.0'	
19.0		2								19.0			
21.0	S-8	1	1.2'	-				NA			Stratum I - Black to Brown Fine to Medium SAND, Little Silt, Trace Organics and Shells	Interlayers of Silt @ 19.0' - 24.0'	
24.0		3											
26.0	S-9	2	1.1'	-				NA					
29.0		1								29.0			
31.0	S-10	1	1.2'	-				NA			Stratum I - Gray Fine to Medium SAND, Little Silt, Trace Gravel and Organics		
34.0		2								34.0			
36.0	S-11	12	1.2'	-				NA			Stratum III - Reddish Brown Fine to Medium SAND, Trace to Little Silt		
39.0		11								39.0			
41.0	S-12	3	1.3'	-				NA			Stratum III - Reddish Brown Fine to Medium SAND and SILT with Thin Interlayers of Silt and Clay		
44.0		4											
46.0	S-13	14	1.3'	-				NA					
48.0		12											
49.9	S-14	5	1.2'	-				NA		49.9		EOB @ 49.9'	

** D = DRY, M = MOIST, W = WET

PROJECT NAME Ed Ford Soccer Complex-Light Standards

PROJECT LOCATION Jersey City, Essex County, NJ

PROJECT NUMBER 27317.J0

INSPECTOR NAME D. DiRocco

EQUIPMENT USED Truck Mounted Drill Rig

DRILLER NAME/COMPANY Uni-Tech Drilling Company

DRILLING METHODS Hollow Stem Auger/Split Spoon Sampler

AUGER: SIZE: _____ ; AUGER DEPTH: _____ ; WATER: DEPTH: 2.6' TIME: 0.5 hrs DATE: 9/5/2014

CHECKED BY: _____ ; DATE: _____ DEPTH: _____ TIME: _____ DATE: _____
 NOT ENCOUNTERED

DEPTH (FT)	SAMPLE NO./TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY (%)	ROD (%)	AASHTO	H ₂ O CONTENT	GRAPHIC LOG	DESCRIPTION	REMARKS
0.0									DEPTH: 0.3 ELEVATION: -0.3 Topsoil (4")	
2.0	S-1	6	1.2'	-			NA		FILL - Brown to Tan Fine to Medium SAND, Some Silt, Trace Brick and Fine Gravel	Wet @ 2.6'
4.0	S-2	7	1.3'	-			NA		FILL - Light Brown to Gray Fine to Medium SAND, Some Silt	
6.0	S-3	2	1.0'	-			NA		FILL - Multi-colored Fine to Coarse SAND, Little to Some Silt, Trace Gravel	
8.0	S-4	2	1.3'	-			NA			
10.0	S-5	2	1.2'	-			NA		Stratum I - Gray to Brown Fine to Medium SAND, Little to Some Silt	
14.0		3								
16.0	S-6	2	1.3'	-			NA			
19.0		3								
21.0	S-7	2	1.4'	-			NA		Stratum II - Black SILT and CLAY, Some to Trace Organics, Trace Fine Sand	Peat @ 20.7' to 25.0' Shelby Tube Sample Retrieved @ 21.0' to 23.0'
24.0		WOH								
26.0	S-8	2	1.7'	-			NA		Stratum II - Blueish Gray SILT, Trace to Little Organics and Clay	
29.0		3								
31.0	S-9	6	1.7'	-			NA		Stratum III - Brown to Reddish Brown Fine to Medium SAND, Trace Silt	
34.0		9								
36.0	S-10	9	1.5'	-			NA		Stratum III - Blueish Gray Fine to Coarse SAND, Little Gravel, Trace Silt	
39.0		17							Stratum III - Brown to Reddish Brown Fine to Medium SAND, Trace Silt	
41.0	S-11	9	1.6'	-			NA			
44.0		9								
46.0	S-12	3	1.1'	-			NA			
48.0		3								
49.9	S-13	3	1.1'	-			NA		Stratum III - Reddish Brown Fine to Medium SAND and SILT with Interlayers of Silt and Clay	EOB @ 49.9'

