

**PUBLIC WORKS DEPARTMENT**  
**CONTRACT**

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**GORE BETZ NEIGHBORHOOD PARK**  
**DESCRIPTION**

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**MBR Construction, Inc.**  
**CONTRACTOR**

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**\$392,041.87**  
**AMOUNT**

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**September 3, 2014**  
**COMMISSION APPROVAL DATE**

CITY OF FORT LAUDERDALE  
CONSTRUCTION AGREEMENT

THIS AGREEMENT made and entered into this 3<sup>rd</sup> day of September, 2014, by and between the City of Fort Lauderdale, a Florida municipal corporation (City) and MBR CONSTRUCTION, INC., (Contractor), (parties);

WHEREAS, the City desires to retain a contractor for the Project as expressed in its Invitation to Bid No., 343-11460, Project Number, 11353, which was opened on August 4, 2014; and,

WHEREAS, the Contractor has expressed its willingness and capability to perform the necessary work to accomplish the Project.

NOW, THEREFORE, the City and the Contractor, in consideration of the mutual covenants and conditions contained herein and for other good and valuable consideration, the receipt and sufficiency is hereby acknowledged, agree as follows:

**ARTICLE 1 – DEFINITIONS**

Whenever used in this Agreement or in other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural forms:

- 1.1 Agreement – This written agreement between the City and the Contractor covering the work to be performed including other Contract Documents that are attached to or incorporated in the Agreement.
- 1.2 Application for Payment – The form accepted by the City which is to be used by the Contractor in requesting progress or final payment and which is to include such supporting documentation as is required by the Contract Documents
- 1.3 Approve – The word approve is defined to mean review of the material, equipment or methods for general compliance with design concepts and with the design concepts and with the information given in the Contract Documents. It does not imply a responsibility on the part of the City to verify in every detail conformance with plans and specifications.
- 1.4 Bid – The offer or Bid of the Contractor submitted on the prescribed form setting forth the total prices for the Work to be performed.
- 1.5 Bid Documents – This Agreement, advertisement for Invitation to Bids, the Instructions to Bidders, the Bid Form (with supplemental affidavits and agreements), the Contract Forms, General Conditions, the Supplementary Conditions, the Specifications, and the Plans, which documents all become an integral part of the Contract Documents.
- 1.6 Certificate of Substantial Completion - Certificate provided by the City certifying that all Work, excluding the punch list items, has been completed, inspected, and accepted by the City.

- 1.7 Change Order - A change order is defined as a written order to a contractor approved by the city, authorizing a revision of an underlying agreement between the city and a contractor that is directly related to the original scope of work or an adjustment in the original contract price or the contract time directly related to the original scope of work, issued on or after the effective date of the contract.
- 1.8 City – The City of Fort Lauderdale, Florida including but not limited to its employees, agents, officials, representatives, contractors, subcontractors, volunteers, successors and assigns, with whom the Contractor has entered into the Agreement and for whom the Work is to be provided. The Project Manager, or designee, shall be the authorized agent for the City unless otherwise specified.
- 1.9 Contract Documents – The Contract Documents shall consist of this Agreement, Exhibits to this Agreement, Public Construction Bond, Performance Bond, Payment Bond and Certificates of Insurance, Notice of Award and Notice to Proceed, General Conditions as amended by the Special Conditions, Technical Specifications, Plans/Drawings, Addenda, Bid Form and supplement Affidavits and Agreements, all applicable provisions of State and Federal Law and any modification, including Change Orders or written amendments duly delivered after execution of Agreement, Invitation to Bid, Instructions to Bidders and Bid Bond, Contractor’s response to the City’s Invitation to Bid, Schedule of Completion, Schedule of Values, all amendments, modifications and supplements, change orders and work directive changes issued on or after the Effective Date of the Agreement, as well as any additional documents that are required to be submitted under the Agreement.

Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Agreement. A copy of all permits shall be given to the City for inclusion in the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

- 1.10 Contract Price – The monies payable to the Contractor by the City under the Contract Documents and in accordance with the line item unit prices listed in the Bid.
- 1.11 Contract Time – The number of calendar days stated in the Agreement for the completion of the Work. The dates on which the work shall be started and shall be completed as stated in the Notice to Proceed.
- 1.12 Contractor – The person, firm, company, or corporation with whom the City has entered into the Agreement, including but not limited to its employees, agents, representatives, contractors, subcontractors, their subcontractors and their other successors and assigns.
- 1.13 Day – A calendar day of twenty-four (24) hours ending at midnight.
- 1.14 Defective – An adjective which when modifying the word “Work” refers to work that is unsatisfactory, faulty, or deficient, or does not conform to the Contract Documents or does not meet the requirements of any inspection, test or approval referred to in the Contract Documents, or has been damaged prior to the Project Manager’s recommendation of final payment.

- 1.15 Effective Date of the Agreement – The effective date of the agreement shall be the date the City Commission approves the work. The contractor shall provide all required payment and performance bonds and insurances to the City within ten (10) Calendar days following the City Commission approval. Upon verification of all bonds and insurances, the City will issue a notice to proceed (NTP) to the Contractor. Contract time will commence on the date when the Notice to Proceed is issued. The Contractor shall commence the work immediately upon receipt of the Notice to Proceed. Failure of the contractor to proceed with the work will constitute nonperformance of the Contractor and would be ground for termination of the contract per ARTICLE 17 of the agreement.
- 1.16 Final Completion Date – The date the Work is completed, including completion of the final punch list, and delivered along with those items specified in the Contract Documents and is accepted by the City.
- 1.17 Hazardous Materials (HAZMAT) - Any solid, liquid, or gaseous material that is toxic, flammable, radioactive, corrosive, chemically reactive, or unstable upon prolonged storage in quantities that could pose a threat to life, property, or the environment defined in Section 101(14) of Comprehensive Environmental Response, Compensation and Liability Act of 1980 and in 40 CFR 300.6. Also defined by 49 CFR 171.8 as a substance or material designated by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce and which has been so designated.
- 1.18 Hazardous Substance - As defined by Section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act; any substance designated pursuant to Section 311(b) (2) (A) of the Clean Water Act; any element, compound, mixture, solution or substance designated pursuant to Section 102 identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act {but not including any waste listed under Section 307[a] of the Clean Water Act}; any hazardous air pollutant listed under Section 112 of the Clean Air Act; and any imminently hazardous chemical substance or mixture pursuant to Section 7 of the Toxic Substances Control Act. The term does not include petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance in the first sentence of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).
- 1.19 Hazardous Waste - Those solid wastes designated by OSHA in accordance with 40 CFR 261 due to the properties of ignitability, corrosivity, reactivity, or toxicity. Any material that is subject to the Hazardous Waste Manifest requirements of the EPA specified in 40 CFR Part 262.
- 1.20 Holidays - Those designated non-work days as established by the City Commission of the City of Fort Lauderdale.
- 1.21 Inspection – The term “inspection” and the act of inspecting as used in this Agreement is defined to mean the examination of construction to ensure that it conforms to the

design concept expressed in the plans and specifications. This term shall not be construed to mean supervision, superintending and/or overseeing.

- 1.22 Notice of Award - The written notice by City to the Contractor stating that upon compliance by the Contractor with the conditions precedent enumerated therein, within the time specified that the City will sign and deliver this Agreement.
- 1.23 Notice to Proceed – A written notice given by the City to the Contractor fixing the date on which the Contract Time will commence to run and on which the Contract Time will end.
- 1.24 Plans - The drawings which show the character and scope of the work to be performed and which have been prepared or approved by the City and are referred to in the Contract Documents.
- 1.25 Premises (otherwise known as Site or Work Site) – means the land, buildings, facilities, etc. upon which the Work is to be performed.
- 1.26 Project – The total construction of the Work to be provided as defined in the Contract Documents.
- 1.27 Project Manager - The employee of the City, or other designated individual who is herein referred to as the Project Manager, will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the contract Documents in connection with completion of the Work in accordance with this Agreement.
- 1.28 Punch List - The City's list of Work yet to be done or be corrected by the Contractor, before the Final Completion date can be determined by the City.
- 1.29 Record Documents - A complete set of all specifications, drawings, addenda, modifications, shop drawings, submittals and samples annotated to show all changes made during the construction process.
- 1.30 Record Drawings or "As-Builts" - A set of drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor. These documents will be signed and sealed by the Engineer of Record or a Professional Land Surveyor licensed in the State of Florida.
- 1.31 Substantially Completed Date – A date when the Contractor has requested in writing, stating that the Work is substantially completed and is ready for an inspection and issuance of a final punch list for the Project.
- 1.32 Work – The entire completed delivered product or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating material and equipment into the product, all as required by the Contract Documents.

## **ARTICLE 2 – SCOPE OF WORK**

2.1 The Contractor shall complete all work as specified or indicated in the Contract Documents. The Project for which the Work under the Contract Documents may be the whole or only part is generally described as follows:

**Gore Betz Neighborhood Park**  
ITB 343-11460 PROJECT 11353

2.2 All Work for the Project shall be constructed in accordance with the Drawings and Specifications. The Work generally involves:

### **PROJECT DESCRIPTION**

This project is located at 1611 SW 9<sup>th</sup> Avenue and is bound by SW 16<sup>th</sup> Street, SW 9<sup>th</sup> Avenue, SW 16<sup>th</sup> Court and SW 9<sup>th</sup> Terrace. The work includes 1) Construction of parallel parking spaces and sidewalks with permeable pavers; 2) Removal of existing inactive electrical pole on-site; 3) Construction of earth berms, rubber mulch path, trees, shrubs, sod, bioswales, and irrigation system; 4) Installation of site lighting; 5) Installation of adult fitness equipment and surfacing; 6) Abandonment of existing irrigation pump; and 7) Installation of new pavilion.

2.3 Within ten (10) days of the execution of this Agreement, the Contractor shall submit a Construction Schedule, Schedule of Values and a listing of those subcontractors that will be utilized by the Contractor. The general sequence of the work shall be submitted by the Contractor and approved by the City before any work commences. The City reserves the right to issue construction directives necessary to facilitate the Work or to minimize any conflict with operations.

## **ARTICLE 3 – PROJECT MANAGER**

3.1 The Project Manager is hereby designated by the City as Angelina Rosenberg, whose address is 100 N. Andrews Avenue, 4<sup>th</sup> Floor, Fort Lauderdale, FL 33301. The Project Manager will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the Contract Documents in connection with completion of the Work in accordance with this Agreement.

## **ARTICLE 4 – CONTRACT DOCUMENTS**

The Contract Documents which comprise the entire Agreement between the City and Contractor are attached to this Agreement, are made a part hereof and consist of the following:

4.1 This Agreement.

4.2 Exhibits to this Agreement (Plans (sheets [ 1 ] to [ 14 ] inclusive)).

4.3 Public Construction Bond, Performance Bond, Payment Bond and Certificates of Insurance.

- 4.4 Notice of Award and Notice to Proceed.
- 4.5 General Conditions as amended by the Special Conditions.
- 4.6 Technical Specifications.
- 4.7 Plans/Drawings
- 4.8 Addenda number 1 through 3, inclusive.
- 4.9 Bid Form and supplement Affidavits and Agreements.
- 4.10 All applicable provisions of State and Federal Law and any modification, including Change Orders or written amendments duly delivered after execution of Agreement.
- 4.11 Invitation to Bid No., 343-11460, Instructions to Bidders, and Bid Bond.
- 4.12 Contractor's response to the City's Invitation to Bid No., 343-11460, dated August 4, 2014.
- 4.13 Schedule of Completion and Schedule of Values.
- 4.14 All amendments, modifications and supplements, change orders and work directive changes issued on or after the Effective Date of the Agreement.
- 4.15 Any Additional documents that are required to be submitted under the Agreement.
- 4.16 Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Agreement. A copy of all permits shall be given to the City for inclusion in the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

There are no Contract Documents other than those listed in this Article 4. The Contract Documents may only be altered, amended, or repealed in accordance with the provisions of the terms of this Agreement.

In the event of any conflict between the documents or any ambiguity or missing specification or instruction, the following priority is established:

- a. Specific direction from the City Manager (or designee)
- b. This Agreement dated September 3, 2014, and any attachments.
- c. Invitation to Bid No., 343-11460, and the specifications prepared by the City.
- d. Contractor's response to the City's Invitation to Bid No., 343-11460, dated August 4, 2014.
- e. Schedule of Values.

f. Schedule of Completion.

If during the performance of the Work, Contractor finds a conflict, error or discrepancy in the Contract Documents, Contractor shall so report to the Project Manager, in writing, at once and before proceeding with the Work affected shall obtain a written interpretation or clarification from the City.

It is the intent of the specifications and plans to describe a complete Project to be constructed in accordance with the Contract Documents. Any Work that may reasonably be inferred from the specifications or plans as being required to produce the intended result shall be supplied whether or not it is specifically called for. When words which have a well-known technical or trade meaning are used to describe Work, materials, or equipment, such works shall be interpreted in accordance with such meaning. Reference to standard specifications, manuals or codes of any technical society, organization or associations, or to the code of any governmental authority whether such reference be specific or implied, shall mean the latest standard specification, manual or code in effect as of the Effective Date of this Agreement, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall change the duties and responsibilities of the City, the Contractor, or any of their agents or employees from those set forth in the Contract Documents.

#### ARTICLE 5 – CONTRACT TIME

- 5.1 The Contractor recognizes that **TIME IS OF THE ESSENCE**. The Work shall commence within 5 calendar days of the date of the Notice to Proceed.
- 5.2 The Work shall be Substantially Completed within 90 calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.
- 5.3 The Work shall be finally completed on the Final Completion Date and ready for final payment in accordance with this Agreement within 95 calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.

#### ARTICLE 6 – CONTRACT PRICE

- 6.1 City shall pay Contractor for performance of the Work in accordance with Article 7, subject to additions and deletions by Change Order, as provided for in this Agreement.
- 6.2 The parties expressly agree that the Contract Price, which shall not exceed the amount of **\$392,041.87**, constitutes the total maximum compensation payable to Contractor for performing the Work, plus any Work done pursuant to a Change Order. The Contract Price is in accordance with the line item unit prices listed in the Bid. Line items are based on a unit price cost multiplied by a defined quantity. Any additional duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change to the Contract Price.
- 6.3 The Contract Price constitutes the compensation payable to Contractor for performing the Work plus any Work done pursuant to a Change Order. All duties, responsibilities

and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change in the Contract price.

## **ARTICLE 7 – PAYMENT PROCEDURES**

- 7.1 Contractor shall submit Applications for Payment in accordance with the Contract Documents. Applications for Payment will be processed by City as provided in the General Conditions.
- 7.2 Progress Payments. City shall make progress payments on account of the Contract Price on the basis of Contractor's monthly Applications for Payment, which shall be submitted by the Contractor between the first (1<sup>st</sup>) and the tenth (10<sup>th</sup>) day after the end of each calendar month for which payment is requested. All progress payments will be made on the basis of the progress of the Work completed.
- 7.3 Prior to Final Completion, progress payments will be made in an amount equal to ninety percent (90%) of the value of Work completed less in each case the aggregate of payments previously made.
- 7.4 Final Payment. Upon final completion of the Work in accordance with the General Conditions, as may be supplemented, the City shall pay Contractor an amount sufficient to increase total payments to one-hundred percent (100%) of the Contract Price. However, not less than ten percent (10%) of the Contract Price shall be retained until Record Drawings (as-builts), specifications, addenda, modifications and shop drawings. Including all manufacturers' instructional and parts manuals are delivered to and accepted by the City.
- 7.5 The City shall make payment to the Contractor in accordance with the Florida Prompt Payment Act, Section 218.70, Florida Statutes.
- 7.6 The City shall make payment to the Contractor through utilization of the City's P-Card Program.

## **ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS**

In order to induce the City to enter into this Agreement, Contractor makes the following representations upon which the City has relied:

- 8.1 Contractor is qualified in the field of public construction and in particular to perform the Work and services set forth in this Agreement.
- 8.2 Contractor has visited the Work Site, has conducted extensive tests, examinations and investigations and represents and warrants a thorough familiarization with the nature and extent of the Contract Documents, the Work, locality, soil conditions, moisture conditions and all year-round local weather and climate conditions (past and present), and, in reliance on such tests, examination and investigations conducted by Contractor and the Contractor's experts, has determined that no conditions exist that would in any manner affect the Proposed Price and that the project can be completed for the Proposed Price submitted within the Contract Time as defined in this Agreement.

Furthermore, Contractor warrants and confirms that he is totally familiar with, understands and obligates Contractor to comply with all federal, state and local laws, ordinances, rules, regulations and all market conditions that affect or may affect the cost and price of materials and labor needed to fulfill all provisions of this Agreement or that in any manner may affect cost, progress or performance of the Work.

- 8.3 The Contractor has satisfied itself as to the nature and location of the Work under the Contract Documents, the general and local conditions of the Project, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, and roads, the conformation and conditions at the ground based on City provided reports, the type of equipment and facilities needed preliminary to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under the Contract Documents.
- 8.4 The Contractor has also studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Works, and finds and has further determined that no conditions exist that would in any manner affect the Proposed Price and that the project can be completed for the Proposed Price submitted.
- 8.5 Contractor has made or caused to be made examinations, investigations, tests and studies of such reports and related data in addition to those referred to in Paragraphs 8.2, 8.3 and 8.4 above as he deems necessary for the performance of the Work at the Contract Prices, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are, or will be, required by Contractor for such purposes.
- 8.6 Contractor has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.
- 8.7 Contractor has given City written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution by City is acceptable to the Contractor.
- 8.8 Labor
- 8.8.1 The Contractor shall provide competent, suitable qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. The Contractor shall at all times maintain good discipline and order at the site.
- 8.8.2 The Contractor shall, at all times, have a competent superintendent, capable of reading and thoroughly understanding the drawings and specifications, as the Contractor's agent on the Work, who shall, as the Contractor's agent, supervise, direct and otherwise conduct the Work.
- 8.8.3 The Contractor shall designate the superintendent on the job to the City, in writing, immediately after receipt of the Notice to Proceed. The Contractor

understands and agrees that the superintendent's physical presence on the job site is indispensable to the successful completion of the Work. If the superintendent is frequently absent from the job site, the Project Manager may deliver written notice to the Contractor to stop work or terminate the Contract in accordance with Article 17.

8.8.4 The Contractor shall assign personnel to the job site that have successfully completed training programs related to trench safety, confined space and maintenance of traffic. A certified "competent person" shall be assigned to the job site. Personnel certified by the International Municipal Signal Associations with Florida Department of Transportation qualifications are required relative to maintenance of traffic. Failure to pursue the Work with the properly certified supervisory staff may result in notice to stop work or terminate the Contract in accordance with Article 17.

#### 8.9 Materials:

8.9.1 The Contractor shall furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation and completion of Work.

8.9.2 All material and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. Suppliers shall be selected and paid by the Contractor; the City reserves the right to approve all suppliers and materials.

8.10 Work Hours: Except in connection with the safety or protection of persons, or the Work, or property at the site or adjacent thereto, and except as otherwise indicated in the Supplementary Conditions, all work at the site shall be performed during regular working hours between 7 a.m. and 6:00 p.m., Monday through Friday. The Contractor will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday (designated by the City of Fort Lauderdale) without the Project Manager's written consent at least seventy two (72) hours in advance of starting such work. If the Project Manager permits overtime work, the Contractor shall pay for the additional charges to the City with respect to such overtime work. Such additional charges shall be a subsidiary obligation of the Contractor and no extra payment shall be made to the Contractor for overtime work. The cost to the Contractor to reimburse the City for overtime inspection is established at direct-labor and overtime costs for each person or inspector required. Incidental overtime costs for engineering, testing and other related services will also be charged to the Contractor at the actual rate accrued.

8.11 Patent Fee and Royalties: The Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work, or any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. The Contractor hereby expressly binds himself or itself to indemnify and save harmless the City from all such claims and fees and from any and all suits and action of every name and description that may be brought against City on account of any such claims, fees, royalties, or costs for any such invention or patent, and from any and all suits or actions that may

be brought against said City for the infringement of any and all patents or patent rights claimed by any person, firm corporation or other entity.

- 8.12 Permits: The Contractor shall obtain and pay for all permits and licenses. There shall be no allowance for Contractor markup, overhead or profit for permits and licenses. The Contractor shall pay all government charges which are applicable at the time of opening of proposals. It shall be the responsibility of the Contractor to secure and pay for all necessary licenses and permits of a temporary nature necessary for the prosecution of Work.
- 8.13 Law and Regulations: The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the Work. If the Contractor observes that the specifications or plans are at variance therewith, the Contractor shall give the Project Manager prompt written notice thereof, and any necessary changes shall be adjusted by any appropriate modifications. If the Contractor performs any work knowing or having reason to know that it is contrary to such laws, ordinances, rules and regulations, and without such notice to the Project Manager, the Contractor shall bear all costs arising therefrom; however, it shall not be the Contractor's primary responsibility to make certain that the specifications and plans are in accordance with such laws, ordinances, rules and regulations.
- 8.14 Taxes: The Contractor shall pay all sales, consumer, use and other similar taxes required to be paid by him in accordance with the laws of the City of Fort Lauderdale, County of Broward, State of Florida.
- 8.15 Contractor Use of Premises: The Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workmen to areas permitted by law, ordinances, permits and/or the requirements of the Contract Documents, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment.

The Contractor shall not enter upon private property for any purpose without first securing the permission of the property owner in writing and furnishing the Project Manager with a copy of said permission. This requirement will be strictly enforced, particularly with regard to such vacant properties as may be utilized for storage or staging by the Contractor.

The Contractor shall conduct his work in such a manner as to avoid damage to adjacent private or public property. Any damage to existing structures of work of any kind, including permanent reference markers or property corner markers, or the interruption of a utility service, shall be repaired or restored promptly at no expense to the City or property owner.

The Contractor will preserve and protect all existing vegetation such as trees, shrubs and grass on or adjacent to the site which do not reasonably interfere with the construction, as determined by the Project Manager. The Contractor will be responsible for repairing or replacing any trees, shrubs, lawns and landscaping that may be damaged due to careless operation of equipment, stockpiling of materials, tracking of grass by equipment or other construction activity. The Contractor will be liable for, or will be required to replace or restore at no expense to the City all

vegetation not protected or preserved as required herein that may be destroyed or damaged.

During the progress of the work, the Contractor shall keep the premises free from accumulations of waste materials, rubbish and debris resulting from the Work. At the completion of the Work, the Contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials and shall leave the site clean and ready for occupancy by the City. The Contractor shall restore to their original condition those portions of the site not designated for alteration by the Contract Documents at no cost to the City.

8.16 Project Coordination: The Contractor shall provide for the complete coordination of the construction effort. This shall include, but not necessarily be limited to, coordination of the following:

8.16.1 Flow of material and equipment from suppliers.

8.16.2 The interrelated work with affected utility companies.

8.16.3 The interrelated work with the City where tie-ins to existing facilities are required.

8.16.4 The effort of independent testing agencies.

8.16.5 Notice to affected property owners as may be directed by the Project Manager.

8.17 Project Record Documents and As-Builts (Record Drawings): The Contractor shall keep one record copy of all specifications, plans addenda, modifications, shop drawings and samples at the site, in good order and annotated to show all changes made during the construction process. These shall be available to the Project Manager for examination and shall be delivered to the Project Manager upon completion of the Work. Upon completion of the project and prior to final payment, an as-built (record drawings) of the Project shall be submitted to the Project Manager. The as-built drawings shall be signed and sealed by a Florida Registered Professional Surveyor and Mapper, Engineer, Architect or Landscape Architect depending on the type of drawing.

8.18 Safety and Protection:

8.18.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

8.18.1.1 All employees working on the project and other persons who may be affected thereby.

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

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

8.18.2 The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify owners of adjacent property and utilities when execution of the Work may affect them at least seventy two (72) hours in advance (unless otherwise required). All damage, injury or loss to any property caused, directly or indirectly, in whole or in part by the Contractor, any subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by the Contractor. The Contractor's duties and responsibilities for safety and protection of the Work shall continue until such time as all the Work is completed and accepted by the City.

8.19 Emergencies: In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the City is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give the Project Manager prompt written notice of any significant changes in the Work or deviations from the Contract Documents caused thereby.

8.20 Risk of Loss: The risk of loss, injury or destruction shall be on the Contractor until acceptance of the Work by the City. Title to the Work shall pass to the City upon acceptance of the Work by the City.

8.21 Environmental: The Contractor has fully inspected the Premises and agrees, except as to the presence of any asbestos, to accept the Premises in an "as is" physical condition, without representation or warranty by the City of any kind, including, without limitation, any and all existing environmental claims or obligations that may arise from the presence of any "contamination" on, in or about the Premises. Further, Contractor and all entities claiming by, through or under the Contractor, releases and discharges the City, from any claim, demand, or cause of action arising out of or relating to the Contractor's use, handling, storage, release, discharge, treatment, removal, transport, decontamination, cleanup, disposal and/or presence of any hazardous substances including asbestos on, under, from or about the Premises. The Contractor shall have no liability for any pre-existing claims or "contamination" on the Premises.

The Contractor shall not use, handle, store, discharge, treat, remove, transport, or dispose of Hazardous Substances including asbestos at, in, upon, under, to or from the Premises until receipt of instructions from the City. At such time, a City approved Change Order, which shall not include any profit, shall authorize the Contractor to perform such services.

The Contractor shall immediately deliver to the Project Manager complete copies of all notices, demands, or other communications received by the Contractor from any governmental or quasi-governmental authority or any insurance company or board of fire underwriters or like or similar entities regarding in any way alleged violations or potential violations of any Environmental Law or otherwise asserting the existence or potential existence of any condition or activity on the Premises which is or could be dangerous to life, limb, property, or the environment.

For other and additional consideration, the Contractor hereby agrees, at its sole cost and expense, to indemnify and protect, defend, and hold harmless the City and its respective employees, agents, officials, officers, representatives, contractors and subcontractors, successors, and assigns (hereafter the "City") from and against any and all claims, demands, losses, damages, costs, expenses, including but not limited to mitigation, restoration, and natural restoration expenses, liabilities, assessments, fines, penalties charges, administrative and judicial proceedings and orders, judgments, causes of action, in law or in equity, remedial action requirements and/or enforcement actions of any kind (including, without limitation, attorneys' fees and costs) directly or indirectly arising out of or attributable to, in whole or in part, the Contractor's use, handling, storage, release, threatened release, discharge, treatment, removal, transport, decontamination, cleanup, disposal and/or presence of a Hazardous Substance (excluding asbestos) on, under, from, to or about the Premises or any other activity carried on or undertaken on or off the Premises by the Contractor or its employees, agents or subcontractors, in connection with the use, handling, storage, release, threatened release, discharge, treatment, mitigation, natural resource restoration, removal, transport, decontamination, cleanup, disposal and/or presence or any Hazardous Substance including asbestos located, transported, or present on, undue, from, to, or about the Premises. This indemnity is intended to be operable under 42 U.S.C. sections 9607, as amended, and any successor section.

The scope of the indemnity obligations includes, but is not limited to: (a) all consequential damages; (b) the cost of any required or necessary repair, cleanup, or detoxification of the applicable real estate and the preparation and implementation of any closure, remedial or other required plan, including without limitation; (i) the costs of removal or remedial action incurred by the United States government or the State of Florida or response costs incurred by any other person, or damages from injury to destruction of, or loss of, natural resources, including the cost of assessing such injury, destruction, or loss, incurred pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, as amended; (ii) the clean-up costs, fines, damages, or penalties incurred pursuant to any applicable provisions of Florida law; and (iii) the cost and expenses of abatement, correction or cleanup, fines, damages, response costs, or penalties which arise from the provisions of any other statute, law, regulation, code ordinance, or legal requirement state or federal; and (c) liability for personal injury or property damage arising under any statutory or common law tort theory, including damages assessed for the maintenance of a public private nuisance, response costs, or for the carrying on of an abnormally dangerous activity.

8.22 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any other reason or allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This

provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

- 8.23 No Liens: If any Subcontractor, supplier, laborer, or materialmen of Contractor or any other person directly or indirectly acting for or through Contractor files or attempts to file a mechanic's or construction lien against the real property on which the work is performed or any part or against any personal property or improvements or claim against any monies due or to become due from the City to Contractor or from Contractor to a Subcontractor, for or on account of any work, labor, services, material, equipment, or other items furnished in connection with the Work or any Change Order, Contractor agrees to satisfy, remove, or discharge such lien or claim at its own expense by bond, payment, or otherwise within twenty (20) days of the filing or from receipt of written notice from the City.

Additionally, until such time as such lien or claim is satisfied, removed or discharged by Contractor, all monies due to Contractor, or that become due to Contractor before the lien or claim is satisfied, removed or otherwise discharged, shall be held by City as security for the satisfaction, removal and discharge of such lien and any expense that may be incurred while obtaining such. If Contractor shall fail to do so, City shall have the right, in addition to all other rights and remedies provided by this Agreement or by law, to satisfy, remove, or discharge such lien or claim by whatever means City chooses at the entire and sole cost and expense of Contractor which costs and expenses shall, without limitation, include attorney's fees, litigation costs, fees and expenses and all court costs and assessments.

- 8.24 Weather Emergencies: Upon issuance of a Hurricane Watch by the National Weather Service, the Contractor shall submit to the City a plan to secure the work area in the event a Hurricane Warning is issued. The plan shall detail how the Contractor will secure the Premises, equipment and materials in a manner as to prevent damage to the Work and prevent materials and equipment from becoming a hazard to persons and property on and around the Premises. The plan shall include a time schedule required to accomplish the hurricane preparations and a list of emergency contacts that will be available and in the City before, during and immediately after the storm.

Upon issuance of a Hurricane Warning by the National Weather Service, if the Contractor has not already done so, the Contractor shall implement its hurricane preparedness plan. Cost of development and implementation of the hurricane preparedness plan shall be considered as incidental to construction. Cost of any clean up and rework required after the storm will be considered normal construction risk within Florida and shall not entitle the Contractor to any additional compensation. Contractor shall be entitled to request an extension in time for completion of the Work, in accordance with the provisions of Article 15 of this Agreement, equal to the time he is shut down for implementation of the preparedness plan, the duration of the storm and a reasonable period to restore the Premises.

- 8.25 Force Majeure: No Party shall hold the other responsible for damages or for delays in performance caused by force majeure, acts of God, or other acts or circumstances beyond the control of the other party or that could not have been reasonably foreseen and prevented. For this purposes, such acts or circumstances shall include, but not be limited to weather conditions affecting performance, floods, epidemics, war, riots,

strikes, lockouts, or other industrial disturbances, or protest demonstrations. Should such acts or circumstances occur, the parties shall use their best efforts to overcome the difficulties arising therefrom and to resume the Work as soon as reasonably possible with the normal pursuit of the Work.

Inclement weather, continuous rain for less than three (3) days or the acts or omissions of subcontractors, third-party contractors, materialmen, suppliers, or their subcontractors, shall not be considered acts of force majeure.

No Party shall be liable for its failure to carry out its obligations under the Agreement during a period when such Party is rendered unable by force majeure to carry out its obligation, but the obligation of the Party or Parties relying on such force majeure shall be suspended only during the continuance of the inability and for no longer period than the unexpected or uncontrollable event.

The Contractor further agrees and stipulates, that its right to excuse its failure to perform by reason of force majeure shall be conditioned upon giving written notice of its assertion that a Force Majeure delay has commenced within 96 hours after such an occurrence. The CONTRACTOR shall use its reasonable efforts to minimize such delays. The CONTRACTOR shall promptly provide an estimate of the anticipated additional time required to complete the Project.

8.26 PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES IN DEPARTMENT OF TRANSPORTATION FINANCIAL ASSISTED CONTRACTS: The recipient shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any DOT-assisted contract or in the administration of its DBE program or the requirements of 49 CFR part 26. The recipient shall take all necessary and reasonable steps under 49 CFR part 26 to ensure nondiscrimination in the award and administration of DOT-assisted contracts. The recipient's DBE program, as required by 49 CFR part 26 and as approved by DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the recipient of its failure to carry out its approved program, the Department may impose sanctions as provided for under part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801 *et seq.*).

Additionally, the contractor assures that they, the sub recipient or the subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate. (This additional language must be included in each subcontract the prime contractor signs with a subcontractor.)

## ARTICLE 9 – CITY’S RESPONSIBILITIES

- 9.1 The City shall furnish the data required of the City under the Contract Documents promptly and shall make payments to the Contractor promptly after they are due as provided in Article 7.
- 9.2 The City’s duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in the Contract Documents.
- 9.3 Technical Clarifications and Interpretations:
- 9.3.1 The City shall issue, with reasonable promptness, such written clarifications or interpretations of the Contract Documents as it may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. Should the Contractor fail to request interpretation of questionable items in the Contract Documents, the City shall not entertain any excuse for failure to execute the Work in a satisfactory manner.
- 9.3.2 The City shall interpret and decide matters concerning performance under the requirements of the Contract Documents, and shall make decisions on all claims, disputes or other matters in question. Written notice of each claim, dispute or other matter will be delivered by claimant to the other Party but in no event later than five (5) days after the occurrence of event, and written supporting data will be submitted to the other Party within five (5) days after such occurrence. All written decisions of the City on any claim or dispute will be final and binding.
- 9.4 The Contractor shall perform all Work to the reasonable satisfaction of the City in accordance with the Contract Documents. In cases of disagreement or ambiguity, the City shall decide all questions, difficulties, and disputes of whatever nature, which may arise under or by reason of this Agreement or the quality, amount and value of the Work, and the City’s decisions on all claims, questions and determination are final.

## ARTICLE 10 – BONDS AND INSURANCE

- 10.1 Public Construction and Other Bonds: The Contractor shall furnish Public Construction or Performance and Payment Bonds (“Bond”), each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all the Contractor’s obligations under the Contract Documents. These Bonds shall remain in effect until at least one (1) year after the date of final payment, except as otherwise provided by law. All Bonds shall be furnished and provided by the surety and shall be in substantially the same form as prescribed by the Contract Documents and be executed by such sureties as (i) are licensed to conduct business in the State of Florida, and (ii) are named in the current list of Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department and (iii) otherwise meet the requirements set forth herein that apply to sureties. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

10.1.1 Performance Bond: A Corporate Surety Bond legally issued, meeting the approval of, and running to the City in an amount not less than the Contract Price of such improvements, conditioned that the Contractor shall maintain and make all repairs to the improvements constructed by the Contractor at their own expense and free of charge to the City, for the period of one (1) year after the date of acceptance of the Work within such period by reason of any imperfection of the material used or by reason of any defective workmanship, or any improper, imperfect or defective preparation of the base upon which any such improvement shall be laid.

The Contractor shall execute and record in the public records of Broward County, Florida, a payment and performance bond in an amount at least equal to the Contract Price with a surety insurer authorized to do business in the State of Florida as surety, ("Bond"), in accordance with Section 255.05, Florida Statutes (2014), as may be amended or revised, as security for the faithful performance and payment of all of the Contractor's obligations under the Contract Documents.

10.2 Disqualification of Surety: If the Surety on any Bond furnished by the Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Florida or it ceases to meet the requirements of clauses (i) and (ii) of Paragraph 10.1, the Contractor shall within five (5) days thereafter substitute another Bond and Surety, both of which shall be acceptable to the City.

### 10.3 Insurance

10.3.1 Contractor shall provide and shall require all of its sub-contractors to provide, pay for, and maintain in force at all times during the term of the Agreement, such insurance, including Property Insurance (Builder's Risk), Commercial General Liability Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Employer's Liability Insurance, and Umbrella/Excess Liability, as stated below, as well as Professional Liability insurance in the amount of \$1,000,000 for any Architectural and or Engineering requirements associated with the fulfillment of the contract if required. Such policy or policies shall be issued by companies authorized to do business in the State of Florida and having agents upon whom service of process may be made in the State of Florida.

A. The City is required to be named as additional insured on the Commercial General Liability insurance policy. BINDERS ARE UNACCEPTABLE. The insurance coverage required shall include those classifications, as listed in standard liability insurance manuals, which most nearly reflect the operations of the Contractor. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for the work contemplated in this Agreement shall be deemed unacceptable, and shall be considered a breach of contract.

B. The Contractor shall provide the City an original Certificate of Insurance for policies required by Article 10. All certificates shall state that the City shall be given ten (10) days' notice prior to expiration or cancellation of

the policy. The insurance provided shall be endorsed or amended to comply with this notice requirement. In the event that the insurer is unable to accommodate, it shall be the responsibility of the Contractor to provide the proper notice. Such notification will be in writing by registered mail, return receipt requested and addressed to the Finance Department. Such policies shall: (1) name the insurance company or companies affording coverage acceptable to the City, (2) state the effective and expiration dates of the policies, (3) include special

endorsements where necessary. Such policies provided under Article 10 shall not be affected by any other policy of insurance, which the City may carry in its own name.

- C. Contractor shall as a condition precedent of this Agreement, furnish to the City of Fort Lauderdale, c/o Project Manager, 100 N. Andrews Avenue, Fort Lauderdale, FL 33301, Certificate(s) of Insurance upon execution of this Agreement, which indicate that insurance coverage has been obtained which meets the requirements as outlined below:

10.3.2 Property Insurance (Builder's Risk): The Contractor shall purchase and maintain property insurance upon the Work at or off the site of 100% of the contract completed value. These policies shall insure the interest of the owner, contractor and subcontractors in the Work, and shall insure against "all risks" of physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage. All such insurance required by this paragraph shall remain in effect until the Work is completed and accepted by the City.

10.3.3 Commercial General Liability

- A. Limits of Liability:
  - Bodily Injury and Property Damage - Combined Single Limit
  - Each Occurrence \$1,000,000
  - Project Aggregate \$1,000,000
  - General Aggregate \$2,000,000
  - Personal Injury \$1,000,000
  - Products/Completed Operations \$1,000,000
- B. Endorsements Required:
  - City of Fort Lauderdale included as an Additional Insured
  - Broad Form Contractual Liability
  - Waiver of Subrogation
  - Premises/Operations
  - Products/Completed Operations
  - Independent Contractors
  - Owners and Contractors Protective Liability
  - Contractors Pollution Liability

10.3.4 Business Automobile Liability

- A. Limits of Liability:
  - Bodily Injury and Property Damage - Combined Single Limit
  - All Autos used in completing the contract
  - Including Hired, Borrowed or Non-Owned Autos
  - Any One Accident \$1,000,000
- B. Endorsements Required:
  - Waiver of Subrogation

### 10.3.5 Workers' Compensation and Employer's Liability Insurance

Limits: Workers' Compensation – Per Florida Statute 440  
Employers' Liability - \$500,000

Any firm performing work on behalf of the City of Fort Lauderdale must provide Workers' Compensation insurance. Exceptions and exemptions can only be made if they are in accordance with Florida Law.

Contractor must be in compliance with all applicable State and Federal workers' compensation laws, including the U.S. Longshore Harbor Workers' Act or Jones Act.

10.3.6 Umbrella/Excess Liability: The Contractor shall provide umbrella/excess coverage with limits of no less than \$2,000,000 excess of Commercial General Liability, Automobile Liability and Employer's Liability.

10.3.7 All insurance policies required above shall be issued by companies authorized to do business under the laws of the State of Florida, with the following qualifications:

The Contractor's insurance must be provided by an A.M. Best's "A-" rated or better insurance company authorized to issue insurance policies in the State of Florida, subject to approval by the City's Risk Manager. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for work contemplated in this project shall be deemed unacceptable, and shall be considered breach of contract.

NOTE: CITY PROJECT NUMBER MUST APPEAR ON EACH CERTIFICATE.

Compliance with the foregoing requirements shall not relieve the Contractor of their liability and obligation under this section or under any other section of this Agreement.

The Contractor shall be responsible for assuring that the insurance certificates required in conjunction with this Section remain in force for the duration of the Project. If insurance certificates are scheduled to expire during the contractual period, the Contractor shall be responsible for submitting new or renewed insurance certificates to the City at a minimum of thirty (30) calendar days in advance of such expiration. In the event that expired certificates are not replaced with new or renewed certificates that cover the contractual period, the City shall:

- A. Suspend the Agreement until such time as the new or renewed certificates are received by the City.
- B. The City may, at its sole discretion, terminate the Agreement for cause and seek damages from the Contractor in conjunction with the violation of the terms and conditions of the Agreement.

## **ARTICLE 11- WARRANTY AND GUARANTEE, TESTS AND INSPECTIONS, CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

- 11.1 Warranty: The Contractor warrants and guarantees to the City that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects shall be given to the Contractor. All defective work, whether or not in place, may be rejected, corrected or accepted as provided in this Article.
- 11.1.1 Warranty of Title: The Contractor warrants to the City that it possesses good, clear and marketable title to all equipment and materials provided and that there are no pending liens, claims or encumbrances against the equipment and materials.
- 11.1.2 Warranty of Specifications: The Contractor warrants that all equipment, materials and workmanship furnished, whether furnished by the Contractor, its subcontractors or suppliers, will comply with the specifications, drawings and other descriptions supplied or adopted and that all services will be performed in a workmanlike manner.
- 11.1.3 Warranty of Merchantability: The Contractor warrants that any and all equipment to be supplied pursuant to this Agreement is merchantable, free from defects, whether patent or latent in material or workmanship, and fit for the ordinary purposes for which it is intended.
- 11.2 Tests and Inspections: The Contractor shall give the Project Manager timely (minimum of thirty six (36) hours) notice of readiness of the Work for all required inspections, tests, or approvals.
- 11.2.1 If any law, ordinance, rule, regulation, code or order of any public body having jurisdiction requires any Work (or part thereof) to specifically be inspected, tested or approved, the Contractor shall assume full responsibility, pay all costs in connection therewith and furnish the Project Manager the required certificates of inspection, testing or approval. The Contractor shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the City's acceptance of a manufacturer, fabricator, supplier or distributor of materials or equipment submitted for approval prior to the Contractor's purchase thereof for incorporation of the Work.
- 11.2.2 All inspections, tests or approvals other than those required by law, ordinance, rule, regulation, code or order of any public body having jurisdiction shall be performed by the City or by a professional testing firm designated by the City. The City will pay for sampling and testing if the test results are passing. The Contractor will reimburse the City for sampling, testing, and retesting costs associated with failing tests.
- 11.2.3 Neither observations by the Project Manager nor inspections, tests or approvals by others shall relieve the Contractor from his obligations to perform the Work in accordance with Contract Documents.

- 11.3 Uncovering Work: If any work that is to be inspected, tested or approved is covered without approval or consent of the Project Manager, it must, if requested by the Project Manager, be uncovered for observation and/or testing. Such uncovering and replacement shall be at the Contractor's sole expense unless the Contractor has given the Project Manager timely notice of the Contractor's intention to cover such Work and the Project Manager has not acted with reasonable promptness in response to such notice.
- 11.3.1 If the Project Manager considers it necessary or advisable that Work covered in accordance with Paragraph 11.2.1, 11.2.2 and 11.2.3 be observed by the City or inspected or tested by others, the Contractor at the City's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the Project Manager may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, the Contractor shall bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, including compensation for additional professional services, and an appropriate deductive Change Order shall be issued. If, however, such work is not found to be defective, the Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection testing and reconstruction if he makes a claim therefore as provided in Articles 14 and 15.
- 11.4 City May Stop the Work: If the Work is defective, or the Contractor fails to supply sufficient skilled supervisory personnel or workmen or suitable materials or equipment or the work area is deemed unsafe, the City may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the City to stop the Work shall not give rise to any duty on the part of the City to exercise this right for the benefit of the Contractor or any other party. The City will not award any increase in Contract Price or Contract Time if the Work is stopped due to the circumstances described herein.
- 11.5 Correction or Removal of Defective Work Before Final Payment: If required by the Project Manager, the Contractor shall promptly, without cost to the City and as Specified by the Project Manager, either correct any defective Work, whether or not fabricated, installed or completed, or if the Work has been rejected by the City remove it from the site and replace it with non-defective Work.
- 11.6 One Year Correction Period After Final Payment: If within one (1) year after the date of final acceptance, or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any work is found to be defective, the Contractor shall promptly, without cost to the City and in accordance with the City's written instructions, either correct such defective Work, or, if it has been rejected by the City, remove it from the site and replace it with non-defective Work.

If The Contractor does not promptly comply with the terms of such instructions or in an emergency where delay would cause serious risk of loss or damage, the City may have the defective Work corrected or the rejected Work removed and replaced, and all

direct and indirect costs for such removal and replacement, including compensation for additional professional services, shall be paid by the Contractor.

- 11.7 Acceptance of Defective Work, Deductions: If, instead of requiring correction or removal and replacement of defective Work, the City, at the city's sole option, prefers to accept it, the City may do so. In such a case, if acceptance occurs prior to the Project Manager's recommendation of final payments, a Change Order shall be issued incorporating the necessary revisions in the Contracts Documents, including appropriate reduction in the Contract Price; or if the acceptance occurs after such recommendation, an appropriate amount shall be paid by the Contractor to the City.
- 11.8 City May Correct Defective Work: If the Contractor fails within a reasonable time after written notice of the Project Manager to proceed to correct defective Work or to remove and replace rejected Work as required by the Project Manager in accordance with Paragraph 11.5, or if the Contractor fails to perform the Work in accordance with the Contract Documents, the City may, after seven (7) days written notice to the Contractor, correct and remedy any such deficiency. In exercising its rights under this paragraph, the City shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the City may exclude the Contractor from all or part of the site, take possession of all or part of the Work, suspend the Contractor's services related thereto and take possession of the Contractor's tools, construction equipment and materials stored at the site or elsewhere. The Contractor shall allow the City's representative agents and employees such access to the site as may be necessary to enable the City to exercise its rights under this paragraph. All direct and indirect costs of the City in exercising such rights shall be charged against the Contractor in an amount verified by the Project Manager, and a Change Order shall be issued incorporating the necessary revisions in the Contract Documents and a reduction in the Contract Price. Such direct and indirect costs shall include, in particular but without limitation, compensation for additional professional services required and costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of the Contractor's defective Work. The Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the City of the City's right hereunder.

## **ARTICLE 12 – INDEMNIFICATION**

- 12.1 Disclaimer of Liability: The City shall not at any time, be liable for injury or damage occurring to any person or property from any cause, whatsoever, arising out of Contractor's construction and fulfillment of this agreement.
- 12.2 Indemnification: For other, additional good valuable consideration, the receipt and sufficiency of which is hereby acknowledged:
- 12.2.1 Contractor shall, at its sole cost and expense, indemnify and hold harmless the City, its representatives, employees and elected and appointed officials from or on account of all claims, damages, losses, liabilities and expenses, direct, indirect or consequential including but not limited to fees and charges of engineers, architects, attorneys, consultants and other professionals and court costs arising out of or in consequence of the performance of this Agreement at all trial and appellate levels. Indemnification shall specifically include but not be

limited to claims, damages, losses, liabilities and expenses arising out of or from (a) the negligent or defective design of the project and Work of this Agreement; (b) any act, omission or default of the Contractor, its Subcontractors, agents, servants or employees; (c) any and all bodily injuries, sickness, disease or death; (d) injury to or destruction of tangible property, including any resulting loss of use; (e) other such damages, liabilities, or losses received or sustained by any person or persons during or on account of any operations connected with the construction of this Project including the warranty period; (f) the use of any improper materials; (g) any construction defect including both patent and latent defects; (h) failure to timely complete the work; (i) the violation of any federal, state, county or city laws, ordinances or regulations by Contractor, its subcontractors, agents, servants, independent contractors or employees; (j) the breach or alleged breach by Contractor of any term of the Agreement, including the breach or alleged breach of any warranty or guarantee.

12.2.2 Contractor agrees to indemnify, defend, save and hold harmless the City, its officers, agents and employees, from all damages, liabilities, losses, claims, fines and fees, and from any and all suits and actions of every name and description that may be brought against City, its officers, agents and employees, on account of any claims, fees, royalties, or costs for any invention or patent and/or for the infringement of any and all copyrights or patent rights claimed by any person, firm, or corporation.

12.2.3 Contractor shall pay all claims, losses, liens, settlements or judgments of any nature in connection with the foregoing indemnifications including, but not limited to, reasonable attorney's fees and costs for trials and appeals.

12.2.4 If any Subcontractor, supplier, laborer, or materialmen of Contractor or any other person directly or indirectly acting for or through Contractor files or attempts to file a mechanic's or construction lien against the real property on which the work is performed or any part or against any personal property or improvements thereon or make a claim against any monies due or to become due from the City to Contractor or from Contractor to a Subcontractor, for or on account of any work, labor, services, material, equipment, or other items furnished in connection with the Work or any change order, Contractor agrees to satisfy, remove, or discharge such lien or claim at its own expense by bond, payment, or otherwise within five (5) days of the filing or from receipt of written notice from the City.

Additionally, until such time as such lien or claim is satisfied, removed or discharged by Contractor, all monies due to Contractor, or that become due to Contractor before the lien or claim is satisfied, removed or otherwise discharged, shall be held by City as security for the satisfaction, removal and discharge of such lien and any expense that may be incurred while obtaining the discharge. If Contractor shall fail to do so, City shall have the right, in addition to all other rights and remedies provided by this Agreement or by law, to satisfy, remove, or discharge such lien or claim by whatever means City chooses at the entire and sole cost and expense of Contractor which costs and expenses shall, without limitation, include attorney's fees, litigation costs, fees

and expenses and all court costs and assessments, and which shall be deducted from any amount owing to Contractor. In the event the amount due Contractor is less than the amount required to satisfy Contractor's obligation under this, or any other article, paragraph or section of this Agreement, the Contractor shall be liable for the deficiency due the City.

12.2.5 The Contractor and the City agree that Section 725.06(2), Florida Statutes controls the extent and limits of the indemnification and hold harmless provisions of this Agreement, if any, and that the parties waive any defects in the wording of this Article that runs afoul of said statutory section.

### **ARTICLE 13 – CHANGES IN THE WORK**

- 13.1 Without invalidating this Agreement, the City may, at any time or from time to time order additions, deletions or revisions in the Work through the issuance of Change Orders. Upon receipt of a Change Order, the Contractor shall proceed with the Work involved. All Work shall be executed under the applicable conditions of the Contract Documents. If any Change Order causes an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, an equitable adjustment will be made as provided in Article 14 or Article 15 on the basis of a claim made by either Party.
- 13.2 The Project Manager may authorize minor changes in the work not involving an adjustment in the Contract Price or the Contract Time, which are consistent with the overall intent of the Contract Documents. Such changes must be in writing and signed by the City and the Contractor.
- 13.3 If notice of any change affecting the general scope of the Work or change in the Contract Price is required by the provisions of any Bond to be given to the Surety, it will be the Contractor's responsibility to so notify the Surety, and the amount of each applicable Bond shall be adjusted accordingly. The Contractor shall furnish proof of such adjustment to the City.

### **ARTICLE 14 – CHANGE OF CONTRACT PRICE**

Change of Contract Price, approved by CITY, shall be computed as follows:

- 14.1 Cost of the Work: The term "Cost of the Work" means the sum of all direct costs necessarily incurred and paid by Contractor in the proper performance of the Work. Except as otherwise may be agreed to in writing by the City, these costs shall be in amounts no higher than those prevailing in the City and shall include only the following items and shall not include any of the costs itemized in Paragraph 14.3:
- 14.1.1 Payroll costs for employees in the direct employ of the Contractor in the performance of the Work under schedules of job classifications agreed upon by the City and the Contractor. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus and cost of fringe benefits which shall include social security contributions,

unemployment, excise and payroll taxes, worker's compensation, health and retirement benefits, bonuses, sick leave, vacation and applicable holiday pay.

14.1.2 Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage, and required suppliers and field services. All cash discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to the City, and the Contractor shall make provisions so that they may be obtained.

14.1.3 Supplemental costs including the following:

14.1.3.1 Cost, including transportation and maintenance of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work.

14.1.3.2 Rentals of all construction equipment and machinery and the parts whether rented from the Contractor or others in accordance with rental agreements approved by the City, and the costs of transporting, loading, unloading, installation, dismantling and removal. The rental of any such equipment, machinery or parts shall cease when the use is no longer necessary for the Work.

14.1.3.3 Sales, consumer, use or similar taxes related to the Work and for which the Contractor is liable, imposed by laws and regulations.

14.1.3.4 Royalty payments and fees for permits and licenses.

14.1.3.5 The cost of utilities, fuel and sanitary facilities at the Work site.

14.1.3.6 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

14.1.3.7 Cost of premiums for additional bonds and insurance required because of changes in the Work.

14.2 The Contract Price may only be increased by a Change Order when Work is modified in accordance with Article 13 and approved by the CITY in writing. Any claim for an increase in the Contract Price resulting from a Change Order shall be based on written notice delivered to the Project Manager within ten (10) days of the occurrence of the Change Order giving rise to the claim. Notice of the amount of the claim with supporting data shall be included in the Change Order and delivered within twenty (20) days of such occurrence unless Project Manager allows an additional period of time to ascertain accurate cost data. Any change in the Contract Price resulting from any such claim shall be incorporated in the Change Order.

14.3 Not Included in the Cost of the Work: The term "cost of the Work" shall not include any of the following:

- 14.3.1 Payroll costs and other compensation of the Contractor's officers executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditor, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by the Contractor whether at the site or in the Contractor's principal or branch office for general administration of the work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 14.1.1, all of which are to be considered administrative costs covered by the Contractor's fee.
- 14.3.2 Expenses of the Contractor's principal and branch offices other than the Contractor's office at the site.
- 14.3.3 Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the Work and charges against the Contractor for delinquent payments.
- 14.3.4 Cost of premiums for all bonds and for all insurance whether or not the Contractor is required by the Contract Documents to purchase and maintain the same.
- 14.3.5 Costs due to the negligence of the Contractor, any subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.
- 14.3.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 14.1

14.4 Basis of Compensation: The Contractor's compensation, allowed to the Contractor for overhead and profit, shall be determined as follows:

14.4.1 A mutually acceptable negotiated fee:

14.4.1.1 For costs incurred under Paragraphs 14.1.1 and 14.1.2, the Contractor's fee shall not exceed five percent (5%).

14.4.1.2 No fee shall be payable on the basis of costs itemized under Paragraphs 14.1.3.1, 14.1.3.2, 14.1.3.3, 14.1.3.4, 14.1.3.5, 14.1.3.6, 14.1.3.7, 14.3.1, 14.3.2, 14.3.3, 14.3.4, 14.3.5 and 14.3.6.

14.4.1.3 The amount of credit to be allowed by the Contractor to the City for any such change which results in a net decrease plus a deduction in the Contractor's fee by an amount equal to five percent (5%) for the net decrease.

14.4.1.4 When both additions and credits are involved in any one change the combined overhead and profit shall be figured on the basis of net

increase if any, however, not to exceed five percent (5%) of the agreed compensation. Profit will not be paid on any Work not performed.

- 14.5 Cost Breakdown Required: Whenever the cost of any Work is to be determined pursuant to this Article, the Contractor will submit in form acceptable to the City an itemized cost breakdown together with supporting documentation. Whenever a change in the Work is to be based upon mutual acceptance of a lump sum, whether the amount is an addition, credit, or no-charge-in-cost, the Contractor shall submit an estimate substantiated by a complete itemized breakdown:
- 14.5.1 The breakdown shall list quantities and unit prices for materials, labor, equipment and other items of cost.
- 14.5.2 Whenever a change involves the Contractor and one (1) or more subcontractors and the change is an increase in the agreed compensation, the overhead and profit percentage for the Contractor and each subcontractor shall be itemized separately.
- 14.6 Time for the City to Approve Extra Work: Any Extra Work in an amount up to and not exceeding a cumulative amount of \$25,000 for a specific project can be approved by the City Manager and shall require a written Change Order proposal to be submitted to the Public Works Director for submittal and approval by the City Manager. Extra Work exceeding the cumulative amount of \$25,000 for a specific project must be approved by the City Commission and a written Change Order proposal must be submitted to the Public Works Director for submittal and approval by the City Manager and City Commission. No financial or time claim for delay to the project resulting from the Change Order approval process outlined above under Section 14.6 will be allowed.

## **ARTICLE 15 – CHANGE OF THE CONTRACT TIME**

- 15.1 The Contract Time may only be changed by a Change Order. Any claim for an extension in the Contract Time shall be based on written notice delivered to the Project Manager within five (5) days of the occurrence of the event giving rise to the claim. Any change in the Contract Time resulting from any such claim shall be incorporated in a Change Order.
- 15.2 The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of the Contractor if a claim is made there for as provided in Paragraph 15.1. Such delays shall include but not be limited to, acts or neglect by the City, or to fires, floods, labor disputes, epidemics, abnormal weather conditions, or acts of God.
- 15.3 All time limits stated in the Contract Documents are of the essence. The provisions of this Article 15 shall not exclude recovery for damages for delay by the Contractor.
- 15.4 Delays caused by or resulting from entities, contractors or subcontractors who are not affiliated with the CONTRACTOR (non-affiliated Contractors) shall not give rise to a claim by the CONTRACTOR for damages for increases in material and/or labor costs. Such entities, contractors and subcontractors include, but are not limited to, the City's

contractors and subcontractors, Florida Power and Light Company, AT&T and Florida East Coast Railway, LLC.

## ARTICLE 16 – LIQUIDATED DAMAGES

- 16.1 Upon failure of the Contractor to complete the Work within the time specified for completion, the Contractor shall pay to the City the sum of **One Thousand Dollars (\$1,000.00)** for each and every calendar day that the completion of the Work is delayed beyond the time specified in this Agreement for completion, as fixed and agreed liquidated damages and not as a penalty, so long as the delay is caused by the Contractor. Should an act of God or the acts or omissions of the City, its agents or representatives, in derogation to the terms of this Agreement cause the delay, the Contractor shall not be responsible for the delay nor liquidated damages. Liquidated damages are fixed and agreed upon between the Parties, recognizing the impossibility of precisely ascertaining the amount of damages that will be sustained by the City as a consequence of such delay and both parties desiring to obviate any question of dispute concerning the amount of damages and the cost and effect of the failure of the Contractor to complete the Work on time. Liquidated damages shall apply separately to each portion of the Work for which a time of completion is given. The City shall have the right to deduct from or retain any compensation which may be due or which may become due and payable to the Contractor the amount of liquidated damages, and if the amount retained by the City is insufficient to pay in full such liquidated damages, the Contractor shall pay all liquidated damages in full. The Contractor shall be responsible for reimbursing the City, in addition to liquidated damages or other damages for delay, for all costs of engineering, architectural fees, and inspection and other costs incurred in administering the construction of the Project beyond the completion date specified or beyond an approved extension of time granted to the Contractor whichever is later. Delays caused by or resulting from entities, contractors or subcontractors who are not affiliated with the Contractor shall not give rise to a claim by Contractor for damages for increase in material and/or labor costs. Such entities, contractors and subcontractors include, but are not limited to, the City's contractors and subcontractors, Florida Power and Light Company, AT&T, and Florida East Coast Railway, LLC.
- 16.2 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any reason, allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

## ARTICLE 17 – SUSPENSION OF WORK AND TERMINATION

- 17.1 City May Suspend Work: The City may, at any time and without cause, suspend the Work or any portion of the Work for a period of not more than ninety (90) days by notice in writing to the Contractor which shall fix the date on which Work shall be resumed. The Contractor shall resume the Work on the date fixed. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension, if the Contractor makes a claim as provided in Articles 14 and 15.
- 17.2 City May Terminate Work: The City retains the right to terminate this Agreement, with thirty (30) days prior written notice. Additionally, the City may also terminate this Agreement upon 15 days' notice upon the occurrence of any one or more of the following events:
- 17.2.1 If the Contractor commences a voluntary case or a petition is filed against the Contractor, under any chapter of the Bankruptcy Code, or if the Contractor takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency.
- 17.2.2 If the Contractor makes a general assignment for the benefit of creditors.
- 17.2.3 If a trustee, receiver, custodian or agent of the Contractor is appointed under applicable law or under Contract, whose appointment or authority to take charge of property of the Contractor is for the purpose of enforcing a lien against such property or for the purpose of general administration of such property for the benefit of the Contractor's creditors.
- 17.2.4 If the Contractor persistently fails to perform the Work in accordance with the Contract Documents, including but not limited to, failure to supply sufficient skilled Workers or suitable materials or equipment or failure to adhere to the progress schedule as same may be revised from time to time.
- 17.2.5 If the Contractor repeatedly fails to make prompt payments to subcontractors or for labor, material or equipment.
- 17.2.6 If the Contractor repeatedly disregards proper safety procedures.
- 17.2.7 If the Contractor disregards any local, state or federal laws or regulations.
- 17.2.8 If the Contractor otherwise violates any provisions of this Agreement.
- 17.3 Further, the Contractor may be excluded from the Work site and the City take possession of the Work and of all the Contractor's tools, appliances, construction equipment and machinery at the site and use them without liability to the City for trespass or conversion, incorporate in the Work all materials and equipment stored at the site or for which the City has paid the Contractor but which are stored elsewhere, and finish the Work as the City may deem expedient. In this instance, the Contractor shall not be entitled to receive any further compensation until the Work is finished.

No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any reason, allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

17.4 If the Contractor commits a default due to its insolvency or bankruptcy, the following shall apply:

17.4.1 Should this Agreement be entered into and fully executed by the parties, funds released and the Contractor (Debtor) files for bankruptcy, the following shall occur:

17.4.1.1 In the event the Contractor files a voluntary petition under 11 U.S.C. 301 or 302, or an order for relief is entered under 11 U.S.C. 303, the Contractor shall acknowledge the extent, validity, and priority of the lien recorded in favor of the City. The Contractor further agrees that in the event of this default, the City shall, at its option, be entitled to seek relief from the automatic stay pursuant to 11 U.S.C. 362. The City shall be entitled to relief from the automatic stay pursuant to 11 U.S.C. 362(d) (1) or (d) (2), and the Contractor agrees to waive the notice provisions in effect pursuant to 11 U.S.C. 362 and any applicable Local Rules of the United States Bankruptcy Court. The Contractor acknowledges that such waiver is done knowingly and voluntarily.

17.4.1.2 Alternatively, in the event the City does not seek stay relief, or if stay relief is denied, the City shall be entitled to monthly adequate protection payments within the meaning of 11 U.S.C. 361. The monthly adequate protection payments shall each be in an amount determined in accordance with the Note and Mortgage executed by the Contractor in favor of the City.

17.4.1.3 In the event the Contractor files for bankruptcy under Chapter 13 of Title 11, United States Code in addition to the foregoing provisions, the Contractor agrees to cure any amounts in arrears over a period not to exceed twenty-four (24) months from the date of the confirmation order, and such payments shall be made in addition to the regular monthly payments required by the Note and mortgage. Additionally, the Contractor shall agree that the City is over secured and, therefore, entitled to interest and attorney's fees pursuant to 11 U.S.C. 506(b). Such fees shall be allowed and payable as an administrative expense. Further, in the event the Contractor has less

than five (5) years of payments remaining on the Note, the Contractor agrees that the treatment afforded to the claim of the City under any confirmed plan of reorganization shall provide that the remaining payments shall be satisfied in accordance with the Note, and that the remaining payments or claim shall not be extended or amortized over a longer period than the time remaining under the Note.

17.4.2 Should this Agreement be entered into and fully executed by the parties, and the funds have not been forwarded to Contractor, the following shall occur:

17.4.2.1 In the event the Contractor files a voluntary petition pursuant to 11 U.S.C. 301 or 302, or an order for relief is entered under 11 U.S.C. 303., the Contractor acknowledges that the commencement of a bankruptcy proceeding constitutes an event of default under the terms of this Agreement. Further, the Contractor acknowledges that this Agreement constitutes an executory contract within the meaning of 11 U.S.C. 365. The Contractor acknowledges that this Agreement is not capable of being assumed pursuant to 11 U.S.C. 365(c)(2), unless the City expressly consents in writing to the assumption. In the event the City consents to the assumption, the Contractor agrees to file a motion to assume this Agreement within ten (10) days after receipt of written consent from the City, regardless of whether the bankruptcy proceeding is pending under Chapter 7, 11, or 13 of Title 11 of the United States Code. The Contractor further acknowledges that this Agreement is not capable of being assigned pursuant to 11 U.S.C. 365(b)(1).

17.5 Where the Contractor's service have been so terminated by the City, the termination shall not affect any rights of the City against the Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due the Contractor by the City will not release the Contractor from liability.

17.6 The Contractor has no right, authority or ability to terminate the Work except for the wrongful withholding of any payments due the Contractor from the City.