** D = DRY, M = MOIST, W = WET

Table
Ground Water Sampling Results Summary
Caven Point Soccer Field
Caven Point Road, Jersey City, New Jersey 07305
July 24, 2014

Sample #: Lab ID: Date Sampled:	CAS	HIGHER OF PQLs and GWQC (ug/L)	Table 1 - Mar 13 Vapor Intrusion GW Screening Levels (ug/L)	MW-11 06849-001 07/24/2014			MW-10 06849-002 07/24/2014			MW-1 06849-003 07/24/2014			REP072414 06849-004 07/24/2014			FB072414 06849-005 07/24/2014			TB072414 06849-006 07/24/2014		
				Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q
Semivolatiles - BN (ug/L)																					
Benzaldehyde	100-52-7	NS	NS	ND	1.00	0.295	ND	1.00	0.295	ND	1.00	0.295	ND	1.00	0.295	ND	1.00	0.295	~	~	~
Bis(2-chloroethyl) ether	111-44-4	7	NS	ND	1.00	0.428	ND	1.00	0.428	ND	1.00	0.428	ND	1.00	0.428	ND	1.00	0.428	~	~	~
Bis(2-chloroisopropyl) ether	108-60-1	300	NS	ND	1.00	0.438	ND	1.00	0.438	ND	1.00	0.438	ND	1.00	0.438	ND	1.00	0.438	~	~	~
N-Nitrosodi-n-propylamine	621-64-7	10	NS	ND	1.00	0.331	ND	1.00	0.331	ND	1.00	0.331	ND	1.00	0.331	ND	1.00	0.331	~	~	~
Acetophenone	98-86-2	700	NS	ND	1.00	0.460	ND	1.00	0.460	ND	1.00	0.460	ND	1.00	0.460	ND	1.00	0.460	~	~	~
Hexachloroethane	67-72-1	7	NS	ND	1.00	0.372	ND	1.00	0.372	ND	1.00	0.372	ND	1.00	0.372	ND	1.00	0.372	~	~	~
Nitrobenzene	98-95-3	6	NS	ND	1.00	0.265	ND	1.00	0.265	ND	1.00	0.265	ND	1.00	0.265	ND	1.00	0.265	~	~	~
Isophorone	78-59-1	40	NS	ND	1.00	0.263	ND	1.00	0.263	ND	1.00	0.263	ND	1.00	0.263	ND	1.00	0.263	~	~	~
Bis(2-chloroethoxy) methane	111-91-1	NS	NS	ND	1.00	0.259	ND	1.00	0.259	ND	1.00	0.259	ND	1.00	0.259	ND	1.00	0.259	~	~	~
Naphthalene	91-20-3	300	300	ND	1.00	0.273	ND	1.00	0.273	ND	1.00	0.273	ND	1.00	0.273	ND	1.00	0.273	~	~	~
4-Chloroaniline	106-47-8	30	NS	ND	1.00	0.305	ND	1.00	0.305	ND	1.00	0.305	ND	1.00	0.305	ND	1.00	0.305	~	~	~
Hexachlorobutadiene	87-68-3	1	1	ND	1.00	0.378	ND	1.00	0.378	ND	1.00	0.378	ND	1.00	0.378	ND	1.00	0.378	~	~	~
Caprolactam	105-60-2	5000	NS	ND	1.00	0.513	ND	1.00	0.513	ND	1.00	0.513	ND	1.00	0.513	ND	1.00	0.513	~	~	~
2-Methylnaphthalene	91-57-6	30	NS	ND	1.00	0.433	ND	1.00	0.433	ND	1.00	0.433	ND	1.00	0.433	ND	1.00	0.433	~	~	~
Hexachlorocyclopentadiene	77-47-4	40	NS	ND	1.00	0.223	ND	1.00	0.223	ND	1.00	0.223	ND	1.00	0.223	ND	1.00	0.223	~	~	~