## **ARTICLE 18 – NOTICES**

18.1 All notices required by any of the Contract Documents shall be in writing and shall be deemed delivered upon mailing by certified mail, return receipt requested to the following:

To the City:

City Manager  
City of Fort Lauderdale  
100 North Andrews Avenue  
Fort Lauderdale, Florida 33301

with copy to the:

Project Manager and City Attorney  
City of Fort Lauderdale  
100 North Andrews Avenue  
Fort Lauderdale, Florida 33301

To the Contractor:

**MBR Construction, Inc.**  
**1020 NW 51<sup>st</sup> Street**  
**Fort Lauderdale, FL 33309**

## **ARTICLE 19 – LIMITATION OF LIABILITY**

- 19.1 The City desires to enter into this Agreement only if in so doing the City can place a limit on the City's liability for any cause of action arising out of this Agreement, so that the City's liability for any breach never exceeds the sum of \$1,000. For other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Contractor expresses its willingness to enter into this Agreement with the knowledge that the Contractor's recovery from the City to any action or claim arising from the Agreement is limited to a maximum amount of \$1,000, which amount shall be reduced by the amount actually paid by the City to the Contractor pursuant to this Agreement, for any action or claim arising out of this Agreement. Nothing contained in this paragraph or elsewhere in this Agreement is in any way intended either to be a waiver of the limitation placed upon the City's liability as set forth in Section 768.28, Florida Statutes, or to extend the City's liability beyond the limits established in said Section 768.28; and no claim or award against the City shall include attorney's fees, investigative costs, expert fees, suit costs or pre-judgment interest.
- 19.2 **No Extended Damages:** For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any reason, allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

## **ARTICLE 20 – GOVERNING LAW**

- 20.1 This Agreement shall be governed by the laws of the State of Florida. Both Parties agree that the courts of the State of Florida shall have jurisdiction of any claim arising

in connection with this Agreement. Venue for any claim, objection or dispute arising out of this Agreement shall be in Broward County, Florida.

## **ARTICLE 21 – MISCELLANEOUS**

- 21.1 The duties and obligations imposed by this Agreement and the rights and remedies available to the parties and, in particular but without limitation, the warranties, guaranties and obligations imposed upon the Contractor and all of the rights and remedies available to the City, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by laws or regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents, and the provisions of this Paragraph will survive final payment and termination or completion of this Agreement.
- 21.2 The Contractor shall not assign or transfer this Agreement or its rights, title or interests. The obligations undertaken by the Contractor pursuant to this Agreement shall not be delegated or assigned to any other person or firm. Violation of the terms of this Paragraph shall constitute a material breach of Agreement by the Contractor and the City any, at its discretion, cancel this Agreement and all rights, title and interest of the Contractor which shall immediately cease and terminate.
- 21.3 The Contractor and its employees, volunteers and agents shall be and remain an independent contractors and not agents or employees of the City with respect to all of the acts and services performed by and under the terms of this Agreement. This Agreement shall not in any way be constructed to create a partnership, association or any other kind of joint undertaking or venture between the Parties.
- 21.4 The City reserves the right to audit the records of the Contractor relating in any way to the Work to be performed pursuant to this Agreement at any time during the performance and term of this Agreement and for a period of three (3) years after completion and acceptance by the City. If required by the City, the Contractor agrees to submit to an audit by an independent certified public accountant selected by the City. The Contractor shall allow the City to inspect, examine and review the records of the Contractor at any and all times during normal business hours during the term of this Agreement.
- 21.5 The remedies expressly provided in this Agreement to the City shall not be deemed to be exclusive but shall be cumulative and in addition to all other remedies in favor of the City now or later existing at law or in equity.
- 21.6 Should any part, term or provisions of this Agreement be decided by the courts to be invalid, illegal or in conflict with any state or federal law, the validity of the remaining portion or provision shall not be affected.

Bid #343-1 Gore Betz Neighborhood Park  
 Lot: BASE BID ITEM

Item #	Item	Qty	Unit	Price	Total
343-11460 1	MOBILIZATION	1	lump sum	27000	27000
343-11460 2	Maintenance of Traffic	1	lump sum	1315	1315
343-11460 3	- Project signage	1	lump sum	723.25	723.25
343-11460 4	Demolition-existing asphalt	200	square yar	15	3000
343-11460 5	Demolition-existing bushes stumps	1	acre	16757	item deleted
343-11460 6	Demolition-existing electrical pole	1	each	4340	4340
343-11460 7	Demolition-artificial turf	50	square foo	2.63	131.5
343-11460 8	Erosion Control and Catch Basin Protection	900	linear foot	1.9	1710
343-11460 9	Concrete-6 inch sidewalk	900	square foo	4.41	723.25
343-11460 10	Concrete-header curb	110	linear foot	13.15	1446.5
343-11460 11	Concrete-type F curb	350	linear foot	21.5	7525
343-11460 12	Concrete-drop curb	350	linear foot	20.32	4340
343-11460 13	Concrete-type D curb	700	linear foot	16.9	11830
343-11460 14	Concrete-flume and base	3	each	1052	3156
343-11460 15	Concrete-CR E ramp	3	each	1052	3156
343-11460 16	Concrete-2 x 5 detectable warning	2	each	341.9	683.8
343-11460 17	Paving-Type S-3 Asphaltic concrete	150	square yar	31.43	4714.5
343-11460 18	Pavedrain Paver	2235	square foo	28.83	64435.05
343-11460 19	Mulch Path-Wood mulch path	7000	square foo	3.22	22540
343-11460 20	Earth Berm and Rain Garden	400	bank cubic	10.65	4260
343-11460 21	Earth Berm and Rain Garden-excavate	2200	square foo	3.96	8712
343-11460 22	Earth Berm and Rain Garden-install	1700	square foo	0.43	731
343-11460 23	Earth Berm and Rain Garden-construction	4600	square foo	1.02	4692
343-11460 24	Landscaping-Coccoloba diversifolia	10	each	249.85	2498.5
343-11460 25	Landscaping-Cordia sebestena	22	each	249.85	5496.7
343-11460 26	Landscaping-Cococarpus erectus ser	4	each	249.85	999.4
343-11460 27	Landscaping-Cupressus sempervirens	17	each	460.85	7834.45
343-11460 28	Landscaping-Lysiloma latisiliquum	4	each	249.85	999.4
343-11460 29	Landscaping-Lagerstroemia speciosa	1	each	249.85	249.85
343-11460 30	Landscaping- Ligustrum lucidum	2	each	328.75	657.5
343-11460 31	Landscaping-Myrcianthes fragrans	3	each	328.75	986.25
343-11460 32	Landscaping-Magnolia grandiflora	2	each	263	526
343-11460 33	Landscaping- Pinus elliottii	1	each	289.3	289.3
343-11460 34	Landscaping-Quercus virginiana SDLNpp12015	1	each	1052	1052
343-11460 35	Landscaping-Sabal palmetto	3	each	249.85	749.55
343-11460 36	Landscaping- Senna surattensis	6	each	236.7	1420.2
343-11460 37	Landscaping-Veitchia montgomeryana	22	each	256.43	5641.46
343-11460 38	Landscaping-Chrysobalanus icaco	109	each	9.21	1003.89
343-11460 39	Landscaping-Ficus microcarpa	300	each	9.21	2763
343-11460 40	Landscaping-Rapanea punctata	15	each	11.84	177.6
343-11460 41	Landscaping-Tripsacum dactyloides	85	each	9.21	782.85
343-11460 42	Landscaping-Stenotaphrum secundatum	67000	square foo	0.75	item deleted
343-11460 43	Landscaping-application of weed killer	1	lump sum	4602	item deleted
343-11460 44	Landscaping-install irrigation system	1	lump sum	16766.25	item deleted
343-11460 45	Bench-install	4	each	939.34	item deleted
343-11460 46	Picnic Table-install	8	each	1251.72	item deleted
343-11460 47	Bike Rack-install	1	each	1145.38	item deleted
343-11460 48	Pavilion-install	1	each	50278.34	50278.34
343-11460 49	Shade Structure Tent-install	1	each	18330.78	18330.78
343-11460 50	Exercise Equipment-install	1	lump sum	47539.88	47539.88
343-11460 51	Artificial Turf and Edging	1	lump sum	27523.71	27523.71
343-11460 52	Drinking Fountain and Water Distribution System.	1	each	4137	4137
343-11460 53	Drinking Fountain and Water Distribution System.	1	lump sum	13729	13729
343-11460 54	Pavement Marking and Signing-4 Solid White Thermoplastic	150	linear foot	2.63	394.5
343-11460 55	Pavement Marking and Signing-4 Solid Blue Thermoplastic	120	linear foot	3.95	474
343-11460 56	Pavement Marking and Signing-install	1	each	111.78	111.78
343-11460 57	Pavement Marking and Signing-handicap sign and post	1	each	440.53	440.53
343-11460 58	Electrical-install Distribution Panel	1	each	1973	1973
343-11460 59	Electrical-Security Fence With Gate	1	each	2840	2840
343-11460 60	Electrical-in 2 PVC Conduit	320	linear foot	8.38	2681.6
343-11460 61	Electrical-in 1-1/4 PVC Conduit	250	linear foot	4.34	1085
343-11460 62	Electrical-in 1-1/4 PVC Conduit	200	linear foot	5.4	1080
343-11460 63	Electrical-4 X #12 THHN - Copper in 1-1/4 PVC Conduit	200	linear foot	7.5	1500
343-11460 64	Electrical- install Pavilion And Sign Light	2	each	920.5	1841
343-11460 65	Electrical- install 18 X 12 Concrete Pull Box	2	each	394.5	789
343-11460 66	Monument Sign	1	each	6758.58	item deleted

392041.87

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed as follows:

**CONTRACTOR:**

**MBR Construction, Inc.**

WITNESSES:

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Witness print/type name)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Witness print/type name)

(Corporate Seal)

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Print Name and Title)

Attest:

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Print/type name)

**CITY:**

City of Fort Lauderdale, a municipal  
corporation of the State of Florida

By: \_\_\_\_\_  
LEE R. FELDMAN, City Manager

(Corporate Seal)

ATTEST:

By: \_\_\_\_\_  
JONDA K. JOSEPH, City Clerk

APPROVED AS TO FORM:

By: \_\_\_\_\_  
Assistant City Attorney

ACKNOWLEDGEMENT OF CONTRACTOR

STATE OF: \_\_\_\_\_

COUNTY OF: \_\_\_\_\_

The foregoing instrument was acknowledged before me this \_\_\_\_ day of \_\_\_\_\_ ,  
20\_\_\_\_ , by \_\_\_\_\_ and \_\_\_\_\_ ,  
as \_\_\_\_\_ and \_\_\_\_\_ , respectively,  
of \_\_\_\_\_ , a \_\_\_\_\_  
corporation, on behalf of the corporation, who is  personally known to me or  has produced  
\_\_\_\_\_ as identification.

(SEAL)

\_\_\_\_\_  
Notary Public, State of Florida  
(Signature of Notary taking Acknowledgement)

\_\_\_\_\_  
Name of Notary Typed, Printed or Stamped

My Commission Expires:

\_\_\_\_\_  
Commission Number

**SURETY BOND**

**IN COMPLIANCE WITH AND INCORPORATING THE PROVISIONS OF SECTION 255.05, FLORIDA STATUTES**

THIS IS A SURETY BOND given by MBR Construction, Inc. the "Contractor" as principal, referred to in this Bond as "Contractor" and \_\_\_\_\_ as "Surety," and they represent by this instrument that they are bound to the CITY OF FORT LAUDERDALE, a municipal corporation of the State of Florida ("City"), in the sum of \$394,178.66 **(Three Hundred and Ninety Four Thousand, One Hundred and Seventy Eight Dollars and Sixty Six Cents)** for the payment of which, to be made to the City of Fort Lauderdale, Florida, they jointly and severally, bind themselves and each of their heirs, executors, administrators, successors and assigns.

**Owner Name:** CITY OF FORT LAUDERDALE  
a municipal corporation of the State of Florida

**Owner Address and Telephone:** City Hall, Public Works Department  
100 N. Andrews Avenue  
Fort Lauderdale, Florida 33301  
(954) 828-5772

**Bond No.:** \_\_\_\_\_

**Contractor Name, Address, Telephone:** MBR Construction, Inc.  
1020 NW 51<sup>st</sup> Street  
Fort Lauderdale, FL 33309  
(954) 486-8404

**Surety Company, Address, Telephone**  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**City Project No.:** 11353  
**Name of Project:** Gore Betz Neighborhood Park

**Project Location:** 1611 SW 9<sup>th</sup> Avenue  
**Legal Description and Street Address** Bound by SW 16<sup>th</sup> Street, SW 9<sup>th</sup> Avenue, SW 16<sup>th</sup> Court and SW 9<sup>th</sup> Terrace.

**Description of Work** The work includes 1) Construction of parallel parking spaces and sidewalks with permeable pavers; 2) Removal of existing inactive electrical pole on-site; 3) Construction of earth berms, rubber mulch path, trees, shrubs, sod, bioswales, and irrigation system; 4) Installation of site lighting; 5) Installation of adult fitness equipment and surfacing; 6) Abandonment of existing irrigation pump; and 7) Installation of new pavilion.

"Contractor" is bound by an instrument in writing dated the 19th day August, 2014, by which Contractor has contracted with the City of Fort Lauderdale, Florida, to furnish labor, tools, and materials for the Project referenced and described above, together with all work incidental thereto, as fully set out in the plans, specifications and details on file in the Office of the City Engineer of the City.

Notice required by Section 255.05(6), Florida Statutes: "This bond is given to comply with Section 255.05 Florida Statutes, and any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2), Florida Statutes."

The condition of the above obligation is such that if the above bound "Contractor," or its successor or assigns shall in good faith and in good, sufficient, substantial and workmanlike manner, perform the work and comply with the conditions of the contract, including payment of penalties, in strict accordance with the terms and provisions stipulated in it and shall indemnify and hold harmless the City against and for payments of any and all damages that may happen to persons or property by reason of excavations, embankments, obstructions and all other work in streets, alleys or places in connection with the work, or arising out of any act, neglect or omission of the "Contractor" or its agents, servants, or employees with relation to the work, and shall indemnify and hold harmless the City against and from all suits and acts of every nature and description arising out of any claims by patentees of any process connected with the work agreed to be performed under the contract, or of any materials used upon the work, and pay all costs accruing if the contract is cancelled and a new contract for finishing the work is let, and all other expenses lawfully chargeable to the "Contractor," then this agreement shall be null and void; otherwise it is to remain in full force and effect, but it is expressly provided, understood and agreed that if the "Contractor" or its subcontractors fail to duly and promptly pay for any labor, material, or other supplies used by "Contractor" or any of its subcontractors in the performance of the work to be done, or the Contractor defaults in its Contract with the City, the "Surety" will promptly pay to all claimants, as defined in Section 255.05(1), Florida Statutes, the same in an amount not exceeding the sum specified in this bond, together with interest at the rate of fifteen percent (15%) per annum, and the Surety hereby stipulates and agrees that no change, extension, reduction, alteration or addition to the terms of the contract or the plans, details and specifications shall in any way affect the obligations of this bond.

Whenever Contractor shall be, and is declared by the City to be in default under the contract, the City may proceed to cancel the contract and award a new contract for finishing the work or order the Surety to promptly remedy the default by obtaining a bid or bids for completing the contract in accordance with the original contract terms and conditions. Upon the determination by the City of the lowest responsible bidder, the Surety shall complete all work and pay the full cost of completion, less previous payments.

This Bond is effective for one (1) year after completion and acceptance of the work, with liability equal to 25% of the contract price, and is so conditioned that the "Contractor" will, at its own expense, correct any defective or faulty work or material which appears within one (1) year after completion of the work and final payment, upon notification by the City.

IN WITNESS WHEREOF, the above "Contractor" has signed this Agreement, and the "Surety" has caused this Agreement to be signed in its name by its Attorney-in-Fact, and its corporate seal affixed, this \_\_\_\_ day of \_\_\_\_\_, 2014.

Signed, sealed and delivered  
in the presence of:

CONTRACTOR:

\_\_\_\_\_  
(Witness) Signature

\_\_\_\_\_  
\_\_\_\_\_

(SEAL)

\_\_\_\_\_  
(Witness) Print Name

\_\_\_\_\_  
Print Name and Title

(SEAL)

SURETY:

\_\_\_\_\_  
(Witness) Signature

\_\_\_\_\_  
Local Agent

(SEAL)

\_\_\_\_\_  
(Witness) Print Name

\_\_\_\_\_  
Print Name and Title

(SEAL)

The undersigned acknowledges receipt of the Addenda listed below (if applicable) and further acknowledges that the provisions of each Addendum have been included in the preparation for this Bid.

<u>Addendum No.</u>	<u>Date Received</u>	<u>Addendum No.</u>	<u>Date Received</u>
1	7/24/2014	2	7/28/2014
3	7/31/2014		

The undersigned bidder agrees to furnish all labor, tools, material and supplies, and to sustain all the expense incurred in doing the work set forth that may be awarded the undersigned by the City of Fort Lauderdale, Florida, through its proper officers, and to do the same strictly in accordance with these plans and contract documents at the unit prices indicated.

DATE: **8/4/2014**  
**Inc.**

FOR: **MBR Construction,**

**Richard Pesta**  
(Witness  $\frac{1}{2}$  Print or type name)

BY: **Michael R. Boss**  
(Signature)

Seal: **State Of Florida**

**Wendy Cole**  
(Witness  $\frac{1}{2}$  Print or type name)

TITLE: President Vice-President



City of Fort Lauderdale • Procurement Services Division  
100 N. Andrews Avenue, 619 • Fort Lauderdale, Florida 33301  
954-828-5933 Fax 954-828-5576  
[purchase@fortlauderdale.gov](mailto:purchase@fortlauderdale.gov)

ITB 343-11460

PROJECT 11353

GORE BETZ NEIGHBORHOOD PARK

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## ADDENDUM NUMBER 1

July 24, 2014

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The following Addendum is hereby made a part of the Plans and Specifications and shall be included with all contract documents:

Acknowledge receipt of this Addendum by inserting its number and date on Page P-3 of the Proposal. **All changes are in bold.**

1. **Change:** Updated Electrical drawing Sheet No. E-1 added to documents.

All other terms, conditions, and specifications remain unchanged.



John Curran  
Procurement Specialist II



ITB 343-11460

PROJECT 11353

GORE BETZ NEIGHBORHOOD PARK

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## ADDENDUM NUMBER 2

July 28, 2014

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The following Addendum is hereby made a part of the Plans and Specifications and shall be included with all contract documents:

Acknowledge receipt of this Addendum by inserting its number and date on Page P-3 of the Proposal. **All changes are in bold.**

1. **Change:** To replace base bid items 54 and 55.

Item 54

Furnish all materials, labor and equipment to install new 4" Solid White **Thermoplastic Paint**

Item 55

Furnish all materials, labor and equipment to install new 4" Solid Blue **Thermoplastic Paint**

- 2 **Change:** Add the following to Item 6

This item to include the plugging of existing irrigation well per plan.

3. **Change:** Documents added to replace Section 32141 Permeable Interlocking Concrete Pavers

All other terms, conditions, and specifications remain unchanged.

John Curran  
Procurement Specialist II



ITB 343-11460

PROJECT 11353

GORE BETZ NEIGHBORHOOD PARK

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## ADDENDUM NUMBER 3

July 31, 2014

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The following Addendum is hereby made a part of the Plans and Specifications and shall be included with all contract documents:

Acknowledge receipt of this Addendum by inserting its number and date on Page P-3 of the Proposal. **All changes are in bold.**

**Change:** To replace the following statement found on page ITB-1 in respect to bid bonds:

**Bid Bonds:** Please note that BIDSYNC allows bidders to submit bid bonds electronically directly through their system. For more information on this feature and to access it, contact BIDSYNC customer care department. If bidders choose not to utilize this feature, bidders may either deliver their bond on or before the opening date and time, in a sealed envelope, at the location specified in this solicitation for bid openings, or you may upload a copy of your executed bid bond with your electronic proposal, and deliver, upon request, the sealed hard copy within five (5) business days after bid opening.

With

**Bid Bonds:**

Bidders can submit bid bonds for projects four different ways:

- 1) BidSync allows bidders to submit bid bonds electronically directly through their system using Surety 2000. For more information on this feature and to access it, contact BIDSYNC customer care department.
- 2) Bidders may upload a copy of their executed bid bond on BIDSYNC with your electronic proposal, and deliver, upon request, the sealed hard copy within five (5) business days after bid opening.
- 3) Bidders can hand deliver their bid bond in a sealed envelope to the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, with the bid number and title clearly indicated on the envelope before time of bid opening.
- 4) Bidders can mail their bid bonds to the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, with the bid number and title clearly indicated on the envelope before time of bid opening.

It is the bidders sole responsibility to assure that his bid bond or other bid security is received by the Procurement Services Division before time of bid opening. Failure to adhere to this requirement may be grounds to consider your bid as non-responsive.

All other terms, conditions, and specifications remain unchanged.

A handwritten signature in black ink, appearing to read 'J. Curran', with a long horizontal flourish extending to the right.

John Curran  
Procurement Specialist II

**SECTION 32141 - PERMEABLE INTERLOCKING CONCRETE PAVERS****PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes
  - 1. Permeable concrete pavers.
  - 2. Bedding and void opening aggregates
  - 3. Aggregate Base
  - 4. Edge restraint.
- B. Related Sections
  - 1. Section 02200 - Earthwork.
  - 2. Section 03300 - Cast-in-place concrete

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - 1. C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - 2. C 136, Method for Sieve Analysis for Fine and Coarse Aggregate.
  - 3. C 140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
  - 4. D 448, Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
  - 5. C 936, Standard Specification for Solid Interlocking Concrete Pavers.
  - 6. C 979, Specification for Pigments for Integrally Colored Concrete.
  - 7. D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5-lb (2.49 kg) Rammer and 12 in. (305 mm) drop.
  - 8. D 1557, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (4.54 kg) Rammer and 18 in. (457 mm) drop.
  - 9. D 2922 Standard Test Methods for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).
  - 10. D 4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- B. Interlocking Concrete Pavement Institute (ICPI)
  - 1. Permeable Interlocking Concrete Pavement manual.
  - 2. Permeable Design Pro software for hydrologic and structural design

**1.03 SUBMITTALS**

- A. In accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Sieve analysis of aggregates for subbase, base and bedding materials per ASTM C 136.
- C. Project specific or producer/manufacturer source test results for void ratio and bulk

GORE BETZ PARK  
CITY OF FORT LAUDERDALE  
PROJECT # 11353

density of the base and subbase aggregates.

D. Permeable concrete pavers:

1. Paver manufacturer's catalog sheets with product specifications.
2. Four representative full-size samples of each paver type, thickness, color, and finish. Submit samples indicating the range of color expected in the finished installation.
3. Accepted samples become the standard of acceptance for the work of this Section.
4. Laboratory test reports certifying compliance of the concrete pavers with ASTM C 936.
5. Manufacturer's certification of concrete pavers by ICPI as having met applicable ASTM standards.
6. Manufacturers' material safety data sheets for the safe handling of the specified paving materials and other products specified herein.
7. Paver manufacturer's written quality control procedures including representative samples of production record keeping that ensure conformance of paving products to the product specifications.

#### 1.04 QUALITY ASSURANCE

A. Paver Installation Subcontractor Qualifications:

1. Installation shall be by a contractor and crew with at least one year of experience in placing interlocking concrete pavers on projects of similar nature or dollar costs.
2. Job references from projects of a similar size and complexity. Provide Owner/Client/General Contractor names, postal address, phone, fax, and email address.
3. The Contractor shall be in compliance with all local, state and federal licensing and bonding requirements

B. Regulatory Requirements and Approvals

#### 1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 1 Product Requirement Section.

B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged container packaging with identification tags intact on each paver bundle.

1. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.
2. Deliver concrete pavers to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by forklift or clamp lift.
3. Unload pavers at job site in such a manner that no damage occurs to the product or existing construction.

D. Storage and Protection: Store materials in protected area such that they are kept free from mud, dirt, and other foreign materials.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not install in rain.

1.07 MAINTENANCE

- A. Extra materials: Provide additional material for use by owner for maintenance and repair.
- B. Pavers shall be from the same production run as installed materials.

**PART 2 PRODUCTS**

Note: Some projects may include permeable and solid interlocking concrete pavements. Specify each product as required.

2.01 PAVING UNITS FOR ROADWAY

- A. Manufacturer: PaveDrain or Approved Equal.
- B. Permeable Interlocking Concrete Paver Units:
  - 1. Paver Type:
    - a. Material Standard: Comply with ASTM C 936.
    - b. Color: Sunset Burst Blend
    - c. Color Pigment Material Standard: Comply with ASTM C 979.

2.02 PRODUCT SUBSTITUTIONS

- A. Substitutions: Permitted for gradations for crushed stone ~~jointing material~~, base and subbase materials. Base and subbase materials shall have a minimum 0.32 void ratio. All substitutions shall be approved in writing by the project engineer.

2.03 CRUSHED STONE ~~FILLER~~, BEDDING, BASE AND SUBBASE FOR ROADWAYS

- A. Crushed stone with 90% fractured faces, LA Abrasion < 40 per ASTM C 131.
- B. Do not use rounded river gravel for vehicular applications.
- C. All stone materials shall be washed with less than 2% passing the No. 200 sieve.
- D. ~~Joint/opening filler and bedding~~: conforming to ASTM D 448 gradation as shown in Tables 1 and 2 below:

Table 1  
AASHTO No. 57 Bedding  
Grading Requirements

Sieve Size	Percent Passing
37.5 mm (1 1/2 in.)	100
25 mm (1 in.)	95 to 100
12.5 mm (1/2 in.)	25 to 60

GORE BETZ PARK  
CITY OF FORT LAUDERDALE  
PROJECT # 11353

4.75 mm (No. 4)	0 to 10
2.36 mm (No. 8)	0 to 5

Table 2

AASHTO No. 2 Bedding Grading Requirements	
Bedding Sieve Size	Percent Passing
75 mm (3 in.)	100
63 mm (2 1/2 in.)	90 to 100
50 mm (2 in.)	35 to 70
37.5 mm (1 1/2 in.)	0 to 15
19 mm (3/4 in.)	0 to 5

**PART 3 EXECUTION**

**3.01 EXAMINATION**

Note: The elevations and surface tolerance of the soil subgrade determine the final surface elevations of concrete pavers. The paver installation contractor cannot correct deficiencies excavation and grading of the soil subgrade with additional bedding materials. Therefore, the surface elevations of the soil subgrade should be checked and accepted by the General Contractor or designated party, with written certification presented to the paver installation subcontractor prior to starting work.

A. Acceptance of Site Verification of Conditions:

1. General Contractor shall inspect, accept and certify in writing to the paver installation subcontractor that site conditions meet specifications for the following items prior to installation of interlocking concrete pavers.
  - a. Verify that subgrade preparation, compacted density and elevations conform to specified requirements.
  - b. Provide written density test results for soil subgrade to the Owner, General Contractor and paver installation subcontractor.
  - c. Verify location, type, and elevations of edge restraints, concrete collars around utility structures, and drainage pipes and inlets.
2. Do not proceed with installation of bedding and interlocking concrete pavers until subgrade soil conditions are corrected by the General Contractor or designated subcontractor.

**3.02 PREPARATION**

A. Verify that the soil subgrade is free from standing water.

~~B. Stockpile joint/opening filler, base and subbase materials such that they are free from standing water, uniformly graded, free of any organic material or sediment, debris, and ready for placement.~~

C. Edge Restraint Preparation:

1. Install edge restraints per the drawings at the indicated elevations.

**3.03 INSTALLATION**

GORE BETZ PARK  
CITY OF FORT LAUDERDALE  
PROJECT # 11353

**A. General**

1. Any excess thickness of soil applied over the excavated soil subgrade to trap sediment from adjacent construction activities shall be removed before application of the geotextile and subbase materials.
2. Keep area where pavement is to be constructed free from sediment during entire job. Base and bedding materials contaminated with sediment shall be removed and replaced with clean materials.
3. Do not damage drainpipes, overflow pipes, observation wells, or any inlets and other drainage appurtenances during installation. Report any damage immediately to the project engineer.

**B. Geotextiles**

1. Place on bottom and sides of soil subgrade. Secure in place to prevent wrinkling from vehicle tires and tracks.
2. Overlap a minimum of 0.3 m (12 in.) in the direction of drainage.

**C. Open-graded subbase and base**

Note: Compaction of areas or sites that cannot accommodate a roller vibratory compactor may use a minimum 13,500 lbf (60 kN) vibratory plate compactor with a compaction indicator. At least two passes should be made over each lift of the subbase and base aggregates.

1. Moisten, spread and compact the subbase in 4 to 6 in. (100 to 150 mm) lifts without wrinkling or folding the geotextile. Place subbase to protect geotextile from wrinkling under equipment tires and tracks.
2. For each lift, make at least two passes in the vibratory mode then at least two in the static mode with a minimum 10 t (8 T) vibratory roller until there is no visible movement of the stone. Do not crush aggregate with the roller.
3. Moisten, spread and compact the base layer in one 4 in. (100 mm) thick lift. On this layer, make at least two passes in the vibratory mode then at least two in the static mode with a minimum 10 t (8 T) vibratory roller until there is no visible movement of the stone. Do not crush aggregate with the roller.

D. The surface tolerance the compacted base should not deviate more than.  $\pm 1$  in. (25 mm) over a 10 ft (3 m) straightedge.

**E. Permeable interlocking concrete pavers and joint/opening fill material**

1. Lay the paving units in the pattern(s) and joint widths shown on the drawings. Maintain straight pattern lines.
2. ~~Fill gaps at the edges of the paved area with cut units. Cut pavers subject to tire traffic shall be no smaller than 1/3 of a whole unit.~~
3. Cut pavers and place along the edges with a double-bladed splitter or masonry saw.
4. ~~Remove excess aggregate on the surface by sweeping pavers clean.~~
5. Compact and seat the pavers into the bedding material using a low-amplitude, 75-90 Hz plate compactor capable of at least 5,000 lbf (22 kN). This will require at least two passes with the plate compactor.
6. Do not compact within 6 ft (2 m) of the unrestrained edges of the paving units.
7. ~~Apply additional aggregate to the openings and joints if needed, filling them completely. Remove excess aggregate by sweeping then compact the pavers.~~

~~This will require at least two passes with the plate compactor.~~

8. All pavers within 6 ft (2 m) of the laying face must be left fully compacted at the completion of each day.
9. The final surface tolerance of compacted pavers shall not deviate more than  $\pm 3/8$  (10 mm) under a 10 ft (3 m) long straightedge.
10. The surface elevation of pavers shall be 1/8 to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.

### 3.05 FIELD QUALITY CONTROL

- A. After sweeping the surface clean, check final elevations for conformance to the drawings.
- B. Lippage: No greater than 1/8 in. (3 mm) difference in height between adjacent pavers.
- C. The surface elevation of pavers shall be 1/8 to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.
- D. Bond lines for paver courses:  $\pm 1/2$  in. ( $\pm 15$  mm) over a 50 ft (15 m) string line.

### 3.06 PROTECTION

- A. After work in this section is complete, the General Contractor shall be responsible for protecting work from sediment deposition and damage due to subsequent construction activity on the site.
- B. Installation contractor shall return to site after 6 months from the completion of the work and provide the following as required: ~~fill paver joints with stones,~~ replace broken or cracked pavers, and re-level settled pavers to initial elevations. Any additional work shall be considered part of original bid price and with no additional compensation.

**END OF SECTION**



**CITY OF FORT LAUDERDALE  
CONTRACT AND SPECIFICATIONS PACKAGE**

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**BID NO. 343-11460**

**PROJECT NO. 11353**

**GORE BETZ  
NEIGHBORHOOD PARK**



**Issued on Behalf of: Public Works Department  
100 North Andrews Avenue  
Fort Lauderdale, Florida 33301**

**ANGELINA ROSENBERG, P.E.  
SENIOR PROJECT MANAGER**

**JOHN CURRAN  
PROCUREMENT SPECIALIST II  
Telephone: (954) 828-4357 E-mail: [jcurran@fortlauderdale.gov](mailto:jcurran@fortlauderdale.gov)**

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**Note: The following documents are available electronically for completion.**

- Attachment 1 - CITB Signature Page (formerly P-2 to P-3)
- Attachment 2 - CITB Questionnaire Sheets (formerly P-4 to P-5)
- Attachment 3 - CITB Trench Safety (formerly P-6)
- Attachment 4 - CITB Local Business Preference (LBP-1 & 2)
- Attachment 5 - CITB Prime Contractor ID Form (MBE-1 & 2)
- Attachment 6 - CITB Non-Collusion Statement (NCS-1)

These documents **must** be returned with your bid along with your bid security, proof of insurance, and proof of required licenses/certifications.

## INVITATION TO BID

Sealed bids will be received electronically until 2:00 P.M. on **MONDAY, AUGUST 4, 2014**, and opened immediately thereafter in the 5th Floor Conference Room, City Hall, City of Fort Lauderdale, Florida, 100 North Andrews Avenue, for **Bid No., 343-11460, PROJECT NO. 11353 – GORE BETZ NEIGHBORHOOD PARK.**

This project consists of Drawing File No. 4-135-87, with fourteen (14) sheets.

The work includes: 1) Construction of parallel parking spaces and sidewalks with permeable pavers; 2) Removal of existing inactive electrical pole on-site; 3) Construction of earth berms, rubber mulch path, trees, shrubs, sod, bioswales, and irrigation system; 4) Installation of site lighting; 5) Installation of adult fitness equipment and surfacing; 6) Abandonment of existing irrigation pump; and 7) Installation of new pavilion.

**Possession of a State of Florida General Contractor License and A Broward County Certificate of Competency 3G-Interlocking Brick Paver (paver only) is required by the contractor/sub-contractor that is installing the brick pavers.**

Bidding blanks may be obtained **free of charge** at BIDSYNC.COM. Drawing Plans are on file in the Public Works Department, City of Fort Lauderdale at 100 North Andrews Avenue, 4<sup>th</sup> floor, (Monday thru Friday 8:00 am to 4:30 pm) at a **NON-REFUNDABLE cost of \$25.00 (including sales tax per set)**. Only cash or cashier's check made payable to the City of Fort Lauderdale are accepted.

It will be the sole responsibility of the bidder to ensure that his bid is submitted prior to the bid opening date and time listed. **PAPER BID SUBMITTALS WILL NOT BE ACCEPTED. BIDS MUST BE SUBMITTED ELECTRONICALLY VIA BIDSYNC.COM**

**Bid Security:** A certified check, cashier's check, bank officer's check or bid bond for **TEN** percent (**10%**) of the bid amount, made payable to the City of Fort Lauderdale, Florida, shall accompany each proposal.

**Bid Bonds:** Please note that BIDSYNC allows bidders to submit bid bonds electronically directly through their system. For more information on this feature and to access it, contact BIDSYNC customer care department. If bidders choose not to utilize this feature, bidders may either deliver their bond on or before the opening date and time, in a sealed envelope, at the location specified in this solicitation for bid openings, or you may upload a copy of your executed bid bond with your electronic proposal, and deliver, upon request, the sealed hard copy within five (5) business days after bid opening.

**Certified Checks, Cashier's Checks and Bank Drafts CANNOT** be submitted via BIDSYNC, nor are their images allowed to be uploaded and submitted with your electronic bid. These forms of securities, as well as hard copy bid bonds, must be received on or before the Invitation to Bid (ITB) opening date and time, at the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, with the bid number and title clearly indicated on the envelope.

The City of Fort Lauderdale reserves the right to waive any informality in any or all and to reject any or all bids.

For information concerning technical specifications please utilize the question/answer feature provided by BidSync at [www.bidsync.com](http://www.bidsync.com). Questions of a material nature must be received prior to the cut-off date specified in the solicitation. Material changes, if any, to the scope of services or bidding procedures will only be transmitted by written addendum. (See addendum section of BidSync

Site). Contractors please note: No part of your bid can be submitted via FAX. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Contractor has familiarized themselves with the nature and extent of the work, and the equipment, materials, and labor required. The entire bid response must be submitted in accordance with all specifications contained in this solicitation.

Information on bid results and projects currently out to bid can be obtained on the City's website – <http://www.fortlauderdale.gov/purchasing>. For general inquiries - please call (954) 828-4357.

Jonda K. Joseph  
City Clerk

## INSTRUCTIONS TO BIDDERS

The following instructions are given for the purpose of guiding bidders in properly preparing their bids or proposals. These directions have equal force and weight with the specifications and strict compliance is required with all of these provisions.

QUALIFICATIONS OF BIDDERS – No proposal will be accepted from, nor will any contract be awarded to, any person who is in arrears to the CITY OF FORT LAUDERDALE, upon any debt or contract, or who has defaulted, as surety or otherwise, upon any obligation to the City, or who is deemed irresponsible or unreliable by the City Commission of Fort Lauderdale.

PERSONAL INVESTIGATION - Bidders shall satisfy themselves by personal investigation, and by such other means as they may think necessary or desirable, as to the conditions affecting the proposed work and the cost. No information derived from maps, plans, specifications, or from the Engineer, City Manager, or their assistants shall relieve the Contractor from any risk or from fulfilling all terms of the contract.

INCONSISTENCIES – Any seeming inconsistency between different provisions of the plans, specifications, proposal or contract, or any point requiring explanation must be inquired into by the bidder, in writing, at least ten (10) days prior to the time set for opening proposals. After proposals are opened, the bidders shall abide by the decision of the Engineer as to such interpretation.

ADDENDA AND INTERPRETATIONS - No interpretations of the meaning of the plans, specifications or other contract documents will be made orally to any bidder. Prospective bidders must request such interpretation in writing as instructed in the bid package. To be considered, such request must be received by the Questions and Answers deadline as indicated in BIDSYNC.COM. Material changes, if any, to the scope of services or bidding procedures will only be transmitted by written addendum. **It is the bidder's responsibility to verify if addendums have been issued in BIDSYNC.COM.** Failure of any bidder to receive any such addenda or interpretation shall not relieve any bidder from any obligation under his bid as submitted. All addenda so issued shall become a part of the contract document. **Bidder** shall verify **in BIDSYNC.COM** that he has all addenda before submitting a bid.

LEGAL CONDITIONS - Bidders are notified to familiarize themselves with the provisions of the laws of the State of Florida relating to hours of labor on municipal work, and with the provisions of the laws of the State of Florida and the Charter and the ordinances of the City of Fort Lauderdale.

PUBLIC ENTITY CRIMES - A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a Contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, Florida Statutes, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list.

FORMS OF PROPOSALS - Each proposal and its accompanying statements must be made on the blanks provided. **THE FORMS MUST BE SUBMITTED ELECTRONICALLY, IN GOOD ORDER WITH ALL BLANKS COMPLETED,** and must show the name of the bidder and a statement as to its contents.

FORMS OF PROPOSALS (CONTINUED) - The proposal must be signed by one duly authorized to do so, and in case signed by a deputy or subordinate, the principal's properly written authority to such deputy or subordinate must accompany the proposal. No proposal will be accepted, for any reason whatsoever, which is not submitted to the City as stated above, within the specified time.

INSURANCE - Contractor shall provide and shall require all of its sub-contractors to provide, pay for, and maintain in force at all times during the term of the Agreement, such insurance, including Property Insurance (Builder's Risk), Commercial General Liability Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Employer's Liability Insurance, and Umbrella/Excess Liability, as stated below. Such policy or policies shall be issued by companies authorized to do business in the State of Florida and having agents upon whom service of process may be made in the State of Florida.

BID BOND - A certified check, cashier's check or bank officer's check, for the sum set forth in the advertisement, made payable to the City of Fort Lauderdale, Florida, or bid bond in such amount, shall accompany each proposal as evidence of the good faith and responsibility of the bidder. The check or bond shall be retained by the City as liquidated damages should the bidder refuse to or fail to enter into a contract for the execution of the work embraced in this proposal, in the event the proposal of the bidder is accepted. Retention of such amount shall not be construed as a penalty or forfeiture.

The above bond or check shall be a guarantee that the bidder will, if necessary, promptly execute a satisfactory contract and furnish good and sufficient bonds. As soon as a satisfactory contract has been executed and the bonds furnished and accepted, the check or bond accompanying the proposal of the successful bidder will be returned to him. The certified or other checks or bid bonds of the unsuccessful bidders will be returned to them upon the acceptance of the bid of the successful bidder. If the successful bidder shall not enter into, execute, and deliver such a contract and furnish the required bonds within ten (10) days after receiving notice to do so, the certified or other check or bid bond shall immediately become the property of the City of Fort Lauderdale as liquidated damages. Retention of such amount shall not be construed as a penalty or forfeiture.

FILLING IN BIDS - All prices must be electronically submitted in the proposal pages, and all proposals must fully cover all items for which proposals are asked and no other. Bidders are required to state the names and places of residence of all persons interested, and if no other person is interested, the bidder shall distinctly state such fact and shall state that the proposal is, in all respects, fair and without collusion or fraud. Where more than one person is interested, it is required that all persons interested or their legal representative make all verification and subscribe to the proposal.

PRICES QUOTED: Deduct any discount offered and quote firm net unit prices. In the case of a discrepancy in computing the amount of the bid, the unit price quoted will govern. All prices quoted shall be F.O.B. destination, freight prepaid (Bidder pays and bears freight charges, Bidder owns goods in transit and files any claims), unless otherwise stated in Special Conditions. Each item must be bid separately. No attempt shall be made to tie any item or items contained in the ITB with any other business with the City.

BIDS FIRM FOR ACCEPTANCE: Bidder warrants, by virtue of bidding, that his bid and the prices quoted in his bid will be firm for acceptance by the City for a period of one hundred and twenty (120) days from the date of bid opening unless otherwise stated in the ITB. The City shall award contract within this time period or shall request to the recommended awarded vendor an extension to hold pricing, until products/services have been awarded.

ADDITIONAL ITEMS OR SERVICES: The City may require additional items or services of a similar nature, but not specifically listed in the contract. The Contractor agrees to provide such items or services, and shall provide the City prices on such additional items or services based upon a formula or method, which is the same or similar to that used in establishing the prices in his proposal. If the price(s) offered are not acceptable to the City, and the situation cannot be resolved to the satisfaction of the City, the City reserves the right to procure those items or services from other vendors, or to cancel the contract upon giving the Contractor thirty (30) days written notice.

DELETION OR MODIFICATION OF SERVICES: The City reserves the right to delete any portion of the Contract at any time without cause, and if such right is exercised by the City, the total fee shall be reduced in the same ratio as the estimated cost of the work deleted bears to the estimated cost of the work originally planned. If work has already been accomplished on the portion of the Contract to be deleted, the Contractor shall be paid for the deleted portion on the basis of the estimated percentage of completion of such portion.

If the Contractor and the City agree on modifications or revisions to the task elements, after the City has approved work to begin on a particular task or project, and a budget has been established for that task or project, the Contractor will submit a revised budget to the City for approval prior to proceeding with the work.

CAUSES FOR REJECTION - No proposal will be canvassed, considered or accepted which, in the opinion of the City Commission, is informal or unbalanced, or contains inadequate or unreasonable prices for any items; each item must carry its own proportion of the cost as nearly as is practicable. Any alteration, erasure, interlineation, or failure to specify bids for all items called for in the schedule shall render the proposal informal.

REJECTION OF BIDS - The City reserves the right to reject any bid if the evidence submitted by the bidder, or if the investigation of such bidder, fails to satisfy the City that such bidder is properly qualified to carry out the obligations and to complete the work contemplated. Any or all proposals will be rejected, if there is reason to believe that collusion exists among bidders. A proposal will be considered irregular and may be rejected, if it shows serious omissions, alterations in form, additions not called for, conditions or unauthorized alternates, or irregularities of any kind. The City reserves the right to reject any or all proposals and to waive such technical errors as may be deemed best for the interests of the City.

BID PROTEST PROCEDURE: Any proposer or bidder who is not recommended for award of a contract and who alleges a failure by the City to follow the City's procurement ordinance or any applicable law may protest to the Procurement Division – Deputy Director of Finance, by delivering a letter of protest within five (5) days after a Notice of Intent to award is posted on the City's website at the following link: [http://www.fortlauderdale.gov/purchasing/notices\\_of\\_intent.htm](http://www.fortlauderdale.gov/purchasing/notices_of_intent.htm). The complete protest ordinance may be found on the City's website at the following link: <http://www.fortlauderdale.gov/purchasing/protestordinance.pdf>

WITHDRAWALS - Any bidder may, without prejudice to himself, withdraw his proposal at any time prior to the expiration of the time during which proposals may be submitted. Such request for withdrawal must be in writing and signed in the same manner and by the same person who signed the proposal. After expiration of the period for receiving proposals, no proposal can be withdrawn, modified, or explained.

CONTRACT - The bidder to whom award is made shall execute a written contract to do the work and maintain the same in good repair until final acceptance by the proper authorities, and shall furnish good and sufficient bonds as specified within ten (10) days after receiving such contract for execution. If the bidder to whom the first award is made fails to enter into a contract as provided, the award may

be annulled and the contract let to the next lowest bidder who is reliable, responsible, and responsive in the opinion of the City Commission, and that bidder shall fulfill every stipulation and obligation as if such bidder were the original party to whom award was made.

The contract shall provide that the Contractor agrees to correct any defective or faulty work or material, which may appear within one (1) year after completion of the work and receipt of final payment.

ENFORCEMENT OF SPECIFICATIONS - Copies of the specifications will be placed in the hands of all the assistants to the Engineer and Inspectors employed on the work, who shall enforce each and every requirement of the contract. Such assistants shall have no authority to vary from such requirements.

COPIES OF DRAWING PLANS - Copies of the drawing plans are on file in the Public Works Department, City Hall, 4<sup>th</sup> Floor, 100 N. Andrews Avenue, Fort Lauderdale, Florida 33301.

SURETY BOND - The successful bidder shall furnish a performance and payment bond in compliance with Section 255.05, Florida Statutes, written by a Corporate Surety company, holding a Certificate of Authority from the Secretary of the Treasury of the United States as acceptable sureties on federal bonds, in an amount equal to the total amount payable by the terms of the contract, executed and issued by a Resident Agent licensed by and having an office in the State of Florida, representing such Corporate Surety, conditioned for the due and faithful performance of the work, and providing in addition to all other conditions, that if the Contractor, or his or its subcontractors, fail to duly pay for any labor, materials, or other supplies used or consumed by such Contractor, or his or its subcontractor or subcontractors, in performance of the work contracted to be done, the Surety will pay the same in the amount not exceeding the sum provided in such bonds, together with interest at the rate of 15% per annum, and that they shall indemnify and save harmless the City of Fort Lauderdale to the extent of any and all payments in connection with carrying out of the contract, which the City may be required to make under the law.

The Contractor is required at all times to have a valid surety bond in force covering the work being performed. A failure to have such bond in force at any time shall constitute a default on the part of the Contractor. A bond written by a surety, which becomes disqualified to do business in the State of Florida, shall automatically constitute a failure on the part of the Contractor to meet the above requirements.

Such bond shall continue in effect for one (1) year after completion and acceptance of the work with liability equal to at least 25% of contract price, or an additional bond shall be conditioned that the Contractor will correct any defective or faulty work or material which appear within one (1) year after completion of the contract, upon notification by the City, except in contracts which are concerned solely with demolition work, in which cases 25% liability will not be applicable.

AUDIT OF CONTRACTOR'S RECORDS - Upon execution of the Contract, the City reserves the right to conduct any necessary audit of the Contractor's records. Such an audit, or audits, may be conducted by the City or its representatives at any time prior to final payment, or thereafter, for a period up to three (3) years. The City may also require submittal of the records from either the Contractor, the Subcontractor, or both. For the purpose of this Section, records shall include all books of account, supporting documents and papers deemed necessary by the City to assure compliance with the contract provisions.

Failure of the Contractor or Subcontractor to comply with these requirements may result in disqualification or suspension from bidding for future contracts or disapproval as a Subcontractor at the option of the City.

The Contractor shall assure that each of its Subcontractors will provide access to its records pertaining to the project upon request by the City.

PERIODIC ESTIMATE FOR PARTIAL PAYMENT - After the Contractor has submitted a periodic estimate for partial payment, approved and certified by the Public Works Department, the City shall make payment in the manner provided in the Contract Documents and in accordance with Florida's Prompt Payment Act, Section 218, Florida Statutes.

RESERVATION FOR AWARD AND REJECTION OF BIDS - The City reserves the right to accept or reject any or all bids, part of bids, and to waive minor irregularities or variations to specifications contained in bids, and minor irregularities in the bidding process. The City also reserves the right to award the contract on a split order basis, lump sum basis, individual item basis, or such combination as shall best serve the interest of the City. The City reserves the right to make an award to the responsive and responsible bidder whose product or service meets the terms, conditions, and specifications of the ITB and whose bid is considered to best serve the City's interest. In determining the responsiveness of the offer and the responsibility of the Bidder, the following shall be considered when applicable: the ability, capacity and skill of the Bidder to perform as required; whether the Bidder can perform promptly, or within the time specified, without delay or interference; the character, integrity, reputation, judgment, experience and efficiency of the Bidder; the quality of past performance by the Bidder; the previous and existing compliance by the Bidder with related laws and ordinances; the sufficiency of the Bidder's financial resources; the availability, quality and adaptability of the Bidder's supplies or services to the required use; the ability of the Bidder to provide future maintenance, service or parts; the number and scope of conditions attached to the bid.

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION AND BUSINESS - It is the desire of the City of Fort Lauderdale to increase the participation of minority (MBE) and women-owned (WBE) businesses in its contracting and procurement programs. While the City does not have any preference or set aside programs in place, it is committed **to a policy of equitable participation for these firms**. The City of Fort Lauderdale wants to increase the participation of Minority Business Enterprises (MBE), Women Business Enterprises (WBE), and Small Business Enterprises (SBE) in its procurement activities. If your firm qualifies in accordance with the below definitions please indicate in the space provided in this ITB.

Minority Business Enterprise (MBE) "A Minority Business" is a business enterprise that is owned or controlled by one or more socially or economically disadvantaged persons. Such disadvantage may arise from cultural, racial, chronic economic circumstances or background or other similar cause. Such persons include, but are not limited to: Blacks, Hispanics, Asian Americans, and Native Americans.

The term "Minority Business Enterprise" means a business at least 51 percent of which is owned by minority group members or, in the case of a publicly owned business, at least 51 percent of the stock of which is owned by minority group members. For the purpose of the preceding sentence, minority group members are citizens of the United States who include, but are not limited to: Blacks, Hispanics, Asian Americans, and Native Americans.

Women Business Enterprise (WBE) a "Women Owned or Controlled Business" is a business enterprise at least 51 percent of which is owned by females or, in the case of a publicly owned business, at least 51 percent of the stock of which is owned by females.

Small Business Enterprise (SBE) "Small Business" means a corporation, partnership, sole proprietorship, or other legal entity formed for the purpose of making a profit, which is independently

owned and operated, has either fewer than 100 employees or less than \$1,000,000 in annual gross receipts.

BLACK includes persons having origins in any of the Black racial groups of Africa.

WHITE includes persons whose origins are Anglo-Saxon and Europeans and persons of Indo-European decent including Pakistani and East Indian.

HISPANIC includes persons of Mexican, Puerto Rican, Cuban, Central and South American, or other Spanish culture or origin, regardless of race.

NATIVE AMERICAN includes persons whose origins are American Indians, Eskimos, Aleuts, or Native Hawaiians.

ASIAN AMERICAN includes persons having origin in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.

## SPECIAL CONDITIONS

### 01. PURPOSE

The City of Fort Lauderdale, Florida (City) is seeking bids from qualified bidders, hereinafter referred to as the Contractor, to provide improvement services at Gore Betz Park for the City's Public Works Department, in accordance with the terms, conditions, and specifications contained in this Invitation To Bid (ITB).

### 02. TRANSACTION FEES

The City of Fort Lauderdale uses BidSync ([www.bidsync.com](http://www.bidsync.com)) to distribute and receive bids and proposals. There is no charge to vendors/contractors to register and participate in the solicitation process, nor will any fees be charged to the awarded contractor.

### 03. SUBMISSION OF BIDS

It is the sole responsibility of the Contractor to ensure that their bid is submitted electronically through BidSync at [www.bidsync.com](http://www.bidsync.com) and that any bid security not submitted via BidSync reaches the City of Fort Lauderdale City Hall, Procurement Services Division, 6<sup>th</sup> floor, Room 619, 100 N. Andrews Avenue, Fort Lauderdale, FL 33301 in a sealed envelope marked on the outside with the ITB solicitation number and Contractor's name, no later than the time and date specified in this solicitation. **PAPER BID SUBMITALS WILL NOT BE ACCEPTED. PLEASE SUBMIT YOUR BID RESPONSE ELECTRONICALLY.**

### 04. INFORMATION OR CLARIFICATION

For information concerning procedures for responding to this solicitation, contact **John Curran**, Procurement Specialist II, at (954) 828-4357 or email at [jcurran@fortlauderdale.gov](mailto:jcurran@fortlauderdale.gov). Such contact shall be for clarification purposes only.

For information concerning technical specifications please utilize the question/answer feature provided by BidSync at [www.bidsync.com](http://www.bidsync.com). Questions of a material nature must be received prior to the cut-off date specified in the solicitation. Material changes, if any, to the scope of services or bidding procedures will only be transmitted by written addendum. (See addendum section of BidSync Site). **Contractors please note:** No part of your bid can be submitted via FAX. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Contractor has familiarized himself with the nature and extent of the work, and the equipment, materials, and labor required. The entire bid response must be submitted in accordance with all specifications contained in this solicitation. The questions and answers submitted in BidSync shall become part of any contract that is created from this ITB.

**05. PRE-BID MEETING AND/OR SITE VISIT**

There will not be a pre-bid meeting or site visit for this Invitation to Bid.

**06. CONTRACT PERIOD**

- 6.1 The Contractor recognizes that TIME IS OF THE ESSENCE. The Work shall commence within 5 calendar days of the date of the Notice to Proceed.
- 6.2 The Work shall be Substantially Completed within 90 calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.
- 6.3 The Work shall be finally completed on the Final Completion Date and ready for final payment in accordance with this Agreement within 95 calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.

The City of Fort Lauderdale reserves the right to waive any informality in any bid and to reject any or all bids. The City of Fort Lauderdale reserves the right to reduce or delete any of the above items.

**At time of award of contract, the City reserves the right to set a maximum dollar limit that may be expended on this project. Contract quantities of any or all items may be increased, reduced, or eliminated to adjust the contract amount to coincide with the amount of work necessary or to bring the contract value to within the established limit. All quantities are estimated and the City reserves the right to increase, reduce, or eliminate the contract quantities in any amount.**

**The undersigned bidder affirms that he has or will obtain all equipment necessary to complete the work described, that he has or will obtain all required permits and licenses from the appropriate agencies, and that his firm is authorized to do business in the State of Florida.**

**07. BID SECURITY**

A certified check, cashier's check, bank officer's check or bid bond for TEN percent (**10%**) of the bid amount, made payable to the City of Fort Lauderdale, Florida, shall accompany each proposal.

**08. REQUIRED LICENSES/CERTIFICATIONS**

Contractor must possess the following licenses/certifications to be considered for award.

State of Florida General Contractor License

**Note: Contractor must have proper licensing prior to submitting bid and must submit evidence of same with bid.**

**09. BID ALLOWANCE: N/A**

**Allowance for permits:** Payments will be made to the contractor based on the actual cost of permits upon submission of paid permit receipts. The City shall not pay for other costs related to obtaining or securing permits.

The amount indicated is intended to be sufficient to cover the entire project. If the City Permit fees exceed the allowance indicated, the City will reimburse the contractor the actual amount of City Permit Fees required for project completion.

**10. SPECIFIC EXPERIENCE REQUIRED: N/A**

**11. INSURANCE REQUIRMENTS** *(See Article 10, Bonds and Insurance, of the Contract for details)*

Insurance

11.1 Contractor shall provide and shall require all of its sub-contractors to provide, pay for, and maintain in force at all times during the term of the Agreement, such insurance, including Property Insurance (Builder's Risk), Commercial General Liability Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Employer's Liability Insurance, and Umbrella/Excess Liability, as stated below. Such policy or policies shall be issued by companies authorized to do business in the State of Florida and having agents upon whom service of process may be made in the State of Florida.

- A. The City is required to be named as additional insured on the Commercial General Liability insurance policy. BINDERS ARE UNACCEPTABLE. The insurance coverage required shall include those classifications, as listed in standard liability insurance manuals, which most nearly reflect the operations of the Contractor. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for the work contemplated in this Agreement shall be deemed unacceptable, and shall be considered a breach of contract.
- B. The Contractor shall provide the City an original Certificate of Insurance for policies required by Article 10. All certificates shall state that the City shall be given ten (10) days' notice prior to expiration or cancellation of

the policy. The insurance provided shall be endorsed or amended to comply with this notice requirement. In the event that the insurer is unable to accommodate, it shall be the responsibility of the Contractor to provide the proper notice. Such notification will be in writing by registered mail, return receipt requested and addressed to the Finance Department. Such policies shall: (1) name the insurance company or companies affording coverage acceptable to the City, (2) state the effective and expiration dates of the policies, (3) include special endorsements where necessary. Such policies provided under Article 10 shall not be affected by any other policy of insurance, which the City may carry in its own name.

- C. Contractor shall as a condition precedent of this Agreement, furnish to the City of Fort Lauderdale, c/o Project Manager, 100 N. Andrews Avenue, Fort Lauderdale, FL 33301, Certificate(s) of Insurance upon execution of this Agreement, which indicate that insurance coverage has been obtained which meets the requirements as outlined below:

11.2 Property Insurance (Builder's Risk): The Contractor shall purchase and maintain property insurance upon the Work at or off the site of 100% of the contract completed value. These policies shall insure the interest of the owner, contractor and subcontractors in the Work, and shall insure against "all risks" of physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage. All such insurance required by this paragraph shall remain in effect until the Work is completed and accepted by the City.

11.3 Commercial General Liability

- A. Limits of Liability:

Bodily Injury and Property Damage - Combined Single Limit	
Each Occurrence	\$1,000,000
Project Aggregate	\$1,000,000
General Aggregate	\$2,000,000
Personal Injury	\$1,000,000
Products/Completed Operations	\$1,000,000
  
- B. Endorsements Required:
  - City of Fort Lauderdale included as an Additional Insured
  - Broad Form Contractual Liability
  - Waiver of Subrogation
  - Premises/Operations
  - Products/Completed Operations
  - Independent Contractors
  - Owners and Contractors Protective Liability
  - Contractors Pollution Liability

11.4 Business Automobile Liability

- A. Limits of Liability:

Bodily Injury and Property Damage - Combined Single Limit  
All Autos used in completing the contract  
Including Hired, Borrowed or Non-Owned Autos  
Any One Accident \$1,000,000

- B. Endorsements Required:  
Waiver of Subrogation

11.5 Workers' Compensation and Employer's Liability Insurance

Limits: Workers' Compensation – Per Florida Statute 440  
Employers' Liability - \$500,000

Any firm performing work on behalf of the City of Fort Lauderdale must provide Workers' Compensation insurance. Exceptions and exemptions can only be made if they are in accordance with Florida Law. Contractor must be in compliance with all applicable State and Federal workers' compensation laws, including the U.S. Longshore Harbor Workers' Act or Jones Act.

- 11.6 Umbrella/Excess Liability: The Contractor shall provide umbrella/excess coverage with limits of no less than \$2,000,000 excess of Commercial General Liability, Automobile Liability and Employer's Liability.

- 11.7 All insurance policies required above shall be issued by companies authorized to do business under the laws of the State of Florida, with the following qualifications:

The Contractor's insurance must be provided by an A.M. Best's "A-" rated or better insurance company authorized to issue insurance policies in the State of Florida, subject to approval by the City's Risk Manager. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for work contemplated in this project shall be deemed unacceptable, and shall be considered breach of contract.

NOTE: CITY PROJECT NUMBER MUST APPEAR ON EACH CERTIFICATE.

Compliance with the foregoing requirements shall not relieve the Contractor of their liability and obligation under this section or under any other section of this Agreement.

The Contractor shall be responsible for assuring that the insurance certificates required in conjunction with this Section remain in force for the duration of the Project. If insurance certificates are scheduled to expire during the contractual period, the Contractor shall be responsible for submitting new or renewed insurance certificates to the City at a minimum of thirty (30) calendar days in advance of such expiration. In the event that expired certificates are not replaced with new or renewed certificates that cover the contractual period, the City shall:

- A. Suspend the Agreement until such time as the new or renewed certificates are received by the City.

- B. The City may, at its sole discretion, terminate the Agreement for cause and seek damages from the Contractor in conjunction with the violation of the terms and conditions of the Agreement.

11. **PERFORMANCE AND PAYMENT BOND:**           **N/A**          

**Number of awards anticipated:**           **1**          

**12. CITY PROJECT MANAGER**

The Project Manager is hereby designated by the City as Angelina Rosenberg whose address is 100 North Andrews, 4<sup>th</sup> Floor, Fort Lauderdale, FL 33301. The Project Manager will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the Contract Documents in connection with completion of the Work in accordance with this Agreement.

**13. LIQUIDATED DAMAGES** *(See Article 16, Liquidated Damages, of the Contract for details)*

Upon failure of the Contractor to complete the Work within the time specified for completion, the Contractor shall pay to the City the sum of **One Thousand Dollars (\$1,000.00)** for each and every calendar day that the completion of the Work is delayed beyond the time specified in this Agreement for completion, as fixed and agreed liquidated damages and not as a penalty, so long as the delay is caused by the Contractor. (See Article 16, Liquidated Damages Clause, of the Contract)

**14. PAYMENT PROCEDURES** *(See Article 7, Payment Procedures, of the Contract for other details)*

The City has implemented a Purchasing Card Program using the VISA network. If the City chooses, purchases made from this contract may be made using the City's Purchasing Card. Contractor will receive payment from the purchasing card in the same manner as other VISA purchases. Accordingly, bidders must presently have the ability to accept VISA or take whatever steps necessary to implement the ability before the start of the contract term, or contract award by the City. The City reserves the right to revise this program in conjunction with implementation of an on-line procurement system.

**15. WORK SCHEDULE (including overtime hours):**

Regular working hours between 7 a.m. and 6:00 p.m., Monday through Friday. The Contractor will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday (designated by the City of Fort Lauderdale) without the Project Manager's written consent at least seventy two (72) hours in advance of starting such work.

**16. INSPECTION OVERTIME COST: \$**           N/A

Lot Name Title  
BASE BID T 1 MOBILIZATION  
BASE BID T 2 Maintenance of Traffic  
BASE BID T 3 - Project signage  
BASE BID T 4 Demolition  
BASE BID T 5 Demolition  
BASE BID T 6 Demolition  
BASE BID T 7 Demolition  
BASE BID T 8 Erosion Control and Catch Basin Protection  
BASE BID T 9 Concrete  
BASE BID T 10 Concrete  
BASE BID T 11 Concrete  
BASE BID T 12 Concrete  
BASE BID T 13 Concrete  
BASE BID T 14 Concrete  
BASE BID T 15 Concrete  
BASE BID T 16 Concrete  
BASE BID T 17 Paving  
BASE BID T 18 Pavedrain Paver  
BASE BID T 19 Mulch Path  
BASE BID T 20 Earth Berm and Rain Garden  
BASE BID T 21 Earth Berm and Rain Garden  
BASE BID T 22 Earth Berm and Rain Garden  
BASE BID T 23 Earth Berm and Rain Garden  
BASE BID T 24 Landscaping  
BASE BID T 25 Landscaping  
BASE BID T 26 Landscaping  
BASE BID T 27 Landscaping  
BASE BID T 28 Landscaping  
BASE BID T 29 Landscaping  
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BASE BID T 41 Landscaping  
BASE BID T 42 Landscaping  
BASE BID T 43 Landscaping  
BASE BID T 44 Landscaping  
BASE BID T 45 Bench  
BASE BID T 46 Picnic Table

BASE BID T 47 Bike Rack  
BASE BID T 48 Pavilion  
BASE BID T 49 Shade Structure Tent  
BASE BID T 50 Exercise Equipment  
BASE BID T 51 Artificial Turf and Edging  
BASE BID T 52 Drinking Fountain and Water Distribution System.  
BASE BID T 53 Drinking Fountain and Water Distribution System.  
BASE BID T 54 Pavement Marking and Signing  
BASE BID T 55 Pavement Marking and Signing  
BASE BID T 56 Pavement Marking and Signing  
BASE BID T 57 Pavement Marking and Signing  
BASE BID T 58 Electrical  
BASE BID T 59 Electrical  
BASE BID T 60 Electrical  
BASE BID T 61 Electrical  
BASE BID T 62 Electrical  
BASE BID T 63 Electrical  
BASE BID T 64 Electrical  
BASE BID T 65 Electrical  
BASE BID T 66 Monument Sign  
Alternate 11A 1 Rubber Mulch Path

## Description

Mobilization - Mobilization,Transportation,Demobilization,Insurance,Bond cost & other fixed costs

Furnish all labor,material and equipment to provide all vehicular and pedestrian maintenance of traffic for entire l

Project Signage-Furnish all labor,material & equipment to install new 4' x 8' project wooden information sign duri

Furnish all materials, labor and equipment to sawcut, remove and properly dispose existing asphalt to various dep

Furnish all materials, labor and equipment to remove and properly dispose existing bushes, stumps, and clear anc

Furnish all materials, labor and equipment to remove and properly dispose existing electical pole, pump, 6' chain l

Furnish all materials, labor and equipment to sawcut, remove and properly dispose artificial turf as shown on the

Furnish all materials, labor and equipment to install Synthetic erosion control, silt fence, polypropylene, ideal con

Furnish all materials, labor and equipment to install 6" Concrete sidewalk with stabilized base per detail.