1,1'-Biphenyl	92-52-4	400	NS	ND	1.00	0.268	ND	1.00	0.268	ND	1.00	0.268	ND	1.00	0.268	ND	1.00	0.268	~	~	~
2-Chloronaphthalene	91-58-7	600	NS	ND	1.00	0.223	ND	1.00	0.223	ND	1.00	0.223	ND	1.00	0.223	ND	1.00	0.223	~	~	~
2-Nitroaniline	88-74-4	NS	NS	ND	1.00	0.243	ND	1.00	0.243	ND	1.00	0.243	ND	1.00	0.243	ND	1.00	0.243	~	~	~
Dimethyl phthalate	131-11-3	100	NS	ND	1.00	0.329	ND	1.00	0.329	ND	1.00	0.329	ND	1.00	0.329	ND	1.00	0.329	~	~	~
2,6-Dinitrotoluene	606-20-2	NS	NS	ND	1.00	0.391	ND	1.00	0.391	ND	1.00	0.391	ND	1.00	0.391	ND	1.00	0.391	~	~	~
Acenaphthylene	208-96-8	100	NS	ND	1.00	0.316	ND	1.00	0.316	ND	1.00	0.316	ND	1.00	0.316	ND	1.00	0.316	~	~	~
3-Nitroaniline	99-09-2	NS	NS	ND	1.00	0.237	ND	1.00	0.237	ND	1.00	0.237	ND	1.00	0.237	ND	1.00	0.237	~	~	~
Acenaphthene	83-32-9	400	NS	ND	1.00	0.261	ND	1.00	0.261	ND	1.00	0.261	ND	1.00	0.261	ND	1.00	0.261	~	~	~
2,4-Dinitrotoluene	121-14-2	NS	NS	ND	1.00	0.230	ND	1.00	0.230	ND	1.00	0.230	ND	1.00	0.230	ND	1.00	0.230	~	~	~
Dibenzofuran	132-64-9	NS	NS	ND	1.00	0.275	ND	1.00	0.275	ND	1.00	0.275	ND	1.00	0.275	ND	1.00	0.275	~	~	~
Diethyl phthalate	84-66-2	6000	NS	ND	1.00	0.449	ND	1.00	0.449	ND	1.00	0.449	ND	1.00	0.449	ND	1.00	0.449	~	~	~
Fluorene	86-73-7	300	NS	ND	1.00	0.447	ND	1.00	0.447	ND	1.00	0.447	ND	1.00	0.447	ND	1.00	0.447	~	~	~
4-Chlorophenyl phenyl ether	7005-72-3	NS	NS	ND	1.00	0.476	ND	1.00	0.476	ND	1.00	0.476	ND	1.00	0.476	ND	1.00	0.476	~	~	~
4-Nitroaniline	100-01-6	NS	NS	ND	1.00	0.331	ND	1.00	0.331	ND	1.00	0.331	ND	1.00	0.331	ND	1.00	0.331	~	~	~
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	NS	ND	1.00	0.218	ND	1.00	0.218	ND	1.00	0.218	ND	1.00	0.218	ND	1.00	0.218	~	~	~
N-Nitrosodiphenylamine	86-30-6	10	NS	ND	1.00	0.310	ND	1.00	0.310	ND	1.00	0.310	ND	1.00	0.310	ND	1.00	0.310	~	~	~
4-Bromophenyl phenyl ether	101-55-3	NS	NS	ND	1.00	0.481	ND	1.00	0.481	ND	1.00	0.481	ND	1.00	0.481	ND	1.00	0.481	~	~	~
Hexachlorobenzene	118-74-1	0.02	NS	ND	0.020	0.020	ND	0.020	0.020	ND	0.020	0.020	ND	0.020	0.020	ND	0.020	0.020	~	~	~
Atrazine	1912-24-9	3	NS	ND	1.00	0.418	ND	1.00	0.418	ND	1.00	0.418	ND	1.00	0.418	ND	1.00	0.418	~	~	~
Phenanthrene	85-01-8	100	NS	ND	1.00	0.372	ND	1.00	0.372	ND	1.00	0.372	ND	1.00	0.372	ND	1.00	0.372	~	~	~