Furnish all materials, labor and equipment to install Header Curb per detail. This item includes excavation.

Furnish all materials, labor and equipment to install Type "F" Curb and Gutter with 8" limerock base per detail. Th

Furnish all materials, labor and equipment to install Drop Curb with 8" limerock base per detail. This item includes

Furnish all materials, labor and equipment to install Type "D" Curb with 8" limerock base per detail. This item incl

Furnish all materials, labor and equipment to install concrete flume and stabilized base per detail. This item includ

Furnish all materials, labor and equipment to install FDOT CR-E accessible ramp with 2' x 5' detectable warning as

Furnish all materials, labor and equipment to install 2' x 5' detectable warning on existing ramps as shown on the

Furnish all materials, labor and equipment to install at least 1-1/2" of Type S-3 Aphaltic concrete and compact exi

Furnish all materials, labor and equipment to install 5 13/20"Pavedrain Pavers, 5 - 13/20 " (Sunset Burst Blend), li

Furnish all materials, labor and equipment to install 4" thick ADA Fiber Engineering Wood mulch path with 4" com

Furnish all materials, labor and equipment to excavate for proposed swale area and rain garden area as shown on

Furnish all materials, labor and equipment to Install Rain Garden (12" Engineering soil, 50-60% sand, 20-30% tops

Furnish all materials, labor and equipment to install sod swale as shown on the plans

Furnish all materials, labor and equipment to construct Earth Berm as shown on the plans exculde sod and plantir

Furnish all materials, labor and equipment to install Coccoloba diversifolia / Pigeon Plum - B&B Field Grown; 10'x5

Furnish all materials, labor and equipment to install Cordia sebestena / Orange Geiger - B&B Field Grown; 10'x5-6

Furnish all materials, labor and equipment to install Cococarpus erectus ser. / Silver Buttonwood - B&B Field Grown

Furnish all materials, labor and equipment to install Cupressus sempervirens / Italian Cypress - 45 Gal., 11-12' OA

Furnish all materials, labor and equipment to install Lysiloma latisiliquum / Wild Tamarind - B&B Field Grown; 10'

Furnish all materials, labor and equipment to install Lagerstroemia speciosa / Queens Crape Myrtle - B&B Field G

Furnish all materials, labor and equipment to install Ligustrum lucidum / Tree Ligustrum - B&B Field Grown; 10'x5-

Furnish all materials, labor and equipment to install Myrcianthes fragrans / Simpson Stopper - B&B Field Grown; 1

Furnish all materials, labor and equipment to install Magnolia grandiflora "LG" / Little Gem Magnolia - B&B Field G

Furnish all materials, labor and equipment to install Pinus elliottii / Slash Pine - B&B Field Grown; 10'x5-6', 2" Cal.,

Furnish all materials, labor and equipment to install Quercus virginiana SDLNpp12015 / Cathedral Live Oak - B&B f

Furnish all materials, labor and equipment to install Sabal palmetto / Cabbage Palm - B&B Field Collected; 16-28' (

Furnish all materials, labor and equipment to install Senna surattensis / Glaucous Cassia - B&B Field Grown; 10'x5-

Furnish all materials, labor and equipment to install Veitchia montgomeryana / Montgomery Palm - B&B, 16'x8, 3

Furnish all materials, labor and equipment to install Chrysobalanus icaco / Horizontal Cocoplum - 3 Gal., 18"x18",

Furnish all materials, labor and equipment to install Ficus microcarpa / Green Island Ficus - 3 Gal., 12" OA, 30" OC,

Furnish all materials, labor and equipment to install Rapanea punctata / Myrsine - 3 Gal., 24"18-204", 24" OC., inc

Furnish all materials, labor and equipment to install Tripsacum dactyloides / Fakahatchee Grass - 3 Gal., 24"x24", ,

Furnish all materials, labor and equipment to install Stenotaphrum secundatum / St. Augustine 'Palmetto' - 60% S

Furnish all materials, labor and equipment to spray two application of weed killer (Roundup or equal) per sheet C

Furnish all materials, labor and equipment to install irrigation system per drawing sheet L03 and details.

Furnish all materials, labor and equipment to install bench per drawing sheet SP1.

Furnish all materials, labor and equipment to install picnic table per drawing sheet SP1.

Furnish all materials, labor and equipment to install bike rack per drawing sheet SP1.  
Furnish all materials, labor and equipment to install pavilion per drawing sheet SP1.  
Furnish all materials, labor and equipment to install shade structure tent per drawing sheet SP1.  
Furnish all materials, labor and equipment to install exercise equipment per drawing sheet SP1.  
Furnish all materials, labor and equipment to install artificial turf per drawing sheet SP1, including recycled wood  
Furnish all materials, labor and equipment to install drinking fountain per drawing sheet SP1  
Furnish all materials, labor and equipment to install water distribution system per drawing sheet C03, including Pa  
Furnish all materials, labor and equipment to install new 4" Solid White Thermoplastic  
Furnish all materials, labor and equipment to install new 4" Solid Blue Thermoplastic  
Furnish all materials, labor and equipment to install Pavement markings, handicap symbol, painted  
Furnish all materials, labor and equipment to install new Pavement markings, handicap sign and post, 12" x 18", ir  
Furnish all materials, labor and equipment to install Distribution Panel - 200A/ 120/240V, 12 Kaic, NEMA 3R Stainl  
Furnish all materials, labor and equipment to install 6' (H) X 6' (D) X 7'(W) - Security Fence With Gate, H.D. Galvan  
Furnish all materials, labor and equipment to install Circuit - 4 X #8 + 4X #10 THHN-Copper in 2" PVC Conduit  
Furnish all materials, labor and equipment to install Circuit - 4 X #8 THHN - Copper in 1-1/4" PVC Conduit  
Furnish all materials, labor and equipment to install Circuit - 4 X #10 THHN - Copper in 1-1/4" PVC Conduit  
Furnish all materials, labor and equipment to install Circuit - 4 X #12 THHN - Copper in 1-1/4" PVC Conduit  
Furnish all materials, labor and equipment to install Pavilion And Sign Light - 30 Watts LED Bulb  
Furnish all materials, labor and equipment to install 18" X 12" Concrete Pull Box, Traffic Rated  
Furnish all materials, labor and equipment to install monument sign including foundation letter, logo, and paint pe  
Furnish all materials, labor, and equipment to install 1.5' Rainbow Turf poured in place rubber mulch or approved

Quantity	Unit	Shipping Location
1	lump sum	See ITB Specifications
1	lump sum	See ITB Specifications
1	lump sum	See ITB Specifications
200	square yard	See ITB Specifications
0.95	acre	See ITB Specifications
1	each	See ITB Specifications
50	square foot	See ITB Specifications
900	linear foot	See ITB Specifications
1500	square foot	See ITB Specifications
110	linear foot	See ITB Specifications
350	linear foot	See ITB Specifications
450	linear foot	See ITB Specifications
700	linear foot	See ITB Specifications
3	each	See ITB Specifications
3	each	See ITB Specifications
2	each	See ITB Specifications
150	square yard	See ITB Specifications
3200	square foot	See ITB Specifications
7000	square foot	See ITB Specifications
400	bank cubic yard	See ITB Specifications
2200	square foot	See ITB Specifications
1700	square foot	See ITB Specifications
4600	square foot	See ITB Specifications
10	each	See ITB Specifications
22	each	See ITB Specifications
4	each	See ITB Specifications
17	each	See ITB Specifications
4	each	See ITB Specifications
1	each	See ITB Specifications
2	each	See ITB Specifications
3	each	See ITB Specifications
2	each	See ITB Specifications
1	each	See ITB Specifications
1	each	See ITB Specifications
3	each	See ITB Specifications
6	each	See ITB Specifications
22	each	See ITB Specifications
109	each	See ITB Specifications
300	each	See ITB Specifications
15	each	See ITB Specifications
85	each	See ITB Specifications
67000	square foot	See ITB Specifications
1	lump sum	See ITB Specifications
1	lump sum	See ITB Specifications
4	each	See ITB Specifications
8	each	See ITB Specifications

1 each	See ITB Specifications
1 each	See ITB Specifications
1 each	See ITB Specifications
1 lump sum	See ITB Specifications
1 lump sum	See ITB Specifications
1 each	See ITB Specifications
1 lump sum	See ITB Specifications
150 linear foot	See ITB Specifications
120 linear foot	See ITB Specifications
1 each	See ITB Specifications
320 linear foot	See ITB Specifications
250 linear foot	See ITB Specifications
200 linear foot	See ITB Specifications
200 linear foot	See ITB Specifications
2 each	See ITB Specifications
2 each	See ITB Specifications
1 each	See ITB Specifications
7000 square foot	See ITB Specifications

**CITB SIGNATURE PAGE**

The work described in this solicitation includes all the necessary excavations, fill and removal of materials attendant upon the construction of the work complete in place, and the disposal of all excess material and the final cleaning up of the work.

State the true, exact, correct and complete name of the partnership, corporation, or trade name under which you do business, and the address of the place of business (Post Office Box is inappropriate). IF A CORPORATION, state the name of the President, Secretary and Resident Agent. IF A PARTNERSHIP, state the names of all partners. IF A TRADE NAME, state the names of the individuals who do business under the trade name. If the firm is a foreign corporation (i.e., non-Florida), it must be authorized to do business in the State of Florida by the Florida Secretary of State.

PLEASE PRINT OR TYPE.

Firm Name: **MBR Construction, Inc.**  
Address: **1020 NW 51st Street**  
**Fort Lauderdale FL 33309**  
Telephone: **954-486-8404** Fax: **954-486-9579**  
E-Mail Address: **mboss@mbrconstruction.com**

<b>Michael R. Boss</b> (Name)	<b>President</b> (Title)
<b>Ronald R. Boss</b> (Name)	<b>Secretary</b> (Title)
<b>Stephen Squire</b> (Name)	<b>Agent</b> (Title)

(Attach additional sheets, if necessary).

The undersigned bidder acknowledges that he may be required to furnish additional information as deemed necessary by the Public Works Department, to update their records should he be awarded the work described below.

The undersigned bidder affirms that he has or will obtain all equipment necessary to complete the work described, that he has or will obtain all required permits and licenses from the appropriate agencies, and that his firm is authorized to do business in the State of Florida.

The undersigned bidder has not divulged to, discussed, or compared this bid with other bidders, and has not colluded with any other bidder or parties to a bid whatsoever. Further, the undersigned guarantees the truth and accuracy of all statements and answers contained in this proposal.

## QUESTIONNAIRE SHEET

PLEASE PRINT OR TYPE:

Firm Name: **MBR Construction, Inc.**  
 President **Michael R. Boss**  
 Business Address: **1020 NW 51st Street, Fort Lauderdale FL 33309**  
 Telephone: **954-486-8404** Fax: **954-486-9579**  
 E-Mail Address: **mboss@mbrconstruction.com**

What was the last project of this nature which you completed?

**South Side School, City of Fort Lauderdale.**  
**West Side Park, City of Deerfield Beach.**  
**Quiet Waters Park, City of Deerfield Beach.**  
**Peace Mound Park, City of Weston.**  
**Helwig Park, Broward County.**

The following are named as three corporations and representatives of those corporations for which you have performed work similar to that required by this contract, and which the City may contact as your references (include addresses and telephone numbers):

<b>Broward County</b>	<b>1 University Drive,</b>	<b>Shoban Smart 954-577-</b>
	<b>Plantation FL</b>	<b>4624</b>
<b>Deerfield Beach</b>	<b>150 NE 2nd Avenue,</b>	<b>Bob Harbin 954-480-7428</b>
	<b>Deerfield Beach FL</b>	
<b>Weston</b>	<b>17200 Royal Palm Blvd,</b>	<b>Karl Tompson 954-385-</b>
	<b>Weston FL</b>	<b>2600</b>

How many years has your organization been in business? **21**

Have you ever failed to complete work awarded to you; if so, where and why?

**No.**

The name of the qualifying agent for the firm and his position is: **Michael R. Boss - President**

Certificate of Competency Number of Qualifying Agent: **CGC1512261**

Effective Date: **10/31/2013** Expiration Date: **9/30/2014**

Licensed in: **Broward/Florida** Engineering Contractor's License #  
 (County/State)

Expiration Date:

**NOTE: To be considered for award of this contract, the bidder must submit a financial statement upon request.**

**Contractor must have proper licensing prior to submitting bid and must submit evidence of**

same with bid.

## QUESTIONNAIRE SHEET

1. Have you personally inspected the proposed work and have you a complete plan for its performance?

**Yes**

2. Will you sublet any part of this work? If so, list the portions or specialties of the work that you will.

a) **Landscape**

b) **Irrigation**

c) **Electrical**

d) **Striping**

e)

f)

g)

3. What equipment do you own that is available for the work?

**Loader, Skid Steer, Flat Bed Truck, Dump Truck, Concrete forming tools, Concrete Finishing Tools.**

4. What equipment will you purchase for the proposed work?

**Any required per plans and specifications.**

5. What equipment will you rent for the proposed work?

**Any required per plans and specifications.**

LOCAL BUSINESS PREFERENCE

Section 2-199.2, Code of Ordinances of the City of Fort Lauderdale, (Ordinance No. C-12-04), provides for a local business preference.

In order to be considered for a local business preference, a bidder must include the Local Business Preference Certification Statement of this ITB, as applicable to the local business preference class claimed at the time of bid submittal:

Upon formal request of the City, based on the application of a Local Business Preference the Bidder shall within ten (10) calendar days submit the following documentation to the Local Business Preference Class claimed:

A) Copy of City of Fort Lauderdale current year business tax receipt, or Broward County current year business tax receipt, and

B) List of the names of all employees of the bidder and evidence of employees residence within the geographic bounds of the City of Fort Lauderdale or Broward County, as the case may be, such as current Florida driver license, residential utility bill (water, electric, telephone, cable television), or other type of similar documentation acceptable to the City.

Failure to comply at time of bid submittal shall result in the bidder being found ineligible for the local business preference.

THE COMPLETE LOCAL BUSINESS PREFERENCE ORDINANCE MAY BE FOUND ON THE CITY'S WEB SITE AT THE FOLLOWING LINK: <http://www.fortlauderdale.gov/purchasing/index.htm>

Definitions: The term Business shall mean a person, firm, corporation or other business entity which is duly licensed and authorized to engage in a particular work in the State of Florida. Business shall be broken down into four (4) types of classes:

1. Class A Business shall mean any Business that has established and agrees to maintain a permanent place of business located in a non-residential zone and staffed with full-time employees within the limits of the City and shall maintain a staffing level of the prime contractor for the proposed work of at least fifty percent (50%) who are residents of the City.
2. Class B Business - shall mean any Business that has established and agrees to maintain a permanent place of business located in a non-residential zone and staffed with full-time employees within the limits of the City or shall maintain a staffing level of the prime contractor for the proposed work of at least fifty percent (50%) who are residents of the City.
3. Class C Business - shall mean any Business that has established and agrees to maintain a permanent place of business located in a non-residential zone and staffed with full-time employees within the limits of Broward County.
4. Class D Business shall mean any Business that does not qualify as either a Class A, Class B, or Class C business.

LOCAL BUSINESS PREFERENCE CERTIFICATION STATEMENT

The Business identified below certifies that it qualifies for the local BUSINESS preference classification as indicated herein, and further certifies and agrees that it will re-affirm its local preference classification annually no later than 1/2 thirty (30) calendar days prior to the anniversary of the date of a contract awarded pursuant to this ITB. Violation of the foregoing provision may result in contract termination.

- (1) Business Name is a Class A Business as defined in City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. A copy of the City of Fort Lauderdale current year Business Tax Receipt and a complete list of full-time employees and their addresses shall be provided within 10 calendar days of a formal request by the City.
(2) Business Name is a Class B Business as defined in the City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. A copy of the Business Tax Receipt or a complete list of full-time employees and their addresses shall be provided within 10 calendar days of a formal request by the City.
(3) MBR Construction, Inc. Business Name is a Class C Business as defined in the City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. A copy of the Broward County Business Tax Receipt shall be provided within 10 calendar days of a formal request by the City.
(4) Business Name requests a Conditional Class A classification as defined in the City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. Written certification of intent shall be provided within 10 calendar days of a formal request by the City.
(5) Business Name requests a Conditional Class B classification as defined in the City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. Written certification of intent shall be provided within 10 calendar days of a formal request by the City.
(6) Business Name is considered a Class D Business as defined in the City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2, and does not qualify for Local Preference consideration.

BIDDER'S COMPANY: MBR Construction, Inc.

AUTHORIZED COMPANY PERSON: Michael R. Boss Michael R. Boss 8/4/2014

NAME SIGNATURE DATE

CITY OF FORT LAUDERDALE  
PUBLIC WORKS DEPARTMENT

MINORITY BUSINESS ENTERPRISE (MBE) - WOMEN BUSINESS ENTERPRISE (WBE)

PRIME CONTRACTOR IDENTIFICATION FORM

In order to assist us in identifying the status of those companies doing business with the City of Fort Lauderdale, this form must be completed and returned with your bid package.

Name of Firm: **MBR Construction, Inc.**

Address of Firm: **1020 NW 51st Street, Fort Lauderdale FL 33309**

Telephone Number: **954-486-8404**

Name of Person Completing Form: **Michael R. Boss**

Title: **President**

Signature: **Michael R. Boss**

Date: **8/4/2014**

City Project Number: **11353**

City Project Description: **Gore Betz Nieghborhood Park**

Please check the item(s) which properly identify the status of your firm:

Our firm is not a MBE or WBE.

Our firm is a MBE, as at least 51 percent is owned and operated by one or more socially and economically disadvantaged individuals.

American Indian    Asian    Black    Hispanic

Our firm is a WBE, as at least 51 percent is owned and operated by one or more women.

American Indian    Asian    Black    Hispanic

## MBE/WBE CONTRACTOR INFORMATION

The City, in a continuing effort, is encouraging the increased participation of minority and women-owned businesses in Public Works Department related contracts. Along those lines, we are requiring that each firm provide documentation detailing their own programs for utilizing minority and women-owned businesses.

Submit this information as a part of this bid package and refer to the checklist, to ensure that all areas of concern are covered. The low responsive bidder may be contacted to schedule a meeting to discuss these objectives. It is our intention to proceed as quickly as possible with this project, so your cooperation in this matter is appreciated.

### CONTRACTOR CHECKLIST

List Previous City of Fort Lauderdale Contracts

**NE 15th Street Boat Launch & Marina Complex, South Side School Redesign - South Exterior, Flagler Greenway Trail, Floyd Hull Stadium Facility Improvements, South Middle River Park, Fort Lauderdale Beach Park Wall Replacement, Bill Keith Preserve, Harbordale Park, Peter Feldman Park (AKA Flagler Heights), Riverwalk South Regional Park, City Park Garage Rehab Phase II Elevator Replacement, George English Park Tennis Center, Lincoln Park, Sunset Memorial Gardens**

Number of Employees in your firm **40**

--Percent (**10%**) Women

--Percent (**49%**) Minorities

--Job Classifications of Women and Minorities

**Office Manager, Project Manager, Estimator, Purchase Agent, Superintendent, Forman, Laborer.**

Use of minority and/or women subcontractors on past projects.

**27%-31%**

Nature of the work subcontracted to minority and/or women-owned firms.

**Electrical, Plumbing, Roofing, Flooring, Paving, Striping, HVAC, Stucco, Painting, Drywall, Windows and Storefronts. Landscaping, Irrigation.**

How are subcontractors notified of available opportunities with your firm?

**Phone, Fax, Email.**

Anticipated amount to be subcontracted on this project.

**51%**

Anticipated amount to be subcontracted to minority and/or women-owned businesses on this project.

**at least 12%**

**NON-COLLUSION STATEMENT:**

By signing this offer, the vendor/contractor certifies that this offer is made independently and *free* from collusion. Vendor shall disclose below any City of Fort Lauderdale, FL officer or employee, or any relative of any such officer or employee who is an officer or director of, or has a material interest in, the vendor's business, who is in a position to influence this procurement.

Any City of Fort Lauderdale, FL officer or employee who has any input into the writing of specifications or requirements, solicitation of offers, decision to award, evaluation of offers, or any other activity pertinent to this procurement is presumed, for purposes hereof, to be in a position to influence this procurement.

For purposes hereof, a person has a material interest if they directly or indirectly own more than 5 percent of the total assets or capital stock of any business entity, or if they otherwise stand to personally gain if the contract is awarded to this vendor.

In accordance with City of Fort Lauderdale, FL Policy and Standards Manual, 6.10.8.3,

3.3. City employees may not contract with the City through any corporation or business entity in which they or their immediate family members hold a controlling financial interest (e.g. ownership of five (5) percent or more).

3.4. Immediate family members (spouse, parents and children) are also prohibited from contracting with the City subject to the same general rules.

**Failure of a vendor to disclose any relationship described herein shall be reason for debarment in accordance with the provisions of the City Procurement Code.**

<u>NAME</u>	<u>RELATIONSHIPS</u>
None	None
None	None
	None
	None

**In the event the vendor does not indicate any names, the City shall interpret this to mean that the vendor has indicated that no such relationships exist.**

**TRENCH SAFETY**

Bidder acknowledges that included in the appropriate bid items of his bid and in the Total Bid Price are costs for complying with the Florida Trench Safety Act, Florida Statutes 553.60 to 553.64. The bidder further identifies the costs of such compliance to be summarized below:

Total: **\$5.00**

The bidder certifies that all trench excavation done within his control in excess of five feet (5') in depth shall be in accordance with the Occupational Safety and Health Administration's excavation safety standards, C.F.R. s. 1926.650 Subpart P., and the Florida Trench Safety Act, Florida Statutes 553.60-553.64.

Failure to complete the above may result in the bid being declared non-responsive.

DATE: **8/4/2014**

**Michael R. Boss**  
(SIGNATURE)

STATE OF: **Florida**COUNTY OF: **Broward**

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

**Micheal R. Boss**  
(Name of Individual Signing)

**Michael R. Boss** who, after first being duly sworn by me,  
**Ronald R. Boss** affixed his/her signature in the space provided above on this **4** day of **August**, 2014.

**Wendy Cole**  
NOTARY PUBLIC

My Commission Expires: **8/28/2014**

## GENERAL CONDITIONS

**Unless otherwise modified in the projects special conditions, the following General Conditions shall be part of the Contract:**

**GC - 01 - DEFINITIONS** - The following words and expressions, or pronouns used in their stead, shall wherever they appear in the Contract and the Contract Documents, be construed as follows:

"Addendum" or "Addenda" - shall mean the additional Contract provisions issued in writing, by the Engineer, prior to the receipt of bids.

"Bid" – shall mean the offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

"Bidder" – shall mean any person, firm, company, corporation or entity submitting a Bid for the Work.

"Bonds" –shall mean Bid, performance and payment bonds and other instruments of security, furnished by Contractor and his surety in accordance with the Contract Documents.

"City" – shall mean the City of Fort Lauderdale, Florida, a Florida municipal corporation. In the event the City exercises its regulatory authority as a government body, the exercise of such regulatory authority and the enforcement of any rules, regulations, codes, laws and ordinances shall be deemed to have occurred pursuant to City's authority as a governmental body and shall not be attributable in any manner to the City as a party to this Contract. For the purpose of this Contract, "City" without modification shall mean the City Commission, and/or City Manager or his/her designee(s) as applicable.

"Public Works Director" –shall mean the Public Works Director of the City of Fort Lauderdale, Florida or his/her designee(s).

"Consultant" – shall mean a person, firm, company, corporation or other entity employed by the City to perform the professional services for the project.

"Contract Work" - shall mean everything expressed or implied to be required to be furnished and furnished by the Contractor by any one or more of the parts of the Contract Documents referred to in the Contract hereof except Extra Work as hereinafter defined, it being understood that, in case of any inconsistency in or between any part or parts of this Contract, the Public Works Director shall determine which shall prevail.

"Design Documents" – shall mean the construction plans and specifications included as part of a Bid/Proposal Solicitation prepared either by the City or by the Consultant under a separate Agreement with the City.

"Extra Work" - shall mean work other than that required by the Contract.

"Inspector" – shall mean an authorized representative of the City assigned to make necessary inspections of materials furnished by Contractor and of the Work performed by Contractor.

"Notice" - shall mean written notice sent by certified United States Mail, return receipt requested, or sent by commercial express carrier with acknowledgement of delivery, or via fax or email, or by

hand delivery with a request for a written receipt of acknowledgment of delivery and shall be served upon the Contractor either personally or to its place of business listed in the Bid.

"Site" - shall mean the area upon or in which the Contractor's operations are carried out and such other areas adjacent thereto as may be designated as such by the Public Works Director.

"Subcontractor" - shall mean any person, firm, company, corporation or other entity, other than employees of the Contractor, who or which contracts with the contractor, to furnish, or actually furnishes labor and materials, or labor and equipment, or labor, materials and equipment at the site.

"Surety" - shall mean any corporation or entity that executes, as Surety, the Contractor's performance and payment bond securing the performance of this Contract.

**GC - 02 - SITE INVESTIGATION AND REPRESENTATION** - The Contractor acknowledges that it has satisfied itself as to the nature and location of the Work under the Contract Documents, the general and local conditions of the Site, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, and roads, the conformation and conditions at the ground based on City provided reports, the type of equipment and facilities needed preliminary to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under the Contract Documents.

The Contractor acknowledges that it has conducted extensive tests, examinations and investigations and represents and warrants a thorough familiarization with the nature and extent of the Contract Documents, the Work, locality, soil conditions, moisture conditions and all year-round local weather and climate conditions (past and present), and, in reliance on such tests, examination and investigations conducted by Contractor and the Contractor's experts, has determined that no conditions exist that would in any manner affect the Bid Price and that the project can be completed for the Bid Price submitted.

The Contractor, on its own, has made or caused to be made examinations, investigations, tests and studies of reports and related data in addition to those referred above, as Contractor deemed necessary to perform the Work at the Bid price set by the Contractor, within the contract time and in accordance with the other terms and conditions of the Contract Documents and the Bid made by the Contractor; and no additional examinations, investigations, tests, reports or similar data are, or will be, required by Contractor to assure that the Work can be done at the Bid price set by the Contractor.

The Contractor further acknowledges that it has satisfied itself based on any geotechnical reports the City may provide and inspection of the project Site as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site and from evaluating information derived from exploratory work that may have been done by the City or included in the Contract Documents and finds and has further determined that no conditions exist that would in any manner affect the Bid price and that the project can be completed for the Bid price submitted..

Any failure by the Contractor to acquaint itself with all the provided information and information obtained by visiting the project Site will not relieve Contractor from responsibility for properly estimating the difficulty or cost thereof under the Contract Documents. In the event that the actual subsurface conditions vary from the actual City provided reports, the Contractor shall notify the City and the Contract amount may be adjusted depending on the conditions, at the approval of the City.

**GC - 03 - SUBSTITUTIONS** - If the Contractor desires to use materials and/or products of manufacturer's names different from those specified in the Contract Documents, the Bidder requesting the substitution shall make written application as described herein. The burden of proving the equality of the proposed substitution rests on the Bidder making the request. To be acceptable, the proposed substitution shall meet or exceed all expressed requirements of the Contract Documents and shall be submitted upon the Contractor's letterhead, in addition to the "Contractor's Request for Substitution" form provided by the Public Works Director. The following requirements shall be met in order for the substitution to be considered:

1. Requests for substitution shall reach the Public Works Director no less than ten (10) Working Days prior to the date set for opening of Bids; and
2. Requests for substitution shall be accompanied by such technical data, as the party making the request desires to submit. The Public Works Director will consider reports from reputable independent testing laboratories, verified experience records from previous users and other written information valid in the circumstances; and
3. Requests for substitution shall completely and clearly indicate in what respects the materials and/or products differ from those indicated in the Contract Documents; and
4. Requests for substitution shall be accompanied by the manufacturer's printed recommendations clearly describing the installation, use and care, as applicable, of the proposed substitutions; and
5. Requests for substitution shall be accompanied by a complete schedule of changes in the Contract Documents, if any, which must be made to permit the use of the proposed substitution; and
6. Provide the "Contractor's Request for Substitution" form, completely executed. Failure to provide all pertinent data will result in immediate rejection of such a request.

If a proposed substitution is approved by the Public Works Director, an Addendum will be issued to prospective bidders not less than three (3) working days prior to the date set for opening of Bids. Unless substitutions are received and approved as described above, the successful Bidder shall be responsible for furnishing materials and products in strict accordance with the Contract Documents.

**GC - 04 - CONTROL OF THE WORK** - The Public Works Director shall have full control and direction of the Work in all respects. The Public Works Director and/or his authorized designee(s) shall, at all times, have the right to inspect the Work and materials. The Contractor shall furnish all reasonable facilities for obtaining such information, as the Public Works Director may desire respecting the quality of the Work and materials and the manner of conducting the Work. Should the Contractor be directed or permitted to perform night Work, or to vary the period which work is ordinarily carried on in the daytime, he shall give ample notice to the Public Works Director so that proper and adequate inspection may be provided. Such Work shall be done only under such regulations as are furnished in writing by the Public Works Director, and no extra compensation shall be allowed to the Contractor therefore. In the event of night work, the Contractor shall furnish such light, satisfactory to the Public Works Director, as will insure proper inspection. Nothing herein contained shall relieve the Contractor from compliance with any and all City ordinances relating to noise or Work during prohibited hours.

The Contractor shall keep the Public Works Director informed, a reasonable time in advance, as to his need for grades and lines in order that the same may be furnished and all necessary measurements made for records and for payment with the minimum of inconvenience to the Public Works Director or delay to the Contractor. The Contractor shall submit to the Public Works Director or Inspector on the job a written request outlining the streets, etc., for which the Contractor desires lines and grades. It is the intention not to delay the Work for the giving of lines and grades, but when necessary, work operations shall be suspended for such reasonable time as the Public Works Director may require for this purpose. However, such cost increases shall be authorized either by the City Manager and/or designee, or the City Commission based upon the purchasing threshold amounts provided for in Chapter 2 of the City of Fort Lauderdale's Code of Ordinances.

**GC - 05 - SUBCONTRACTOR** - The Contractor shall not sublet, in whole or any part of the Work without the written consent and approval of the Public Works Director. Within ten (10) days after official notification of starting date, the Contractor must submit in writing, to the Public Works Director, a list of all Subcontractors. No Work shall be done by any Subcontractor until such Subcontractor has been officially approved by the Public Works Director. A subcontractor not appearing on the original list will not be approved without written request submitted to the Public Works Director and approved by the Public Works Director. In all cases, the Contractor shall give his personal attention to the Work of the Subcontractors and the Subcontractor is liable to be discharged by the Contractor, at the direction of the Public Works Director, for neglect of duty, incompetence or misconduct.

Acceptance of any Subcontractor, other person, or organization by the Public Works Director shall not constitute a waiver of any right of Public Works Director to reject defective Work or Work not in conformance with the Contract Documents.

Contractor shall be fully responsible for all acts and omissions of his Subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any contractual relationship between City and any Subcontractor or other person or organization having a direct contract with Contractor, nor shall it create any obligation on the part of City to pay or to see to the payment of any moneys due to any Subcontractor or other person, or organization, except as may otherwise be required by law.

**GC - 06 - QUANTITIES** - It is mutually agreed that the proposal shows the approximate amounts only along with the Plans and the general location. It is also mutually agreed that no change will be made involving any departure from the general scheme of the Work and that no such change involving a material change in cost, either to the City or Contractor, shall be made, except upon written permission of the City. However, the Public Works Director shall have the right to make minor alternations in the line, grade, plan, form or materials of the Work herein contemplated any time before the completion of the same. That if such alterations shall diminish the quantity of the Work to be done, such alterations shall not constitute a claim for damages or anticipated profits. That if such alterations increase the amount of the Work to be done, such increase shall be paid for according to the quantity actually performed and at the unit price or prices stipulated therefore in the Contract.

The City shall, in all cases of dispute, determine the amount or quantity of the several kinds of Work which are to be paid for under this Contract, and shall decide all questions relative to the execution of the same, and such estimates and decisions shall be final and binding.

Any Work not herein specified, which might be fairly implied as included in the Contract, of which the City shall judge, shall be done by the Contractor without extra charge. However, such cost increases shall be authorized either by the City Manager and/or designee, or the City Commission based upon the purchasing threshold amounts provided for in Chapter 2 of the City of Fort Lauderdale's Code of Ordinances.

**GC-07 - NO ORAL CHANGES** - Except to the extent expressly set forth in the Contract, no change in or modification, termination or discharge of the Contract in any form whatsoever, shall be valid or enforceable unless it is in writing and signed by the parties charged, therewith or their duly authorized representative.

**GC - 08 - PERMITS AND PROTECTION OF PUBLIC** – Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Contract. A copy of all permits shall be given to the City and become part of the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

The Contractor shall be required to observe all the ordinances in relation to obtaining permits for occupying, excavating, or in any way obstructing the streets and alleys. He shall erect and maintain barricades and sufficient safeguards around all excavations, embankments or obstructions; he shall place sufficient warning lights at or near the Work; keep the same burning from sunset to sunrise, employ watchmen, and strictly obey all laws and ordinances controlling or limiting those engaged in similar work.

Where there are telephones, light or power poles, water mains, conduits, pipes or drains or other construction, either public or private, in or on the streets or alleys, the Work shall be so conducted that no interruption or delay will be caused in the operation or use of the same. Proper written notice shall be given, and all the facilities, afforded the owners of such construction encountered or likely to be encountered, as will enable them to preserve the same from injury.

The Contractor shall not be permitted to interfere with public travel and convenience by grading or tearing up streets indiscriminately, but the Work of constructing the various items in this contract shall proceed in an orderly, systematic and progressive manner.

Contractor shall not load nor permit any part of any structure to be loaded with weights that will endanger the structure, nor shall he subject any part of the Work to stresses or pressures that will endanger it.

Where lifting operations involving the use of specialized cranes are required as part of construction, Contractor must make undertake the following investigation and submit the results and documentation to the Engineer prior to commencing any lifting operations: marking a very specific area in the field for the placement of the crane; a drawing showing the limitations of the job operation (i.e. not over adjacent properties or pedestrian and high vehicular traffic areas); underground utility exploration in the vicinity of the crane location, which may include ground penetrating radar to identify voids or old pipe or other subsurface features that could lead to sudden failure; assessment of the underlying soil and roadway materials and a worst case analysis based on entire load being distributed on just one or two outriggers; provision of properly sized pads under the outriggers; loading charts from manufacturer showing allowable configurations/loads; and inspection to make sure crane operation is in accordance with the permit conditions.

**GC - 09 - DISEASE REGULATIONS** - The Contractor shall enforce all sanitary regulations and take all precautions against infectious diseases as the Public Works Director may deem necessary. Should any infectious or contagious diseases occur among his employees, he shall arrange for the immediate removal of the employee from the Site and isolation of all persons connected with the Work.

**GC - 10 - CONTRACTOR TO CHECK PLANS, SPECIFICATIONS, AND DATA** - The Contractor shall verify all dimensions, quantities, and details shown on the plans, supplementary drawings, schedules, or other data received from the Public Works Director, and shall notify the Public Works Director of all errors, omissions, conflicts and discrepancies found therein within three (3) working days of discovery. Failure to discover or correct errors, conflicts, or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory Work, faulty construction, or improper operation resulting there from nor from rectifying such condition at his own expense.

**GC - 11 - SUPPLEMENTARY DRAWINGS** - When, in the opinion of the Public Works Director, it becomes necessary to explain more fully the Work to be done, or to illustrate the work further, or to show any changes which may be required, drawings, known as supplementary drawings, with specifications pertaining thereto, will be prepared by the Public Works Director and copies will be given to the Contractor.

The supplementary drawings shall be binding upon the Contractor with the same force as the original Plans. Where such supplementary drawings require either less or more than the estimated quantities of work, credit to the City or compensations therefore to the Contractor shall be subject to the terms of the Contract.

**GC - 12 - MATERIALS AND WORKMANSHIP** - All material and workmanship shall, in every respect, be in conformity with approved modern practice and with prevailing standards of performance and quality. In the event of dispute the Public Works Director's decision shall be final. Wherever the Plans, specifications, Contract Documents, or the directions of the Public Works Director are unclear as to what is permissible and/or fail to note the quality of any Work, that interpretation will be made by the Public Works Director, which is in accordance with approved modern practice, to meet the particular requirements of the Contract.

In all cases, new materials shall be used, unless this provision is waived by notice from the City in writing.

**GC - 13 - SAFEGUARDING MARKS** - The Contractor shall safeguard all points, stakes, grade marks, monuments, and bench marks made or established on the Work, bear the cost of re-establishing same if disturbed, or bear the entire expense of rectifying Work improperly installed due to not maintaining or protecting or for removing without authorization, such established points, stakes and marks. The Contractor shall safeguard all existing and known property corners, monuments and marks not related to the Work and, if required, shall bear the cost of having them re-established by a licensed surveyor if disturbed or destroyed during the course of construction.

**GC - 14 - EXISTING UTILITY SERVICE** - All existing utility service shall be maintained with a minimum of interruption at the expense of the Contractor.

**GC - 15 - JOB DESCRIPTION SIGNS** – Contractor, at Contractor's expense, shall furnish, erect, and maintain suitable weatherproof signs on jobs over \$100,000 containing the following information:

1. City Seal (in colors)
2. Project or Improvement Number
3. Job Description
4. Estimated Cost
5. Completion Date

Minimum size of sign shall be four feet high, eight feet wide and shall be suitably anchored. The entire sign shall be painted and present a pleasing appearance. Exact location of signs will be determined in the field. Two (2) signs will be required, one at each end of the job. All costs of this work shall be included in other parts of the work.

**GC - 16 - FLORIDA EAST COAST RIGHT-OF-WAY** - Whenever a City contractor is constructing within the Florida East Coast Railway Company's Right-of-Way, it will be mandatory that the contractor carry separate bodily injury and property damage insurance in the amounts as stated below. This insurance shall be taken out and maintained during the life of the Contract.

Bodily injury insurance in an amount not less than \$500,000.00 for injuries, including wrongful death to any one person, and subject to the same limit for each person, in an amount not less than \$1,000,000.00 on account of any one occurrence, and

Property damage insurance in an amount not less than \$500,000.00 for damages on account of any one occurrence and in an amount not less than \$1,000,000.00 for damages on account of all occurrences.

**GC - 17 - ACCIDENTS** - The Contractor shall provide such equipment and facilities as are necessary and/or required, in the case of accidents, for first aide services to be provided to a person who may be injured during the project duration. The Contractor shall also comply with the OSHA requirements as defined in the United States Labor Code 29 CFR 1926.50.

In addition, the Contractor must report immediately to the Public Works Director every accident to persons or damage to property, and shall furnish in writing full information, including testimony of witnesses regarding any and all accidents.

**GC - 18 - SAFETY PRECAUTIONS** - Contractor must adhere to the applicable environmental protection guidelines for the duration of a project. If hazardous waste materials are used, detected or generated at any time, the Project Manager must be immediately notified of each and every occurrence. The Contractor shall comply with all codes, ordinances, rules, orders and other legal requirements of public authorities (including OSHA, EPA, DERM, the City, Broward County, State of Florida, and Florida Building Code), which bear on the performance of the Work.

The Contractor shall take the responsibility to ensure that all Work is performed using adequate safeguards, including but not limited to: proper safe rigging, safety nets, fencing, scaffolding, barricades, chain link fencing, railings, barricades, steel plates, safety lights, and ladders that are necessary for the protection of its employees, as well as the public and City employees. All riggings and scaffolding shall be constructed with good sound materials, of adequate dimensions for their intended use, and substantially braced, tied or secured to ensure absolute safety for those required to use it, as well as those in the vicinity. All riggings, scaffolding, platforms, equipment

guards, trenching, shoring, ladders and similar actions or equipment shall be OSHA approved, as applicable, and in accordance with all Federal, State and local regulations.

**GC - 19 - DUST PREVENTION** - The Contractor shall, by means of a water spray, or temporary asphalt pavement, take all necessary precautions to prevent or abate a dust nuisance arising from dry weather or Work in an incomplete stage. All costs of this Work shall be included in cost of other parts of the Work.

Should the Contractor fail to abate a dust nuisance by the above methods, and then he will be required to immediately construct temporary patches per City standards.

**GC - 20 - PLACING BARRICADES AND WARNING LIGHTS** - The Contractor shall furnish and place, at his own expense, all barricades, warning lights, automatic blinker lights and such devices necessary to properly protect the work and vehicular and pedestrian traffic. Should the Contractor fail to erect or maintain such barricades, warning lights, etc., the Public Works Director may, after 24 hours' notice to the Contractor, proceed to have such barricades and warning lights placed and maintained by City or other forces and all costs incurred thereof charged to the Contractor and may be retained by the City from any monies due, or to become due, to the Contractor.

**GC - 21 - TRAFFIC CONTROL** - The Contractor shall coordinate all Work and obtain, through the Engineering Department, any permits required to detour traffic or close any street before starting to work in the road. The following section: Part VI Traffic Controls for Street and Highway Construction and Maintenance Operations, MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, U.S. Department of Transportation Federal Highway Administration, 2009, or current edition, shall be used as a guide for requirement and placement of traffic control devices, signs and barricades. The Public Works Director shall determine requirements for the above. The above publication is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. In the event that a Maintenance of Traffic (MOT) Plan is required, the Plan shall be prepared by an A.A.S.T.A. certified technician.

All traffic control devices, flashing lights, signs and barricades shall be maintained in working condition at all times.

**GC - 22 - COORDINATION** - The Contractor shall notify all utilities, transportation department, etc., in writing, with a copy to the Public Works Director before construction is started and shall coordinate his Work with them. The Contractor shall cooperate with the owners of any underground or overhead utility lines in their removal, construction and rearrangement operations in order that services rendered by these parties will not be unnecessarily interrupted.

The Contractor shall arrange his Work and dispose of his materials so as to not interfere with the operation of other Contractors engaged upon adjacent work and to join his Work to that of others in a proper manner and to perform his Work in the proper sequence in relation to that of other Contractors all as may be directed by the Public Works Director.

Each Contractor shall be responsible for any damage done by him or his agents to the work performed by another Contractor.

The Contractor shall contact the Broward County Transportation Department and the Florida Department of Transportation, as applicable, to verify and obtain location of any and all traffic conduits, loops, and street light underground services.

**GC - 23 - WATER** - Bulk water used for construction, flushing pipelines, and testing shall be obtained from fire hydrants. Contractor shall make payment for hydrant meter at Treasury Billing Office 1st Floor, City Hall, 100 N. Andrews Avenue. With the paid receipt, contractor can pick up hydrant meter at the utility location office. No connection shall be made to a fire hydrant without a meter connected.

**GC - 24 - PROHIBITION AGAINST CONTRACTING WITH SCRUTINIZED COMPANIES** - Subject to *Odebrecht Construction, Inc., v. Prasad*, 876 F.Supp.2d 1305 (S.D. Fla. 2012), *affirmed*, *Odebrecht Construction, Inc., v. Secretary, Florida Department of Transportation*, 715 F.3d 1268 (11th Cir. 2013), this Section applies to any contract for goods or services of \$1 million or more:

The Contractor certifies that it is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List and that it does not have business operations in Cuba or Syria as provided in section 287.135, Florida Statutes (2013), as may be amended or revised. The City may terminate this Contract at the City's option if the Contractor is found to have submitted a false certification as provided under subsection (5) of section 287.135, Florida Statutes (2013), as may be amended or revised, or been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or has been engaged in business operations in Cuba or Syria, as defined in Section 287.135, Florida Statutes (2013), as may be amended or revised.

**GC - 25 - LOCATION OF UNDERGROUND FACILITIES** - If the Proposer, for the purpose of responding to this solicitation, requests the location of underground facilities through the Sunshine State One-Call of Florida, Inc. notification system or through any person or entity providing a facility locating service, and underground facilities are marked with paint, stakes or other markings within the City pursuant to such a request, then the Proposer shall be deemed non-responsive to this solicitation in accordance with Section 2-184(5) of the City of Fort Lauderdale Code of Ordinances.

**GC - 26 – USE OF FLORIDA LUMBER TIMBER AND OTHER FOREST PRODUCTS** - In accordance with Florida Statute 255.20 (3), The City specifies that lumber, timber, and other forest products used for this project shall be produced and manufactured in the state of Florida if such products are available and their price, fitness, and quality are equal. This requirement does not apply to plywood specified for monolithic concrete forms, if the structural or service requirements for timber for a particular job cannot be supplied by native species, or if the construction is financed in whole or in part from federal funds with the requirement that there be no restrictions as to species or place of manufacture.

The Bidder affirms by submitting a bid response to this solicitation that they will comply with section 255.20 (3) Florida Statutes.

**GC – 27 – PUBLIC RECORDS** - Contractor shall:

a) Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service.

(b) Provide the public with access to public records on the same terms and conditions that the City would provide the records and at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes (2013), as may be amended or revised, or as otherwise provided by law.

(c) Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law.

(d) Meet all requirements for retaining public records and transfer, at no cost, to the City, all public records in possession of the contractor upon termination of this contract and destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. All records stored electronically must be provided to the City in a format that is compatible with the information technology systems of the City.

## SECTION 01001 - GENERAL REQUIREMENTS

### PART 1 PROJECT DESCRIPTION

#### 1.01 GENERAL

- A. A brief description of the Work is stated in the INVITATION TO BID. To determine the full scope of the project or any particular part of the project, coordinate the applicable information in these Contract Documents and review the available project drawings.
- B. The Work under this Contract shall be performed by the Contractor as required by the City of Fort Lauderdale (City). Work will be authorized by a Notice to Proceed (NTP) issued to the Contractor. The Contractor shall complete all work within the number of calendar days stipulated in the Contract unless an extension in the time of completion is granted by the CITY'S ENGINEER, as stated in the Instructions to Bidders. Upon satisfactory completion of the work and compliance with applicable provisions in the Contract Documents, the Contractor will receive final payment for all work done.
- C. The following additional information, though not all-inclusive, is given to assist contractors in their evaluation of the work required to meet the project objectives.
- D. The Contractor shall become familiar with the existing operating conditions of the City's water system, sewage transmission system and pumping stations and take such into consideration in planning and scheduling work. No extra claims shall be made for work required to achieve conditions beyond those obtainable under normal operation of the existing transmission, collection and pumping facilities necessary to accomplish the Work.
- E. Contractor shall be required to submit Maintenance of Traffic (MOT)s for work in the county and state highways and City streets. Contractor shall coordinate with MOTs for nearby or highway work and obtain approval for all traffic control as required by the permits contained elsewhere in this Section.

### PART 2 SEQUENCE OF OPERATIONS

#### 2.01 SCHEDULING

- A. General: Prepare and submit schedule in accordance with the provisions of Section 01311, Construction Progress Documentation.
- B. Plan the work and carry it out with minimum interference to the operation of the existing facilities. Prior to starting the work, confer with the CITY'S ENGINEER to develop an approved work schedule, which will permit the facilities to function normally as practical. It may be necessary to do certain parts of the construction work outside normal working hours in order to avoid undesirable conditions. The Contractor shall do this work at such times, and at no additional cost to the City. Do not make connections between existing work and new work until necessary

inspection and tests have been completed on the new work and it is found to conform in all respects to the requirements of the Contract Documents.

- C. No work shall be started until the Contractor has received approved shop drawings, established material/delivery dates for all equipment, and received approval of the construction schedule from the ENGINEER. The Contractor shall have sufficient manpower, equipment, and material to complete the project.
- D. No work shall commence without express consent of the CITY'S ENGINEER.
- E. If a privately owned staging area is required, no work shall commence until approval of the facility is obtained from City Planning and Zoning in accordance with Section 47-19.2 of the Unified Land Development Regulations. Submit a copy of the approval and agreement to the CITY'S ENGINEER.

## 2.02 MOBILIZATION AND DEMOBILIZATION

- A. Contractor shall be responsible for mobilization and demobilization of labor, materials and equipment. Payment for mobilization and demobilization shall be included in the lump sum price indicated in the Proposal for the project.

## 2.03 COORDINATION

- A. Contractor shall cooperate in the coordination of separate activities in a manner that will provide the least interference with the Owner's operations and other contractors and utility companies working in the area, and in the interfacing and connection of the separate elements of the overall project work.
- B. If any difficulty or dispute should arise in the accomplishment of the above, the problem shall be brought immediately to the attention of the CITY'S ENGINEER.

## 2.05 OPERATION OF EXISTING SYSTEM PROHIBITED

- A. At no time is the Contractor to undertake to close off any utility lines or open valves or take any other action, which would affect the operation of existing systems. The City's operations crew will operate all valves. Provide at least one business day notice to City prior to any operations.

# **PART 3 SITE CONDITIONS**

## 3.01 SITE INVESTIGATION AND REPRESENTATION

- A. The Contractor acknowledges satisfaction as to the general nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract.

- B. Failure by the Contractor to become acquainted with the physical conditions and all the available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the Work.
- C. The Contractor warrants that as a result of examination and investigation of all the aforesaid data, the Contractor can perform the work in a good and workmanlike manner and to the satisfaction of the City. The City assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by the City.

### 3.02 INFORMATION ON SITE CONDITIONS

- A. General: Information obtained by the CITY'S ENGINEER regarding site conditions, subsurface information, groundwater elevations, existing construction of site facilities, as applicable, and similar data will be available for inspection at the office of the CITY'S ENGINEER upon request. Such information is offered as supplementary information only. The CITY'S ENGINEER does not assume any responsibility for the completeness or interpretation of such supplementary information.

### 3.03 UTILITIES

- A. The Contractor shall be responsible for determining and/or confirming, at his cost, the locations of all utilities within the project area, and shall be responsible for contacting each utility for location and notification prior to commencing work.
- B. The Contractor shall contact potentially affected utilities as provided in Section 01060, Regulatory Requirements & Permits.
- C. The Contractor shall contact Sunshine State One Call at 811 or visit [www.callsunshine.com](http://www.callsunshine.com) at least 2 business days (10 business days for water crossings) prior to any excavation and make arrangements for locating all utilities in the project area.

### 3.04 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

- A. Where the Contractor's operations could cause damage or inconvenience to utilities, telephone, television, power, water, or sewer systems, the operations shall be suspended until all arrangements necessary for the protection of these utilities and services have been made by the Contractor with the owner of the utility affected.
- B. Notify all utility offices, which are affected by the construction operation at least 2 business days in advance. Under no circumstances expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, locate, expose, and provide temporary support for all existing underground utilities.
- C. The Contractor shall be solely and directly responsible to the Owner and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits,

actions, or claims of any character brought because of any injuries or damage, which may result from the construction operations under this Contract.

- D. Neither the Owner nor its officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the Work.
- E. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental breakage due to construction operations, promptly notify the proper authority. Cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is granted.
- F. In the event the Contractor encounters water service lines or sewer laterals that interfere with trenching, he may, by obtaining prior approval of the property owner, and the CITY'S ENGINEER, cut the service, dig through, and restore the service with similar and equal materials at the Contractor's expense.
- G. The Contractor shall replace, at his own expense, all existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract documents or ordered by the City's Engineer.
- H. Telephone and communications drops and signal systems may extend throughout the project area. Properly located cable, conduit, interface equipment, pull or junction boxes and other signal or systems equipment damaged by the Contractor shall be replaced at the Contractor's expense.
  - a. Damaged cable shall be replaced as an entire run, from junction box to junction box.
  - b. Notify Broward County Engineering two business days in advance of the need to remove traffic detection loops.
  - c. Contractor shall verify marked cables and signal systems prior to excavation.

### 3.05 INTERFERING STRUCTURES

- A. Take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground.
- B. Protect underground and aboveground existing structures from damage, whether or not they lie within the limits of the easements obtained by the City. Where such existing fences, gates, sheds, buildings, or any other structure must be removed in order to properly carry out the construction, or are damaged during construction, restore to their original condition to the satisfaction of the property owner involved at the Contractor's own expense. Notify the City of any damaged underground structure, and make repairs or replacements before backfilling.

- C. Without additional compensation, the Contractor may remove and shall replace in a condition as good as or better than original, such small miscellaneous structures as fences, mailboxes, and signposts that interfere with the Contractor's operations.

### 3.06 EASEMENTS AND WORK ON PRIVATE PROPERTY

- A. Where portions of the work are located on public or private property, easements and permits will be obtained by the City, except as otherwise noted in these Specifications. Easements will provide for the use of property for construction purposes to the extent indicated on the easements. Copies of these easements and permits are available upon request to the City. It shall be the Contractor's responsibility to determine the adequacy of the easement obtained in every case and to abide by all requirements and provisions of the easement. The Contractor shall confine his construction operations to within the easement limits or street right-of-way limits or make special arrangements with the property owners or appropriate public agency for the additional area required. Any damage to property, either inside or outside the limits of the easements provided by the City or street rights-of-way, shall be the responsibility of the Contractor as specified herein. The Contractor shall provide immediate notice to the owner of any damage to fencing and provide temporary fencing as required to provide a functionally similar level of security. The Contractor shall remove, protect, and replace all fences or other items encountered on public or private property. Before final payment will be authorized by the City's Engineer, the Contractor will be required to furnish the City with written releases from property owners or public agencies where side agreements or special easements have been made by the Contractor or where the Contractor's operations, for any reason, have not been kept within the construction right-of-way obtained by the City or the street right-of-way.
- B. The Contractor shall be responsible for all damage to private property where work related activities have occurred without proper easement or authorization. The City may withhold payment to the Contractor pending resolution of any claims by private owners.
- C. It is anticipated that the required easements and permits will be obtained before construction is started. However, should the procurement of any easement or permit be delayed, the Contractor shall schedule and perform the work around these areas until such a time as the easement or permit has been secured.
- D. Prior to removing an existing structure or item, provide written notice to the Owner at least 14 days in advance of the anticipated removal.
- E. The Contractor shall not engage in private construction activities within the project area without the presence of a contract with the private owner of the property containing a hold harmless clause protecting the City from any and all damages that occur during the performance of the privately authorized work.

## **PART 4 SAFETY AND CONVENIENCE**

### 4.01 SAFETY AND ACCESS

- A. The Contractor shall do all work necessary to protect the general public from hazards, including, but not limited to, surface irregularities or unramped grade changes in pedestrian sidewalk or walkway, and trenches or excavations in roadway. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work. All barricades and signs shall be clean and serviceable, in the opinion of the City's Engineer.
- B. During construction, the Contractor shall construct and at all times maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades or steel plates, as applicable, at all openings, obstructions, or other hazards in streets, sidewalks, floors, roofs, and walkways. All such barriers shall have adequate warning lights as necessary, or required, for safety. All lights shall be regularly maintained, and in a fully operational state at all times.
- C. The Contractor shall notify all residences and businesses of planned construction at least 5 (five) business days prior to the start of work in the block where they are located. Such notices shall be brochures or door-hangers with sufficient information to describe the extent and duration of the planned work. Notification activities shall be coordinated with the CITY'S ENGINEER.
- D. Homeowners and business owners shall be provided reasonable access. The Contractor shall provide temporary sidewalks, bridges or driveway access, including safe passage over open excavations as required.

#### 4.02 ACCIDENT REPORTS

- A. In addition, the Contractor must promptly report in writing to the CITY'S ENGINEER all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the ENGINEER.
- B. If a claim is made by anyone against the contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the CITY'S ENGINEER, giving full details of the claim.

#### 4.03 SAFE ACCESS BY FEDERAL, STATE, AND LOCAL GOVERNMENT OFFICIALS

- A. Authorized representatives of the state, federal, or local governmental agencies, shall at all times have safe access to the work, and the Contractor shall provide proper facilities for such access and inspection.

#### 4.04 PROTECTION OF PROPERTY

- A. Protect stored materials located adjacent to the proposed work. Notify property owners affected by the construction at least two business days in advance of the time construction begins. During construction operations, construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to his residence or place of business for a period exceeding 2 hours, unless the Contractor has made special arrangements with the affected persons.

- B. The Contractor shall identify and isolate his active work zone in such a manner as to exclude all personnel not employed by him, the CITY'S ENGINEER, and the City.

#### 4.05 FIRE PREVENTION AND PROTECTION

- A. The Contractor shall perform all work in a fire-safe manner. He shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable federal, state, and local fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

#### 4.06 ACCESS FOR POLICE, FIRE, AND POSTAL SERVICE

- A. Notify the fire department and police department before closing any street or portion thereof. No closing shall be made without the Owner's approval of MOT plan. Notify said departments when the streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without special written permission from the fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. MOT plans that result in restricted access for emergency vehicles must be submitted and approved 2 weeks prior to the proposed closing with separate and specific notification made to the ENGINEER to provide for appropriate agency coordination.
- B. The Contractor shall leave a night emergency telephone number or numbers with the police department, the Engineer, and the Owner, so that contact may be made easily at all times in case of barricade and flare trouble or other emergencies.
- C. Maintain postal service facilities in accordance with the requirements of the U.S. Postal Service. Move mailboxes to temporary locations designated by the U.S. Postal Service, and at the completion of the work in each area, replace them in their original location and in a condition satisfactory to the U.S. Postal Service.

### **PART 5 PRESERVATION, RESTORATION, AND CLEANUP**

#### 5.01 SITE RESTORATION AND CLEANUP

- A. At all times during the work, keep the premises clean and orderly, and upon completion of the Work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.
- B. Stockpile excavated materials in a manner that will cause the least damage to adjacent lawns, grassed areas, gardens, shrubbery, or fences, regardless of whether these are on private property, or on state, county, or city rights-of-way. Remove all excavated materials from grassed and planted areas, and leave these surfaces in a condition equivalent to their original condition. Replace excavated areas as specified in Section 02221, Trench Excavation and Backfill, raked and graded to conform to their original contours.

## 5.02 FINISHING OF SITE, BORROW, AND STORAGE AREAS

- A. Upon completion of the project, all areas used by the Contractor shall be properly cleared of all temporary structures, rubbish, and waste materials and properly graded to drain and blend in with the abutting property. Areas used for the deposit of waste materials shall be finished to properly drain and blend with the surrounding terrain. Grassed areas shall be restored as specified.

## 5.03 HISTORIC PRESERVATION

- A. The Contractor shall coordinate with the historic preservation representative supplied by the owner for initial excavation operations. If the project work should uncover prehistoric or historic artifacts associated with Native American cultures, early colonial cultures, or American settlements, all project activities in the area shall cease immediately.
- B. All such discoveries shall be reported to the Division of Historical Resources. Review and Compliance Section at (800) 847-7278.
- C. Project activities in the affected area cannot resume without authorization from the Division of Historic Resources.

## **PART 6 PERMITS**

### 6.01 GENERAL

- A. City has prepared the following application for the Contractor to submit and obtain Permit:
  - a. City of Fort Lauderdale Building Permit
- B. Permits to be obtained by the Contractor include, but are not limited to the following:
  - a. Local and County Building permits.
  - b. Local, County, and State contracting licenses.
  - c. MOT approval from local, county, and state agencies as required.
  - d. Tree removal and trimming permits.
  - e. Broward County Planning and Environmental Regulation Division (BCPERD): Dewatering permit, including National Pollution Discharge Elimination System (NPDES) permit if required.
  - f. Environmental Resource Permit if necessary.
- C. The Contractor shall comply with all applicable permit conditions.

**END OF SECTION**

## SECTION 01005 - TECHNICAL PROVISIONS

### **PART 1 GENERAL**

#### 1.01 SCOPE

- A. Work under this contract includes furnishing materials, labor, tools equipment, supervision and incidentals necessary to construct infrastructure improvements.

#### 1.02 ITEMS SPECIFIED ON DRAWINGS

- A. Items of material, equipment, machinery and the like may be specified on the Drawings and not in the Technical Specifications. The CONTRACTOR shall provide such items in accordance with the General Notes on the Drawings.

#### 1.03 FIELD LAYOUT OF THE WORK AND RECORD DRAWINGS

- A. After completion of construction, the CONTRACTOR shall provide three (3) sets of signed & sealed. As-Built Drawings with all the As-Built information; all locations, coordinates, dimensions and elevations of the constructed facilities, certified, signed and sealed thereon by a Land Surveyor registered in the State of Florida. All elevations shall refer to N.G.V.D. 29 (National Geodetic Vertical Datum of 1929) and all state plane coordinates shall be NAD 83 (with 1990 adjustment). The cost of such field layout and recording work shall be the responsibility of the CONTRACTOR. The As-Built utility information shall meet the requirements of the City of Fort Lauderdale and any other permitting agencies having jurisdiction on this project.

#### 1.04 SALVAGE

- A. Any existing equipment or material, including but not limited to valves, pipes, fittings, couplings, etc., which is removed as a result of construction under this project may be designated as salvage by the CONTRACT ADMINISTRATOR, and if so, shall be delivered clean to the CITY at a location directed by the CONTRACT ADMINISTRATOR. Any equipment or material not worthy of salvaging shall be disposed of by the CONTRACTOR at a suitable location in accordance with all applicable regulations, ordinances and laws at no additional cost to the CITY.

#### 1.05 POWER

- A. The CONTRACTOR shall furnish and pay for all electrical power required for the construction, testing and trial operation, prior to final acceptance by the CITY.

#### 1.06 WATER SUPPLY

- A. All water required for testing, flushing, and construction shall be furnished by the CITY and paid for by the CONTRACTOR. The purchase price shall be the prevailing rate as published by the CITY. The quantity of water used shall be determined by reading the meter at the start and at the finish of construction. The CONTRACTOR shall make all arrangements and incur all expense involved in having the CITY furnish and install the necessary water meters. Each water service line shall be

provided with a vacuum relief or backflow preventer which shall meet the requirements of ASA A40.6, latest revision, and the local administrative authority.

#### 1.07 MAINTENANCE

- A. The CONTRACTOR shall fully cooperate at all times with the CITY in order to maintain the operation of the existing water and/or sewer system with the least amount of interference and interruption possible. The schedule, plans and work of the CONTRACTOR shall at all times be subject to alteration and revision if necessary for public health and safety considerations. The creation of a public nuisance will not be permitted.
- B. It may be necessary to interrupt the operation of the existing water and/or sewer system. In all cases where the CONTRACTOR must cause an interruption, CONTRACTOR shall prepare and submit to the CITY'S ENGINEER four (4) working days prior to commencing the work, a complete description of the proposed procedure and a time schedule, which CONTRACTOR will guarantee. At least forty-eight (48) hours prior to the time proposed for starting the work, the CITY'S ENGINEER will notify the CONTRACTOR whether or not the work will be permitted as proposed.
  - 1. The CITY'S ENGINEER reserves the right to require the CONTRACTOR to work 24 hours per day in all cases where, in ENGINEER'S opinion, interference with operation of the system may result in dangerous health hazards or offensive conditions.
  - 2. In no case will the CONTRACTOR be permitted to interfere with the existing system until all materials, supplies, equipment, tools and incidentals necessary to complete the work are on the site. Backup equipment on key equipment items shall be required on work necessitating interference with the existing system.