Anthracene	120-12-7	2000	NS	ND	1.00	0.322	ND	1.00	0.322	ND	1.00	0.322	ND	1.00	0.322	ND	1.00	0.322	~	~	~
Carbazole	86-74-8	NS	NS	ND	1.00	0.276	ND	1.00	0.276	ND	1.00	0.276	ND	1.00	0.276	ND	1.00	0.276	~	~	~
Di-n-butyl phthalate	84-74-2	700	NS	ND	1.00	0.264	ND	1.00	0.264	ND	1.00	0.264	ND	1.00	0.264	ND	1.00	0.264	~	~	~
Fluoranthene	206-44-0	300	NS	ND	1.00	0.362	ND	1.00	0.362	ND	1.00	0.362	ND	1.00	0.362	ND	1.00	0.362	~	~	~
Pyrene	129-00-0	200	NS	ND	1.00	0.308	ND	1.00	0.308	ND	1.00	0.308	ND	1.00	0.308	ND	1.00	0.308	~	~	~
Butyl benzyl phthalate	85-68-7	100	NS	ND	1.00	0.304	ND	1.00	0.304	ND	1.00	0.304	ND	1.00	0.304	ND	1.00	0.304	~	~	~
3,3'-Dichlorobenzidine	91-94-1	30	NS	ND	1.00	0.285	ND	1.00	0.285	ND	1.00	0.285	ND	1.00	0.285	ND	1.00	0.285	~	~	~
Benzo[a]anthracene	56-55-3	0.1	NS	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	~	~	~
Chrysene	218-01-9	5	NS	ND	1.00	0.243	ND	1.00	0.243	ND	1.00	0.243	ND	1.00	0.243	ND	1.00	0.243	~	~	~
Bis(2-ethylhexyl) phthalate	117-81-7	3	NS	ND	1.00	0.304	ND	1.00	0.304	ND	1.00	0.304	ND	1.00	0.304	ND	1.00	0.304	~	~	~
Di-n-octyl phthalate	117-84-0	100	NS	ND	1.00	0.507	ND	1.00	0.507	ND	1.00	0.507	ND	1.00	0.507	ND	1.00	0.507	~	~	~
Benzo[b]fluoranthene	205-99-2	0.2	NS	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	~	~	~
Benzo[k]fluoranthene	207-08-9	0.5	NS	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	~	~	~
Benzo[a]pyrene	50-32-8	0.1	NS	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	~	~	~
Indeno[1,2,3-cd]pyrene	193-39-5	0.2	NS	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	~	~	~
Dibenz[a,h]anthracene	53-70-3	0.3	NS	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	ND	0.100	0.100	~	~	~
Benzo[g,h,i]perylene	191-24-2	100	NS	ND	1.00	0.468	ND	1.00	0.468	ND	1.00	0.468	ND	1.00	0.468	ND	1.00	0.468	~	~	~
1,4-Dioxane	123-91-1	10	NS	ND	1.00	0.570	ND	1.00	0.570	ND	1.00	0.570	ND	1.00	0.570	ND	1.00	0.570	~	~	~
Dinitrotoluene (2,4- and 2,6-)	25321-14-6	10	NS	ND	1.00	0.391	ND	1.00	0.391	ND	1.00	0.391	ND	1.00	0.391	ND	1.00	0.391	~	~	~
TOTAL BN'S:		NS	NS	ND		NA	ND		NA	ND		NA	ND		NA	ND		NA	~	~	~
TOTAL TIC's:		500	NS	ND		NA	ND		NA	4.80	JN	NA	4.90	JN	NA	ND		NA	~	~	~
TOTAL BN'S & TIC's:		NS	NS	ND		NA	ND														