#### 1.08 SITE RESTORATION

- A. The CONTRACTOR shall remove all excess material and shall clean up and restore the site to its original condition or better. All damage, as a result of work under this Contract, done to existing structures, pavement, driveways, paved areas, curbs and gutters, sidewalks, shrubbery, grass, trees, utility poles, utility pipe lines, conduits, drains, catch basins, flagstones, rocked, graveled, or stabilized areas of driveways, and including all obstructions not specifically named herein, shall be repaired, or replaced, as determined by the CITY'S ENGINEER. Site restoration shall be done in a timely manner as the work progresses. Site restoration work shall be completed on private property within 30 days after being disturbed.

#### 1.09 SANITARY FACILITIES

- A. The CONTRACTOR shall provide temporary facilities at the site as directed by the CITY'S ENGINEER.

#### 1.10 STANDARDS

- A. Wherever in these TECHNICAL SPECIFICATIONS or in the drawings name and/or number refer to certain standards or regulations, the applicable publication shall be the latest revision thereof. Reference by abbreviation is made in accordance with the Section 01070, "Abbreviations of Institutions."

#### 1.11 QUALITY OF ITEMS

- A. All material furnished for this project shall be new and unused. Any material, which has become excessively weathered or damaged since manufacture, shall not be considered as new. CITY'S ENGINEER shall be the sole judge as to what constitutes excessive weathering or damage.

#### 1.12 TESTING

- A. The City of Fort Lauderdale Engineering Minimum Design and Construction Standards may require that materials and equipment supplied meet given standards and testing to demonstrate conformance to the standards is a part of those standards. The cost of these tests shall be the obligation of the CONTRACTOR and no extra charge shall be made to the CITY on account of such testing.
- B. The CONTRACTOR shall select a recognized, independent testing laboratory to make tests on concrete, reinforcing steel, soils and other materials for the construction phase, to test for conformity with the TECHNICAL SPECIFICATIONS, FDOT and BROWARD COUNTY Construction Standards, and any other applicable testing/Quality control standards as required by all permitting agencies having jurisdiction over this project. The CONTRACTOR shall supply the necessary samples for this testing without cost to the CITY. The costs for actual testing shall be paid by the CONTRACTOR and scheduling of all required tests will be the responsibility of the CONTRACTOR.
- C. Construction in areas where installation and restoration must satisfy the additional requirements of a local, state or federal authority may require testing to demonstrate conformance. The CONTRACTOR shall ascertain the extent of testing required by regulatory agencies within these areas. The CONTRACTOR is responsible for performing such tests, including but not limited to, tests of compaction, and all costs for these tests shall be the obligation of the CONTRACTOR and no extra charge shall be made to the CITY on account of such testing.

#### 1.13 UTILITY CROSSINGS

- A. It is intended that wherever existing utilities must be crossed that the pipe may be deflected up to 75% of the manufacturer's recommended limits, but shall not exceed the allowable limits of the CITY. Adequate cover shall be used to adequately clear the obstruction. However, when in the opinion of the CITY'S ENGINEER, this procedure is not feasible CITY'S ENGINEER may direct the use of fittings to clear a utility crossing as detailed on the Drawings. The cost of such crossing including joint restraints shall be on the basis of the schedule of pay items applied.
- B. Deflections and adjustments of the proposed water and/or sewer mains to avoid all other existing utilities shall be verified/determined in the field during construction.

#### 1.14 BASIS OF MEASUREMENT

- A. Where mains are to be paid for on a unit price per linear foot basis, the number of linear feet will be determined by measurement along the centerline of the pipe in place, including fittings. Square yardage will be determined by the actual number of square yards installed.

#### 1.15 ADJUSTMENT AND RELOCATION OF EXISTING LINES

- A. When the drawings indicate that existing lines must be deflected, the pipe may be deflected up to 75% of the manufacturer's recommended limits but shall not exceed the allowable limits of the CITY. The CONTRACTOR will need to be directed by the ENGINEER. If the ENGINEER determines that the use of new pipe and fittings is required for deflection, the CONTRACTOR will be directed to use this method. The price for either method shall be based upon the unit prices bid. This does not apply to connections to existing system (Paragraph 1.17, this Section).

#### 1.16 CONNECTION TO EXISTING SYSTEM

- A. The CONTRACTOR shall perform all work necessary to locate, excavate and prepare for connection to the existing mains as shown on the Drawings. The cost of this work and for the actual connection to the existing main shall be based upon the unit prices for installing the pipe and appurtenances and shall not result in any additional cost to the CITY. The cost of ductile iron sleeves shall be included in the fittings unit price.
- B. Additional valves used for the CONTRACTOR's convenience shall not be considered as an extra cost payable by the CITY for the tie-in to the existing system.
- C. During all phases of the work, (i.e. installation, testing and restoration), the CONTRACTOR shall ensure at all times the safe operation of the existing water and/or sewage systems. Service to the customers shall be maintained with the least amount of interference and interruption as possible.

#### 1.17 RELOCATIONS

- A. The CONTRACTOR shall be responsible for the relocation of structures that are shown on the drawings, including, but not limited to, light poles, signs, fences, piping, conduits and drains that interfere with the proposed positioning of the water/sewer mains. The cost of all such relocations shall be included in the prices bid for the appropriate items.

#### 1.18 UTILITIES

- A. Existing utilities are shown on the Drawings insofar as information is reasonably available; however, it will be the responsibility of the CONTRACTOR to preserve all existing utilities whether shown on the Drawings or not. If utility conflicts are encountered by the CONTRACTOR during construction, CONTRACTOR shall give sufficient notice to the CITY so that they may make the necessary adjustments. Damage to any utility, which in the opinion of the CITY is caused by carelessness on

the part of the CONTRACTOR shall be repaired at the expense of the CONTRACTOR.

#### 1.19 GUARANTEE

- A. The CONTRACTOR shall guarantee the equipment, material and labor performed under the Contract against any and all failures in proper use and operation for a period of one (1) year from date of written acceptance by the CITY.
- B. The CONTRACTOR shall also obtain warranties from manufacturers for each piece of equipment furnished so that the manufacturer's warranty fully covers the equipment for a period of one (1) year from the date of written acceptance by the CITY, unless otherwise specified in the specifications.

#### 1.20 PERFORMANCE OF WORK

- A. The CONTRACTOR shall provide all personnel and equipment required to complete all work specified herein and on the Drawings. In an emergency situation, if the CITY determines that it must provide staff and/or equipment to assist the CONTRACTOR in the satisfactory performance of the Contract terms and conditions, the CONTRACTOR at the applicable prevailing wage rates shall reimburse the CITY.
- B. CONTRACTOR shall provide forty-eight (48) hours advance written notice to the CITY for approval of CONTRACTOR'S intention to work overtime on weekdays or to work on the weekends.

#### 1.21 BARRICADING (SAFETY)

- A. The CONTRACTOR shall be responsible for the furnishing and maintaining of all required barricades, either the lighted or the reflector type, to ensure the public's safety during open trench work or for any other potentially unsafe or hazardous construction activities. Barricades shall be located and displayed in conformance with the most stringent regulations required by the governing agencies. All costs for barricading, including any permits, shall be the responsibility of the CONTRACTOR.
- B. All work in public rights-of-way and on private property shall be done in strict compliance with these specifications and Florida Department of Transportation Minimum Standards. Failure to so comply will result in cessation of operations and the removal of project related obstructions from the right-of-way until compliance is achieved.

#### 1.22 EMERGENCY ACCESS AND SECURITY

- A. In order to provide protection to the workers and residents, the CONTRACTOR shall maintain emergency access to the property at all times during construction. These access ways shall be protected and delineated with lighted barricades or other such devices as approved by the regulatory agency. Both ends of the emergency access way shall be blocked in accordance with the MOT permit approved by the CITY with signage indicating that this access way is to be used by emergency vehicles only.
- B. No trenches or holes shall be left open after working hours. In the event a trench must be left open after hours, it shall be done so only with the express written

permission from the ENGINEER, and it shall be the CONTRACTOR'S responsibility to provide proper protection of the open trench or hole as required by the regulatory agency. In addition, the CONTRACTOR shall provide a security guard at the site whenever the CONTRACTOR'S personnel are not present, 24 hours per day/ 7 days per week. It shall be the Security Guard's responsibility to protect the open trench or hole from trespassers and to direct emergency personnel on site. The Security Guard shall not have any other responsibilities such as operating pumps or equipment but shall be dedicated to protecting the trench or open hole. The Security Guard shall be equipped with a wireless telephone capable of calling 911 to report an emergency and shall keep that telephone on their person at all times. In addition to this provision the CONTRACTOR shall maintain trench safety and comply with current OSHA regulations and the Trench Safety Act. The CONTRACTOR shall maintain and keep all safety barricades, signage, flashers, and detours, in operating condition. A copy of the approved MOT plans, and details, shall be on site at all times.

- C. All roads are to be maintained during the described construction as to always allow Emergency Access. This item will be paid for under the bid item for Mobilization as named in the Bid Schedule.

#### 1.23 VIBRATORY COMPACTION

- A. The use of vibratory compaction equipment shall be limited to a total gross weight of three (3) tons. The use of vibratory equipment shall be limited to compacting backfill of utility trenches and subgrade of paved areas only. If approved in writing by the ENGINEER, larger vibratory compaction equipment may be allowed if operated in a static mode only.

#### 1.24 REPORTING OF DAMAGE CLAIMS

- A. The CONTRACTOR shall keep the CITY informed of any damage claims made against the CONTRACTOR during the construction period. All claims for automobile damage, property damage/bodily injury will be reported to the CONTRACT ADMINISTRATOR within 24 hours of receipt of notice. CONTRACTOR will conduct a timely investigation of the claim and determine if they will honor the claim and/or report to their insurance carrier. CONTRACTOR will advise the City of Fort Lauderdale in writing of their decision/referral to carrier.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## SECTION 01010 - SUMMARY OF WORK

### PART 1 GENERAL

#### 1.01 SCOPE

A. City: City of Fort Lauderdale

1. City's Representative/Engineer: *Angelina Rosenberg, Senior Project Manager*, or designated representative.

#### 1.03 NOTICE TO BIDDERS

- A. The successful bidder, in order to be considered responsive, must possess the appropriate License as described in the Contract Documents.
- B. It should also be noted that the successful bidder will, at the time of the pre-construction conference, be required to show that each of the CONTRACTOR'S subcontractors is in compliance with the City's Code of Ordinances.

#### 1.04 SITE INVESTIGATION

- A. The CONTRACTOR, by virtue of signing the Contract, acknowledges that CONTRACTOR and all subcontractors have satisfied themselves to the nature and location of the work, the general and local conditions including, but not restricted to: those bearing upon transportation; disposal, handling and storage of materials; access roads to the site; the conformation and conditions of the work area; and the character of equipment and facilities needed preliminary to and during the performance of the work. Failure on the part of the CONTRACTOR to completely or properly evaluate the site conditions shall not be grounds for additional compensation.
- B. Soil boring information will not be furnished to the CONTRACTOR. The CONTRACTOR, by virtue of signing the Contract, acknowledges that CONTRACTOR and subcontractors have satisfied themselves as to the nature and extent of soil and (underground) water conditions on the project site. No additional payment will be made to the CONTRACTOR because of differences between actual conditions and those shown by the boring logs.

#### 1.05 WORK BY OTHERS

- A. Concurrent Work by Other CONTRACTORS. The CONTRACTOR'S attention is directed to the fact that other CONTRACTORS may conduct work at the site during the performance of the WORK under this Contract. The CONTRACTOR shall conduct its operations so as to cause little or no delay to WORK of such other CONTRACTORS, and shall cooperate fully with such CONTRACTORS to provide continued safe access to their respective portions of the site, as required to perform work under their respective contracts.

- B. Interference with Work on Utilities. The CONTRACTOR shall cooperate fully with all utility forces of the OWNER or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the WORK, and shall schedule the WORK so as to minimize interference with said relocation, altering, or other rearranging of facilities.

#### 1.06 WORK SEQUENCE

- A. The CONTRACTOR shall schedule and perform the work in such a manner as to result in the least possible disruption to the public's use of the parking lot and park facilities, roadways, driveways, and utilities. Utilities shall include but not be limited to water, sewerage, drainage structures, ditches and canals, gas, electric, television and telephone. Prior to commencing with the WORK, CONTRACTOR shall perform a location investigation of existing underground utilities and facilities in accordance with Section 01530 entitled "Protection of Existing Facilities" and shall have obtained all required permits and permissions, CONTRACTOR shall also deliver written notice to the CITY, ENGINEER, and property occupants (private and public) of all planned disruption to roadway, driveways, temporary displacement of fences, mailboxes, street signs and traffic signs, and utilities 72 hours in advance of disruption.
- B. The landscaping and adult fitness equipment must be completed prior to November 16, 2014 with material purchased prior to September 16, 2014.

#### 1.07 WORK SCHEDULE

- A. Time is of the essence in completing this project. Because time is of the essence the CONTRACTOR shall commit the necessary resources to this project to complete it in a timely manner. Those resources may include multiple working crews, working overtime, etc. Because time is of the essence, the CONTRACTOR'S construction progress will be monitored closely on a weekly basis. The Construction progress will be measured with the construction schedule submitted by the CONTRACTOR. If the ENGINEER determines that the CONTRACTOR does not meet the Critical Path Method (CPM) as specified in Section 01311, the CONTRACTOR will be required to commit those resources necessary to ensure the completion of the project in a timely manner including working overtime, adding other work crews, etc. All costs incurred to implement measure to complete the work in timely manner will be borne by the CONTRACTOR at no additional cost to the OWNER.

#### B. REQUIRED PERIODS OF WORK SUSPENSION

1. CONTRACTOR shall shut down operations for all City Holidays, terminating production work by noon on the day preceding the holiday (or the weekend before said holiday) and not resuming operations until the start of the following week (or the day after the holiday, whichever is later). The CONTRACTOR shall ensure that the site is restored per Sections 01001 and 01010 and all areas that are off limits to the public will be clearly delineated and protected. For a full list of holidays, please refer to the City, however these include, but are not limited to New Year's Eve and Day, Martin Luther King's Birthday, Memorial Day, the 4<sup>th</sup> of July, Labor Day, Thanksgiving Day and the day after Thanksgiving Day, Christmas Eve and Christmas.

2. The CONTRACTOR shall include these provisions in the schedule required in 01311 and there shall be no additional time granted for these work suspensions.
3. No additional compensation shall be granted for demobilization, cleaning and remobilization as a result of these work suspensions.
4. During the work suspensions, the CONTRACTOR shall remain liable for the safety and security of the project site and be available 24 hours per the Contract Documents. CONTRACTOR shall have personnel visit the site daily during these suspensions to ensure the safety and security of the site.

C. SCHEDULE

1. CONTRACTOR shall submit scheduling information for the work as required in Section 01311 "Construction Progress Documentation".
2. No separate payment shall be made for preparation and/or revision of the schedule.

- D. On-Site Work Hours: Work hours shall be defined at the pre-construction meeting and shall comply with all permit conditions. Except otherwise indicated, work shall be performed during normal business working hours of 7:30 a.m. to 4:00 p.m., Monday through Friday. Overtime pay shall be required for off hour inspections as provided in the September 6, 2002 memo contained herein, with exceptions as modified by S.C. 5-99/5-101.

1.08 COMPUTATION OF CONTRACT TIME

- A. It is the CONTRACTOR'S responsibility to provide clear and convincing documentation to the ENGINEER as to the effect additional work will have with respect to additional contract time extension that may be justified. If additional quantities of work can be carried out concurrent with other existing construction activities without disrupting the critical path of the project then no contract time extension will be granted. The CONTRACTOR is obligated to provide documentation to the ENGINEER if additional elements of work affect the critical path of the project. If work set forth in the original scope of the project is deleted, the contract time may be reduced. This contract is a calendar day contract. While the CONTRACTOR may be granted time to suspend work operations for vacations or holidays, contract time will not be suspended. During suspensions, the CONTRACTOR shall be responsible for all maintenance of traffic and liability without additional compensation from the CITY.

1.09 CONTRACTOR USE OF PREMISES

- A. The CONTRACTOR's use of the project site shall be limited to its construction operations. The CONTRACTOR will arrange for storage of materials and a copy of an agreement for use of other property shall be furnished to the ENGINEER.

1.10 PRE-CONSTRUCTION CONFERENCE

- A. After the award of Contract, a Pre-construction Work Conference will be held between the CONTRACTOR, the ENGINEER, the CITY, other interested Agencies, representatives of Utility Companies and others affected by the work. The ENGINEER will set the time and place of this conference. The CONTRACTOR shall bring to the conference a copy of the proposed work schedule for the approval by the ENGINEER of the proposed methods and manner of executing the work including sequences of operation and time schedule. The work shall be performed in accordance with such schedule or approved amendments thereto.

#### 1.11 UTILITY LOCATIONS

- A. As far as possible, all existing utility lines in the project area have been shown on the plans. However, the CITY does not guarantee that all lines are shown, or that said lines are in their true location. It shall be the CONTRACTOR'S responsibility to identify and locate all underground or overhead utility lines or equipment affected by the project. No additional payment will be made to the CONTRACTOR because of discrepancies in actual and plan location of utilities and damages suffered as a result thereof.
- B. The CONTRACTOR shall notify each utility company involved at least thirty (30) days prior to the start of construction to arrange for positive underground location, relocation or support of its utility where that utility may be in conflict with or endangered by the proposed construction. The CONTRACTOR shall pay for relocation of water mains or other utilities for the convenience of the CONTRACTOR. The CONTRACTOR shall pay for all charges by utility companies for temporary support of its utilities. All costs of permanent utility relocations to avoid conflict shall be the responsibility of the CONTRACTOR and the utility company involved.
- C. The CONTRACTOR shall schedule and coordinate their work in such a manner that they are not delayed by the utility companies relocating or supporting their utilities. No compensation will be paid to the CONTRACTOR for any loss of time or delay.
- D. All overhead, surface, and underground structures and/or utilities encountered are to be carefully protected from damage or displacement. All damage to said structures and/or utilities is to be completely repaired within a reasonable time; needless delay will not be tolerated. The CITY reserves the right to remedy any damage by ordering outside parties to make repairs at the expense of the CONTRACTOR. All repairs made by the CONTRACTOR are to be made to the satisfaction of the utility owner and shall be inspected by a representative of the utility owner and the ENGINEER.
- E. The CONTRACTOR should be aware of the Sunshine State One Call Center, which has a free locating service for CONTRACTORS and excavators. Within forty-eight hours before excavating, dial toll free 1-800-432-4770, and a locator will be dispatched to the work location. CONTRACTOR shall reasonably notify other utility companies not notified by Sunshine State One Call Center.
- F. The permits listed below will be obtained for the project by the CITY prior to beginning construction. The CONTRACTOR is responsible for compliance with any and all permit conditions. In the event that the CITY must obtain permits in addition to those listed below, the CONTRACTOR shall not have any claim for damages arising from any delay caused by the CITY'S obtaining said additional permits.

- a. BCPGMD: Surface Water License.
- G. Permits to be obtained by the CONTRACTOR include, but are not limited to the following:
- 1. Tree removal and trimming permits.
  - 2. Local, County, and State contracting licenses.
  - 3. BCEPGMD: Dewatering permit, including NPDES permit if required.
  - 4. City of Fort Lauderdale Building Permit.
  - 5. Environmental Resource Permit.

#### 1.12 LINE AND GRADE

- A. The ENGINEER has provided vertical and horizontal control for layout of the work in the form of benchmarks and reference points located adjacent to the work. From these controls provided, the CONTRACTOR shall develop and make all detailed surveys needed for construction as-built purposes and shall establish all working points, lines and elevations necessary to perform the work. A Professional Land Surveyor registered in the State of Florida shall supervise this surveying work.

#### 1.13 PROTECTION AND RESTORATION OF SURVEY MONUMENTS

- A. The CONTRACTOR shall carefully protect from disturbance all survey monuments, stakes and bench marks, whether or not established by CONTRACTOR, and shall not remove or destroy any surveying point until it has been properly witnessed by the ENGINEER. All major survey monuments that have been damaged by the CONTRACTOR such as section corners, 1/4 section corners, property corners or block control points shall be replaced at the CONTRACTOR'S expense with markers of a size and type approved by the ENGINEER. The replacement shall be under the supervision of a Florida Registered Land Surveyor where directed by the ENGINEER.

#### 1.14 EQUIPMENT

- A. All equipment necessary and required for the proper construction of all facilities shall be on the construction site, in first-class working condition.

#### 1.15 STORAGE SITES

- A. The CONTRACTOR shall furnish, at CONTRACTOR's expense, properly zoned areas suitable for field office, material storage and equipment service and storage. No material may be stored in the public right of way without prior authorization by the agency having jurisdiction. The CONTRACTOR shall keep these areas in a clean and orderly condition so as not to cause a nuisance or sight obstruction to motorists or pedestrians.

## 1.16 OWNERSHIP OF EXISTING MATERIALS

- A. All materials removed or excavated from the job site shall remain the property of the CITY until released by the Contract Administrator, at which time it shall become the property of the CONTRACTOR, who shall dispose of it in a manner satisfactory to the ENGINEER.

## 1.17 EXCESS MATERIAL

- A. Upon direction of the ENGINEER, all vegetation, debris, concrete or other unsuitable materials shall be disposed of in areas provided by the CONTRACTOR and approved by the ENGINEER. Any excess material desired to be retained by the CITY shall be delivered by the CONTRACTOR to a designated area within a 5-mile radius of the project, at no extra cost to the CITY.

## 1.18 AUDIO-VISUAL PRECONSTRUCTION RECORD

### A. General:

1. The CONTRACTOR shall engage the services of a professional electrographer. A responsible commercial firm known to be skilled and regularly engaged in the business of preconstruction color audio-video documentation shall prepare the color audio-video dvd's. The electrographer shall furnish to the ENGINEER a list of all equipment to be used for the audio-video recording i.e., manufacturer's name, model number, specifications and other pertinent information. Additional information to be furnished by the electrographer are the names and addresses of two references that the electrographer has performed color audio-video recording for on projects of a similar nature within the last 12 months.
2. Prior to beginning the work, the CONTRACTOR shall have a continuous color audio-video recording taken along the entire length of the project to serve as a record of preconstruction conditions. No construction shall begin prior to review and approval of the video covering the construction area by the ENGINEER. The ENGINEER shall have the authority to reject all or any portion of the videos not conforming to the specifications and order that it be redone at no additional charge. The CONTRACTOR shall reschedule unacceptable coverage within five days after being notified. The ENGINEER shall designate those areas, if any, to be omitted from or added to the audio-video coverage.

### B. Digital Video Disk (DVD):

1. DVD's shall be new. Reprocessed dvd's will not be acceptable. They shall be interchangeable with the color dvd player and shall be compatible for playback with a standard player-receiver, DVD format. Any other format must be approved by ENGINEER.
2. CONTRACTOR shall provide the ENGINEER and the CITY with one complete set of dvd's for the project area.
3. In no case shall there be less than 6 inches between any two (2)-pipe lines within the structure or between pipelines and the structure.

## 1.21 ENVIRONMENTAL PROTECTION

- A. The CONTRACTOR shall furnish all labor and equipment and perform all work required for the prevention of environmental pollution during and as a result of the work under this contract. For the purpose of this contract, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life, affect other species of importance to man, or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution requires consideration of air, water, land and involves noise, solid waste management and management of radiant energy and radioactive materials, as well as other pollutants. Environmental pollution prevention shall be in accordance with NPDES requirements with no additional cost to the CITY.

## 1.22 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. The CONTRACTOR shall provide all necessary traffic control devices in order to redirect, protect, warn or maintain existing vehicular and pedestrian traffic during the course of construction.

### 1. Construction Phasing Requirements

N/A for this project.

## B. TRAFFIC CONTROL

1. The CONTRACTOR is required to submit a conceptual Traffic Control Plan at the Pre-Construction Conference. This preliminary plan should identify the phases of construction that the CONTRACTOR plans to proceed with and identify traffic flows during each phase. The ENGINEER will have ten (10) days to notify the CONTRACTOR of any comments. Once the conceptual plan for maintaining traffic has been approved, the CONTRACTOR will be required to submit a detailed plan showing each phase's Maintenance and Protection Plan prior to starting construction of any phase.
2. The "Maintenance of Traffic" plan shall include pedestrian traffic as well as vehicular traffic.

It shall be the responsibility of the CONTRACTOR for any necessary Construction, Pavement Marking and Signage or any Pedestrian Signalization and/or Signal Modification to accommodate an alternate safe walk route.

3. The CONTRACTOR, at all times, shall conduct the work in such a manner as to insure the least obstruction to traffic as is practical. Convenience of the general public and of the residents adjacent to the work shall be provided for in a satisfactory manner, as determined by the ENGINEER.

4. Sidewalks, gutters, drains, fire hydrants and private drives shall, insofar as practical, be kept in condition for their intended uses. Fire hydrants on or adjacent to the work shall be kept accessible to fire apparatus at all times, and no material or obstruction shall be placed within twenty (20) feet of any such hydrant.
5. All existing stop and street name signs will be maintained as long as deemed necessary by the ENGINEER.
6. The CONTRACTOR shall furnish a sufficient number of protective devices to protect and divert the vehicular and pedestrian traffic from working areas closed to traffic, or to protect any new work. Failure to comply with this requirement will result in the ENGINEER shutting down the work until the CONTRACTOR provides the necessary protection.
7. Any time traffic is diverted for a period of time that will exceed one-work day temporary pavement markings will be required. Existing pavement markings that conflict with the new work zone traffic pattern must be obliterated. Painting over existing pavement markings (black out) is not permitted.

#### 1.23 MAINTENANCE AND PROTECTION OF EXISTING DRAINAGE SYSTEM

- A. It shall be the responsibility of the contractor to maintain positive drainage on the surface and to ensure that the existing underground drainage system continues to function as intended during the construction of the new drainage system. The contractor shall submit a plan to maintain the existing drainage patterns and underground system for the approval of the CONSULTANT prior to beginning any work on the existing or new drainage systems. The cost of maintaining positive drainage and preparing the maintenance plan shall be included under maintenance of traffic and existing drainage system, of the Schedule of Prices Bid.

#### 1.24 APPLICATION FOR PAYMENT FOR STORED MATERIALS

- A. Application for payment for stored materials may not be made by the CONTRACTOR.

#### 1.25 SPECIAL CONDITIONS FOR CONSTRUCTION BY OTHER AGENCIES

- A. It will be the CONTRACTOR'S responsibility to coordinate construction schedules with other contractors so as to minimize disruptions, and inconveniences. The project site shall be safe at all times for construction workers and marina visitors.

#### **PART 2 PRODUCTS (Not Applicable)**

#### **PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## SECTION 01012 – NOT IN CONTRACT (N.I.C.) ITEMS

### **PART I GENERAL**

#### 1.01 RELATED DOCUMENTS

- A. All applicable provisions of the Contract Requirements, and Division I - General Requirements shall govern the work under this section.

#### 1.02 ITEMS TO BE PROVIDED UNDER SEPARATE CONTRACTS

- A. The following items of work are not included in the Contract (N.I.C. ITEMS) and shall be executed under separate contracts directly by the OWNER, other public entities, or other utilities:
  - 1. CONTRACTOR shall construct ADA facilities to match recently constructed ADA improvements and ensure ADA compliance.
- B. All other items indicated on the Drawings as N.I.C. ITEMS, and any items listed in the proposal form as N.I.C. ITEMS.

### **PART 2 PRODUCTS (Not Applicable)**

### **PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## SECTION 01025 - MEASUREMENT AND PAYMENT

### PART 1 GENERAL

#### 1.01 SUBMITTALS

- A. See Section 01340, Submittal Procedures, and all other references to document submittals. Submittals shall include, but are not limited to:
  - 1. Schedule of Values: Submit schedule on OWNER's form.
  - 2. Application for Payment.
  - 3. Final Application for Payment.

#### 1.02 SCHEDULE OF VALUES

- A. Prepare a schedule of values for the Work.
- B. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.
- C. Lump Sum Work:
  - 1. Reflect schedule of values format included in conformed Bid Form.
  - 2. List Bonds and insurance premiums, mobilization, demobilization, facility startup, and contract closeout separately.
  - 3. Break down by Divisions 2 through 16 with appropriate subdivision of each Specification.
- D. An unbalanced or front-end loaded schedule will not be acceptable.
- E. Summation of the complete schedule of values representing all the Work shall equal the Contract Price.

#### 1.03 APPLICATION FOR PAYMENT

- A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of CONTRACTOR.
- B. Use detailed Application for Payment Form provided by OWNER.
- C. Include accepted schedule of values for each portion of Work and the unit price breakdown for the Work to be paid on unit price basis, and a listing of OWNER-selected equipment, if applicable, and allowances, as appropriate.

D. Preparation:

1. Round values to nearest dollar.
2. List each Change Order and Written Amendment executed prior to date of submission as separate line item. Totals to equal those shown on the Transmittal Summary Form.
3. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form, a listing of materials on hand as applicable, and such supporting data as may be requested by OWNER.

1.04 MEASUREMENT—GENERAL

- A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and Specifications as specified in National Institute of Standards and Technology, Handbook 44.
- B. Whenever pay quantities of material are determined by weight, material shall be weighed on scales furnished by CONTRACTOR and certified accurate by state agency responsible. Weight or load slip shall be obtained from weigher and delivered to CONSTRUCTION MANAGER or OWNER's representative at point of delivery of material.
- C. If material is shipped by rail, car weights will be accepted provided that actual weight of material only will be paid for and not minimum car weight used for assessing freight tariff, and provided further that car weights will not be acceptable for material to be passed through mixing plants.
- D. Vehicles used to haul material being paid for by weight shall be weighed empty daily and at such additional times as required by CONSTRUCTION MANAGER. Each vehicle shall bear a plainly legible identification mark.
- E. Materials that are specified for measurement by the cubic yard measured in the vehicle shall be hauled in vehicles of such type and size that actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. Vehicles shall be loaded to at least their water level capacity. Loads hauled in vehicles not meeting above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.
- F. Where measurement of quantities depends on elevation of existing ground, elevations obtained during construction will be compared with those shown on Drawings. Variations of 1 foot or less will be ignored, and profiles shown on Drawings will be used for determining quantities.

- G. Units of measure shown on Bid Form shall be as follows, unless specified otherwise. All methods of measurement shall be approved by the CONSTRUCTION MANAGER.

Item	Method of Measurement
AC	Acre—Field Measure
CY	Cubic Yard—Field Measure within limits specified or shown, or measured in vehicle by volume, as specified
EA	Each—Field Count
GAL	Gallon—Field Measure
HR	Hour
LB	Pound(s)—Weight Measure by Scale
LF	Linear Foot—Field Measure
LS	Lump Sum—Unit is one; no measurement will be made
SF	Square Foot
SY	Square Yard
TON	Ton—Weight Measure by Scale (2,000 pounds)

#### 1.05 PAYMENT

A. General:

1. Progress payments will be made monthly.
2. The date for CONTRACTOR's submission of monthly Application for Payment.

#### 1.06 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected or unused material.
2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
3. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.
4. Material not unloaded from transporting vehicle.
5. Defective Work not accepted by OWNER.
6. Material remaining on hand after completion of Work.

#### 1.07 MOBILIZATION

- A. See Section 01505, Mobilization, for payment limitations. All environmental compliance matters on sheets SP-1 and SP-2 shall be included in Mobilization.

- B. Payment for mobilization will be made at an allowance price named in the Bid Schedule. Payment for mobilization will be made in equal monthly amounts during the duration of the original contract time.

#### 1.08 MAINTENANCE OF TRAFFIC (M.O.T.)

- A. See Section 01570, Traffic Regulations, and all other references to traffic control and maintenance, as well as parking control and maintenance in this document and any regulatory requirements.
- B. Payment for maintenance of traffic will be made at an allowance price named in the Bid Schedule. Payment for maintenance of traffic and parking activities will be made in equal monthly amounts during the duration of the original contract time.

#### 1.09 DEMOLITION

- A. Measurement for payment to remove and dispose of existing hardscape elements will be based on a lump sum inclusive of all work on the C drawings.
- B. This lump sum payment for removal and disposal of existing hardscape elements as indicated on the Design Drawings shall constitute full compensation for the removal and disposal of all concrete, asphalt or structures. This includes, but is not limited to sidewalks, curbs, aprons, concrete collars, brick pavers, and all other miscellaneous concrete as directed by the ENGINEER. Existing structures will not be compensated under this line item.

#### 1.10 PAVING AND DRAINAGE

- A. Measurement for payment to furnish and install drainage structures, inlets or top slabs, connections, and paving in addition to all required connections, modifications and cleaning of drainage facilities will be based on the line items provided for each item of work for all work to be performed on the applicable drawings, all in accordance with the requirements of the Contract Documents.
- B. Payment for furnishing and installing, modifying or cleaning all drainage appurtenances in the design drawings which price shall constitute full compensation for the completed installation of the structure including but not limited to excavation, backfill, compaction, modifications, disposal, cleaning, all required dewatering and full compliance with the Trench Safety Act.

#### 1.11 WATER AND SEWER

- A. Measurement for payment to furnish and install all water and sewer items will be lump sum for all work to be performed on the applicable drawings, all in accordance with the requirements of the Contract Documents.
- B. Payment for furnishing and installing all water and sewer items shall constitute full compensation for the completed installation of the structure including but not limited

to excavation, backfill, compaction, modifications, disposal, cleaning, all required dewatering and full compliance with the Trench Safety Act.

#### 1.12 STRUCTURES

- A. Measurement for payment to furnish and install all shade structures and other structures, will be lump sum for all work to be performed on the applicable drawings, all in accordance with the requirements of the Contract Documents.
- B. Payment for furnishing and installing shade structures and other structures, shall constitute full compensation for the completed installation of the structure including but not limited to excavation, dewatering, backfill, compaction, modifications, disposal and cleaning.

#### 1.13 AMENITIES

- A. Measurement for payment to furnish and install all amenities will be lump sum for all work to be performed on the applicable drawings, all in accordance with the requirements of the Contract Documents.
- B. Payment for furnishing and installing all amenities shall constitute full compensation for the completed installation of the structure including but not limited to excavation, dewatering, backfill, compaction, modifications, disposal and cleaning.

#### 1.14 LANDSCAPING

- A. Measurement for payment to furnish and install trees, sod, groundcover and irrigations will be lump sum for all work to be performed on the applicable drawings, all in accordance with the requirements of the Contract Documents.
- B. Payment for furnishing and installing all trees, sod, groundcover and irrigations, shall constitute full compensation for the completed installation of the structure including but not limited to excavation, dewatering, backfill, compaction, modifications, disposal and cleaning.

#### 1.15 ELECTRICAL

- A. Measurement for payment to furnish and install all electrical equipment and conduits, will be lump sum for all work to be performed on the applicable drawings, all in accordance with the requirements of the Contract Documents.
- B. Payment for furnishing and installing all electrical equipment and conduits, shall constitute full compensation for the completed installation of the structure including but not limited to excavation, dewatering, backfill, compaction, modifications, disposal and cleaning.

#### 1.16 PERMIT FEES

- A. Measurement for payment for permit fees will be based upon the actual permit fees required by the CONTRACTOR from the various agencies having jurisdiction for

construction of the project, all in accordance with the Contract Documents. The allowance for permit fee amounts shown on the bid schedule is an estimate of permit fees required for the project and is a cost pass through item. The permit fees are based on allowances and OWNER will reconcile the actual cost with the CONTRACTOR by change order. The CONTRACTOR shall produce documentation upon request verifying actual cost. Only permit fees substantiated and approved by the ENGINEER will be paid as part of this bid item.

- B. Because payment for permit fees will be paid as part of this bid item, payment for permit fees will not be paid as part of mobilization.

#### 1.17 CONSIDERATION FOR INDEMNIFICATION (OWNER/ENGINEER)

- A. Measurement for payment for indemnification of the OWNER and ENGINEER will be based upon the lump sum named for such work, all in accordance with the requirements of the contract documents.
- B. Payment will be twenty-five dollars for consideration for indemnification named in the bid schedule and shall constitute full compensation for indemnifying the OWNER and ENGINEER as specified in the contract documents.

#### 1.18 ALLOWANCE FOR FPL/COMCAST/AT&T

N/A for this project

#### **PART 2 PRODUCTS (Not Applicable)**

#### **PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## SECTION 01031 – ALTERATION PROJECT PROCEDURES

### PART 1 GENERAL

#### 1.01 REQUIREMENTS

- A. Coordinate work of trades and schedule elements of alterations and renovation work by procedure and methods to expedite completion of the work.
- B. In addition to demolition and that specifically shown, cut, move or remove items necessary to provide access or to allow alterations and new work to proceed. Include such items as:
  - 1. Repair or removal of hazardous or unsanitary conditions.
  - 2. Removal of abandoned items and items serving no useful purpose, such as abandoned piping, conduit and wiring.
  - 3. Removal of unsuitable or extraneous materials not marked for salvage, such as abandoned furnishings and equipment, and debris such as rotted wood, rusted metals and deteriorated concrete, shall be removed from the site expeditiously.
  - 4. Cleaning of surfaces, and removal of surface finished as needed to install new work and finishes.
  - 5. Protection as required for existing trees to remain.
  - 6. For purposes of all existing underground utilities work, coordinate as required by use of special telephone number shown on engineering drawings.
  - 7. Site storage for all existing benches, signals, signs, light poles, fire hydrants, manhole covers and grates to be relocated.
- C. Patch, repair and refinish existing items to remain, to the specified condition for each material, with a professional transition to adjacent new items of construction.

#### 1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

#### 1.03 ALTERATIONS, CUTTING AND PROTECTION

- A. Assign the work of moving, removal, cutting, patching and protection to trades qualified to perform the work in a manner to cause least damage to each type of work, and provide means of returning surfaces to appearance of new work.

- B. Perform cutting and removal work to remove minimum necessary, and in a manner to avoid damage to adjacent work.
  - 1. Cut finish surfaces such as paving, masonry, tile, plaster or metals, by methods to terminate surfaces in a straight line at a natural point of division.
- C. Perform cutting and patching as specified in Section 01045.
- D. Protect existing finishes, equipment, and adjacent work which is scheduled to remain, from damage.
  - 1. Protect existing and new work from weather and extremes of temperature.

## **PART 2 PRODUCTS**

### **2.01 PRODUCTS FOR PATCHING, EXTENDING AND MATCHING**

- A. General Requirements that work be complete:
  - 1. Provide same products or types of construction as that in existing structure, as needed to patch, extend or match existing work.
    - a. Generally Contract Documents will not define products or standards of working conduct present in existing construction; CONTRACTOR shall determine products in inspection and any necessary testing by use of the existing as a sample of comparison.
  - 2. Presence of a product, finish, or type of construction, requires that patching, extending or matching shall be performed as necessary to make work complete and consistent to existing identical standards of quality.

## **PART 3 EXECUTION**

### **3.01 PERFORMANCE**

- A. Patch and extend existing work using skilled mechanics who are capable of matching existing quality. Quality of patched or extended work shall be not less than that specified for new work.

### **3.02 DAMAGED SURFACES**

- A. Patch and replace any portion of an existing finished surface with the exception of concrete curb or gutter which is found to be damaged, lifted, discolored, or shows other imperfections. Damaged curbing shall be replaced in sections as directed by the engineer.
  - 1. Provide adequate support of substrate prior to patching the finish.
  - 2. Refinish patched portions of painted or coated surfaces in a manner to produce uniform color and texture over entire surface.

3. When existing surface finish cannot be matched, refinish entire surface to nearest intersections.

### 3.03 TRANSITION FROM EXISTING TO NEW WORK

- A. When new work abuts or is finished flush with existing work, make a smooth transition. Patched work shall match existing adjacent work in texture and appearance so that the patch of transition is invisible at a distance of five feet.
  1. When finished surfaces are cut in such a way that a smooth transition with new work is not possible, terminate existing surface in a neat manner along a straight line at a natural line of division, and provide trim appropriate to finished surface.

### 3.04 CLEANING

- A. Perform periodic and final cleaning as specified in Section 01710.
  1. Clean OWNER occupied areas daily.
  2. Clean spillage, overspray, and heavy collection of dust in OWNER occupied areas immediately.
- B. At completion of work of each trade, clean area and make surfaces ready for work of successive trades.
- C. At completion of alterations work in each area, provide final cleaning and return space to a condition suitable for use by OWNER.

### 3.05 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement or payment for the work in this section. Payment for work shall be included in all other work.

**END OF SECTION**

## SECTION 01040 - COORDINATION

### PART 1 GENERAL

#### 1.01 SUBMITTALS

##### A. Informational:

1. Statement of Qualification (SOQ) for land surveyor or civil engineer.
2. Statement of Qualification (SOQ) for professional videographer.

##### B. Photographs:

1. Color Prints: Submit two copies, accompanied by negatives or digital files, within 5 days of being taken.
2. Video Recordings: Submit two copies within 5 days of being taken.

#### 1.02 UTILITY NOTIFICATION AND COORDINATION

- A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work.
- B. Contact the City of Fort Lauderdale Public Services Department at 954-828-8000 for water and sewer utility locations.
- C. Contact Sunshine State One Call at 1-800-432-4770 at least 2 business days prior to any excavation.
- D. If damage occurs, or if conflicts or emergencies arise during Work, contact the appropriate utility.
  1. Electricity Company: Florida Power and Light.  
Contact Person: Trouble Center (or police/fire – 911).  
Telephone: 954-797-5000.
  2. Telephone Company: BellSouth.  
Contact Person: Jason Boschen.  
Telephone: 954-316-4005 or 954-605-1121.
  3. Water and Sewer Department: Fort Lauderdale Public Services Department.  
Contact Person: Emergency Hotline.  
Telephone: 954-828-8000.
  4. Gas Company: TECO Peoples Gas.  
Contact Person: Dispatch.  
Telephone: 305-957-3857, ext. 7490 or 1-877-832-6747.

5. Telecom: AT&T – Broadband/Comcast.  
Contact: Andy Vaspasiano.  
Telephone: 954-266-6589 or 954-444-2833.
6. Telecom: FP&L FiberNet.  
Contact: Noel R. Reese.  
Telephone: 305-552-3249 or 305-205-1283.
7. Broward County Traffic Engineering Division (For Traffic Signal Communications Systems Underground Cable and Traffic Loops):  
Contact: Keith Smith.  
Telephone: 954-484-9600, ext. 227.

### 1.03 PROJECT MEETINGS

#### A. General:

1. Engineer: Schedule physical arrangements for meetings throughout progress of Work, prepare meeting agenda with PCM, Owner and Contractor input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies minutes after each meeting to participants and parties affected by meeting decisions.
2. Representatives of PCM, Owner, Contractor, and Subcontractors shall attend meetings as needed.

#### B. Preconstruction Conference:

1. Contractor shall be prepared to discuss the following subjects, as a minimum:
  - A. Required schedules.
  - B. Status of Bonds and insurance.
  - C. Sequence of critical path work items.
  - D. Project changes and clarification procedures.
  - E. Use of site, access, office and storage areas, security and temporary facilities.
  - F. Major project delivery and priorities.
  - G. Contractor's safety plan and representative.
  - H. Progress payment procedures.
2. Attendees may include but not limited to:
  - A. Owner's representatives
  - B. PCM's representatives
  - C. Contractor's office representative
  - D. Contractor's resident superintendent
  - E. Contractor's quality control representative
  - F. Subcontractor's representatives whom Contractor may desire or PCM may request to attend.
  - G. Engineer's representatives.
  - H. Others as appropriate.

3. Preliminary Schedules Acceptability Review Meeting: As required to review and finalize Preliminary Schedule.

C. Progress Meetings:

1. Engineer will schedule regular progress meetings at site, conducted weekly to review Work progress, progress schedule, Shop Drawing and Sample submissions schedule, Application for Payment, contract modifications, and other matters needing discussion and resolution.
2. Attendees will include:
  - A. Owner's representatives, as appropriate.
  - B. PCM, as appropriate.
  - C. Contractor, Subcontractors and Suppliers, as appropriate.
  - D. Engineer's representative(s).
  - E. Others as appropriate.
3. On a monthly basis, the PCM will conduct a meeting to review work completed the previous month versus the Progress Schedule, work planned for upcoming month based on the Progress Schedule, the monthly Application for Payment, and any outstanding issues related to performance of the Work including pending contract modifications, requests for clarification, Shop Drawings, etc. All parties will attend the monthly meeting.

D. Pre-installation Meetings:

1. When required in individual Specification sections or as necessary to coordinate the Work, convene at site prior to commencing Work of that section.
2. Require attendance of entities directly affecting, or affected by, Work of that section.
3. Notify PCM 4 days in advance of meeting date.
4. Provide suggested agenda to PCM to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.

E. Other Meetings:

1. In accordance with the Contract Documents and as may be required by the Owner, PCM, and Engineer.

#### 1.04 FACILITY OPERATIONS

- A. Continuous operation of Owner's facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.

- B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of Owner's operations.
- C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of Owner's facilities.
- D. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Owner and Engineer. Such authorization will be considered within 48 hours after receipt of Contractor's written request.
- E. Provide **7** days advance written request for approval of need to shut down a process or facility to Owner and PCM.
- F. Power outages will be considered upon 48 hours written request to Owner and PCM. Describe the reason, anticipated length of time, and areas affected by the outage. Provide temporary provisions for continuous power supply to critical facility components.
- G. Do not proceed with Work affecting a facility's operation without obtaining Owner's and PCM's advance approval of the need for and duration of such Work.
- H. Relocation of Existing Facilities:
  - 1. During construction, it is expected that minor relocations of Work will be necessary.
  - 2. If Contractor determines that in order to expedite construction of new water and or sewer mains it would be necessary to temporarily remove and replace existing water services and/or sewer service connections, he will be responsible for the removal and replacement of such service connections at his own cost and effort. The City will not provide additional compensation for any costs associated with such effort. All labor and material costs associated with means and methods of construction will be compensated as part of the bid item(s) cost submitted by the Contractor. Additionally, the Contractor will have to coordinate and inform utility owner(s) and any City resident(s) impacted by such activities and must repair such utilities in a timely manner to minimize disruption of service.
  - 3. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, traffic loop detectors and other necessary items.
  - 4. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
  - 5. Perform relocations to minimize downtime of existing facilities.
  - 6. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by PCM.

## 1.05 BYPASS PUMPING

- A. Where the Work includes connections or modifications to existing sanitary sewer systems, wastewater flows shall be controlled through the pipeline sections and pump stations where work is being performed. Under no circumstances, can portions of the system be removed from service for periods of time in excess of that approved by the Owner. The Contractor shall be responsible to assess conditions and capacities of the existing sewerlines and pump stations in order to implement an acceptable bypass plan at no additional cost to the Owner. Bypass pumping will be required for all sewer and pump station construction that would result in shutdown of existing facilities. The Contractor shall supply the necessary pumps, conduits, and other equipment to not only divert flow around the pump station, manhole, or pipe section in which work is to be performed, but also to transmit the flow in downstream sewerlines and/or pump stations without surcharge. The bypass systems shall be of sufficient capacity to handle existing flows plus additional flows that may occur during periods of high tide or rainfall. Emergency backup pumping capability must be available in addition to the primary bypass system. The Contractor will be responsible for furnishing the necessary labor, power, and supervision to set up and operate the pumping and bypass systems. When pumping is in operation, all engines shall be equipped in a manner to keep the pump noise to a minimum and to comply with applicable noise ordinances.
- B. Contractor shall be responsible for any damage to properties or buildings connected to the sewer system, and to the pipeline, which result from the flow control activities.
- C. Contractor shall submit a bypass pumping plan for all proposed bypass pumping operations.

## 1.06 PHYSICAL CONDITIONS

- A. Exercise reasonable care to verify locations of existing subsurface structures and underground facilities.
- B. Thoroughly check immediate and adjacent areas subject to excavation by visual examination (and by electronic metal and pipe detection equipment, as necessary) for indications of subsurface structures and underground facilities.
- C. Make exploratory excavations where existing underground facilities or structures may potentially conflict with proposed underground facilities or structures. Conduct exploratory excavations in presence of Engineer and sufficiently ahead of construction to avoid possible delays to Contractor's Work.

## 1.07 ADJACENT FACILITIES AND PROPERTIES

- A. Examination:
1. After Effective Date of the Agreement and before Work at site is started, Contractor, PCM, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.

2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.

B. Documentation:

1. Record and submit documentation of observations made on examination inspections in accordance with paragraphs Construction Photographs and Audio-Video Recordings.
2. Upon receipt, Engineer will review, sign, and return one record copy of documentation to Contractor to be kept on file in field office.
3. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and Owner.

### 1.08 CONSTRUCTION PHOTOGRAPHS

A. Photographically document all unique portions of the construction including tie-ins to existing pipelines or facilities, crossings of existing utilities, buried valve and piping intersections, and other work items that will not otherwise be visible after completion of construction.

B. Film or file handling and development shall be done by a commercial laboratory.

C. PCM and Engineer shall have the right to select the subject matter and vantage point from which photographs are to be taken.

D. Construction Progress Photos:

1. Photographically demonstrate progress of construction, showing every aspect of site and adjacent properties as well as interior and exterior of new or impacted structures.
2. Monthly: Take 24 exposures using 35 mm color film or digital photographs of comparable quality, unless otherwise approved by the PCM.

E. Color Prints:

1. Minimum Size: 3-inch by 5-inch.
2. Finish: Glossy.
3. Label Each Print:
  - A. Project Name.
  - B. Date and time photo was taken.
  - C. Photographer's name.
  - D. Caption (maximum 30 characters).
  - E. Location and area designation.
  - F. Schedule activity number, as appropriate.

4. Assemble in bound albums in clear plastic sleeves that facilitate viewing both front and back of each photograph.
5. Assemble negatives in their corresponding album in clear plastic sleeves made for the purpose or on recordable CD media organized by project segment.

#### 1.09 AUDIO-VIDEO RECORDINGS

- A. Prior to beginning Work on construction site or of a particular area of the Work, and again within 10 days following date of Substantial Completion, videograph construction site and property adjacent to construction site.
- B. In the case of preconstruction recording, no Work shall begin in the area prior to PCM's review and approval of content and quality of video for that area.
- C. Particular emphasis shall be directed to physical condition of existing vegetation, structures, and pavements within pipeline alignment and areas adjacent to and within the right-of-way or easement, and on Contractor storage and staging areas.
- D. PCM and Engineer shall have right to select subject matter and vantage point from which videos are to be taken.
- E. Videotaping shall be by a professional commercial videographer, experienced in shooting construction videos.
- F. Video Format and Quality:
  1. DVD format, with sound.
  2. Video:
    - A. Produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections.
    - B. Electronically, and accurately display the month, day, year, and time of day of the recording.
  3. Audio:
    - A. Audio documentation shall be done clearly, precisely, and at a moderate pace.
    - B. Indicate date, Project name, and a brief description of the location of taping, including:
      1. Facility name;
      2. Street names or easements;
      3. Addresses of private property; and
      4. Direction of coverage, including engineering stationing, if applicable.

G. Documentation:

1. Provide two copies to the Owner.
2. DVD Label:
  - A. DVD number (numbered sequentially, beginning with 001).
  - B. Project Name.
  - C. Name of street(s) or easement(s) included.
  - D. Applicable location by engineering stationing.
  - E. Date and time of coverage.
3. Project DVD Log: Maintain an ongoing log that incorporates above noted label information for DVD'S on Project.

H. The Following Shall be Included with the Video Documentation:

1. Coverage is required within and adjacent to the rights-of-way, easements, storage, and staging areas where the work is being constructed.
2. Documentation of the conditions of the adjacent properties or any affected structures as a result of the impending construction.
3. Certification as to date work done and by whom.
4. All videos shall be keyed to the construction drawings, provided with an index and a written narrative.

I. Preconstruction and Post-Construction Videos Shall be Submitted as follows:

1. Preconstruction videos shall be presented to the Owner at the preconstruction conference.
2. Post-construction videos shall be submitted prior to final project closeout. This submittal is contingent to final payment.

J. Payment for the work in this Section will be included as part of the lump sum price for mobilization/demobilization.

#### 1.10 REFERENCE POINTS, SURVEYS, AND RECORD DRAWINGS

A. Location and elevation of benchmarks are shown on Drawings.

B. Contractor's Responsibilities:

1. Provide all survey efforts required to layout the Work.

2. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
3. In event of discrepancy in data or benchmarks, request clarification before proceeding with Work.
4. Retain a professional land surveyor or civil engineer registered in the State of Florida who shall perform or supervise all surveying necessary for construction staking and layout and obtaining record information for as-built and record drawing preparation.
5. Maintain complete accurate log of survey Work as it progresses as a Record Document. The Contractor is responsible for the quality control of horizontal location and vertical elevations of the installed project.
6. On request of PCM, submit documentation.
7. Provide competent employee(s), tools, stakes, and other equipment and materials as PCM may require to:
  - A. Establish control points, lines, and easement boundaries.
  - B. Check layout, survey, and measurement Work performed by others.
  - C. Measure quantities for payment purposes.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION**

### **3.01 CUTTING, FITTING, AND PATCHING**

- A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.
- B. Obtain prior written authorization of Engineer before commencing Work to cut or otherwise alter:
  1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
  2. Weather- or moisture-resistant elements.
  3. Efficiency, maintenance, or safety of element.
  4. Work of others.
- C. Refinish surfaces to provide an even finish.
  1. Refinish continuous surfaces to nearest intersection.

2. Refinish entire assemblies.
3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and Work is evident in finished surfaces.
  - A. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown.
  - B. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.

## SECTION 01045 – CUTTING AND PATCHING

### PART 1 GENERAL

#### 1.01 REQUIREMENTS INCLUDED

- A. CONTRACTOR shall be responsible for all cutting, fitting and patching, including attendant excavation and backfill, required to complete the work or to:
  - 1. Make its several parts fit together properly.
  - 2. Uncover portions of the work to provide for installation of ill-timed work.
  - 3. Remove and replace defective work.
  - 4. Remove and replace work not conforming to requirements of Contract Documents.
  - 5. Remove samples of installed work as specified for testing.
  - 6. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.

#### 1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

#### 1.03 SUBMITTALS

- A. Submit a written request to ENGINEER well in advance of executing any cutting or alteration, which affects:
  - 1. Work of the OWNER or any separate CONTRACTOR.
  - 2. Structural value of integrity of any element of the project.
  - 3. Integrity of effectiveness of weather-exposed or moisture-resistant elements or systems.
  - 4. Efficiency, operational life, maintenance or safety of operational elements.
  - 5. Visual qualities of sight-exposed elements.
- B. Request shall include:
  - 1. Identification of the project.

2. Description of the affected work.
  3. The necessity for cutting, alteration or excavation.
  4. Effect on work of OWNER or any separate CONTRACTOR, or on structural or weatherproof integrity of project.
  5. Description of proposed work:
    - a. Scope of cutting, patching, alteration, or excavation.
    - b. Trades who will execute the work.
    - c. Products proposed to be used.
    - d. Extent of refinishing to be done.
  6. Alternatives to cutting and patching.
  7. Cost proposal, when applicable.
  8. Written permission of any separate CONTRACTOR whose work will be affected.
- C. Should conditions of work or the schedule indicate a change of products from original installation, CONTRACTOR shall submit request for substitution as specified in Section 01600, paragraph 1.08.
- D. Submit written notice to ENGINEER designating the date and time the work will be uncovered.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Comply with specifications and standards for each specific product involved.

## **PART 3 EXECUTION**

### **3.01 INSPECTION**

- A. Inspect existing conditions of project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering the work, inspect conditions affecting installation of products, or performance of work.
- C. Report unsatisfactory or questionable conditions affecting installation of products, or performance of work.

### **3.02 PREPARATION**

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of work.

- B. Provide devices and methods to protect other portions of project from damage.
- C. Provide protection from elements for that portion of the project, which may be exposed by cutting and patching, work, and maintain excavations free from water.

### 3.03 PERFORMANCE

- A. Execute cutting and demolition by methods, which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods, which will prevent settlement or damage to other work.
- C. Employ original Installer or Fabricator to perform cutting and patching for:
  - 1. Weather-exposed or moisture-resistant elements.
  - 2. Sight-exposed finished surfaces.
- D. Execute fitting and adjustment of products to provide a finished installation to comply with specified product, functions, tolerances and finishes.
- E. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.
- F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
  - 1. For continuous surfaces, refinish to nearest intersection.
  - 2. For an assembly, refinish entire unit.

### 3.04 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement or payment for the work under this section, it shall be included in the unit price bid of any item requiring cutting and patching, including pavement restoration.

**END OF SECTION**

## SECTION 01050 – PROJECT MANAGEMENT

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Coordination Drawings.
  - 2. Special Project Procedures
  - 3. Administrative and supervisory personnel.
  - 4. Project meetings.
  - 5. Requests for Information (RFIs).
- B. Related Sections include the following:
  - 1. Section 01200, "Project Meetings"
  - 2. Section 01311, "Construction Progress Documentation"
  - 3. Section 01340, "Submittal Procedures"
  - 4. Section 1700, "Contract Closeout "

#### 1.03 DEFINITIONS

- A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

#### 1.04 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
  4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for City and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
  2. Preparation of the Schedule of Values.
  3. Installation and removal of temporary facilities and controls.
  4. Delivery and processing of submittals.
  5. Progress meetings.
  6. Project closeout activities.

#### 1.05 SUBMITTALS

- A. Key Personnel Names: Within 5 days of notice to proceed, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

#### 1.06 SPECIAL PROJECT PROCEDURES

- A. Discrepancies, Errors: Should discrepancies or errors appear in the drawings or specifications concerning materials, workmanship, or quantity of work to be performed, the Contractor will be required to immediately notify the City before

proceeding with the work. If the Contractor fails to notify the City and proceeds with the work, Contractor will be required to correct the errors at his/her own expense. In the event of a conflict between the drawings and specifications, the City will decide on the way to perform the work or supply the materials.

- B. Dimensions and Measurements: The figured dimensions on the drawings or notes including dimensions shall be used for construction instead of measurements of the drawings by scale. No scale measurements shall be used as a dimension for construction. Dimensions on all drawings as well as the detail drawings themselves are subject in every case to measurements of adjacent or previously completed work. All such measurements necessary shall be taken before undertaking any work dependent upon such data. Field verification of dimensions on plans is mandatory since actual locations, distances, and levels will be governed by actual field conditions.
- C. Discrepancies or Inconsistencies: Should any discrepancy or inconsistency appear between larger and smaller scale drawings in any of the divisions of the specifications or in any of the contract documents, such discrepancy shall be immediately submitted to the City for correction before proceeding with the work in question. In no case shall the Contractor make any alterations, erasures, changes or modifications in the drawings or specifications.
  - 1. Should it appear that any of the work as specified or shown by the drawings is not sufficiently detailed or explained, the Contractor shall apply to the City for such further details or information as may be necessary for full understanding of the work in question.
  - 2. The data set forth in these specifications and indicated on the drawings are as accurate as can be obtained, but their extreme accuracy is not guaranteed. Final application thereto shall be determined on the job as conditions may demand and subject to the approval of the City.
- D. Plans and Specifications Acknowledgment by Subcontractors and Suppliers: All Subcontractors and Suppliers must submit, through the General Contractor to the City's Engineer, a statement on their individual letterhead stationery, signed and sealed with their corporate seal, or a notarized statement on their letterhead stationery in the absence of a corporate seal, that the individual Subcontractor or Supplier:
  - 1. Has received or reviewed a FULL set of approved plans and specifications for the project,
  - 2. Is aware that items concerning their particular trade may be shown and/or detailed in other trades or sections of the plans and specifications, and
  - 3. Will comply with said plans, specifications and all applicable codes and permit requirements.
- E. In the event a Subcontractor or Supplier notes a mistake or details appear incomplete, or if there are questions or concerns with the plans and specifications,

the Subcontractor or Supplier will immediately notify the General Contractor. No work will proceed until such conflicts or questions are resolved in writing.

- F. The Subcontractor will not be permitted to start work, nor will any Shop drawings/submittals be accepted for review from a supplier until this letter of acknowledgment is received and approved by the General Contractor and City's Engineer. Also, the City will not process any pay request for the work of any Subcontractor or Supplier whose acknowledgment letter is not on file with the City.

#### 1.07 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
  - 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
  - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
  - 1. City Project Number
  - 2. City Project Name.
  - 3. Date.
  - 4. Name of Contractor.
  - 5. RFI number, numbered sequentially.
  - 6. Specification Section number and title and related paragraphs, as appropriate.
  - 7. Drawing number and detail references, as appropriate.
  - 8. Field dimensions and conditions, as appropriate.
  - 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 10. Contractor's signature.
  - 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

- a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
12. Identify each page of attachments with the RFI number and sequential page number.
- C. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above. Word Template is available upon request from the City's Engineer's Office.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Engineer's Action: Engineer will review each RFI, determine action required, and return it. Allow seven working days for Engineer's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for coordination information already indicated in the Contract Documents.
    - d. Requests for adjustments in the Contract Time or the Contract Sum.
    - e. Requests for interpretation of Engineer's actions on submittals.
    - f. Incomplete RFIs or RFIs with numerous errors.
  2. Engineer's action may include a request for additional information, in which case Engineer's time for response will start again.
  3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 days of receipt of the RFI response.
- E. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly. Include the following:
1. Project name.
  2. Name and address of Contractor.
  3. RFI number including RFIs that were dropped and not submitted.

4. RFI description.
5. Date the RFI was submitted.
6. Date Engineer's response was received.
7. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## SECTION 01060 – REGULATORY REQUIREMENTS & PERMITS

### PART 1 GENERAL

#### 1.01 REQUIREMENTS INCLUDED

- A. CONTRACTOR shall comply with all building codes appropriate to the project, including those of:
  - 1. National Electric Code.
  - 2. Florida Building Code. (Latest Revision)
- B. CONTRACTOR shall comply with these codes, laws, regulations, rules, directives of all agencies, boards, districts, and governmental bodies having jurisdiction.
- A. CONTRACTOR shall obtain and pay the cost of all building permits, fees, tie-in or connection charges associated with the project.
- D. The CONTRACTOR shall obtain construction permits from Broward County Planning and Environmental Regulation Division license(s), Florida Department of Environmental Protection, Fort Lauderdale Building Department and file a NOI with FDEP for NPDES compliance. Fort Lauderdale Building Permit will be available for pickup by CONTRACTOR once Notice to Proceed has been granted.

#### 1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

#### 1.03 MEASUREMENT AND PAYMENT

- A. CONTRACTOR shall be reimbursed for permit fees as described in Section 01025.

### PART 2 PRODUCTS (Not Applicable)

### PART 3 EXECUTION (Not Applicable)

**END OF SECTION**

## SECTION 01070 – ABBREVIATIONS OF INSTITUTIONS

### PART 1 GENERAL

#### 1.01 GENERAL

- A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these Specifications, the following acronyms or abbreviations, which may appear in these Specifications, shall have the meanings indicated herein.

#### 1.02 ABBREVIATIONS

AAMA	Architectural Aluminum Manufacturer's Association
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHAM	Association of Home Appliance Manufacturers
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANS	American Nuclear Society
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
ASA	American Standards Association
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association

BBC	Basic Building Code, Building Officials and Code Administrators International
BCPERD	Broward County Planning and Environmental Regulation Division
BCHCED	Broward County Highway Construction & Engineering Division
BCHD	Broward County Health Department
BCTED	Broward County Traffic Engineering Division
BCWRMD	Broward County Water Resource Management Division
BCWWS	Broward County Water & Wastewater Services Division
BHMA	Builders Hardware Manufacturer's Association
CBM	Certified Ballast Manufacturers
CEMA	Conveyors Equipment Manufacturer's Association
CGA	Compressed Gas Association
CLFMI	Chain Link Fence Manufacturer's Institute
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DIPRA	Ductile Iron Pipe Research Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
EPA	Environmental Protection Agency
FBC	Florida Building Code
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FM	Factory Mutual System
FPL	Florida Power & Light
FS	Federal Specifications
HI	Hydraulics Institute
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IME	Institute of Makers of Explosives
IP	Institute of Petroleum (London)
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
MBMA	Metal Building Manufacturer's Association
MPTA	Mechanical Power Transmission Association
MSS	Manufacturers Standardization Society
MTI	Marine Testing Institute
NAAMM	National Association of Architectural Metal Manufacturer's
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NCCLS	National Committee for Clinical Laboratory Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NLGI	National Lubricating Grease Institute
NMA	National Microfilm Association

NSF	National Sanitation Foundation
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PPI	Plastics Pipe Institute
RCRA	Resource Conservation and Recovery Act
RIS	Redwood Inspection Service
RVIA	Recreational Vehicle Industry Association
RWMA	Resistance Welder Manufacturer's Association
SAE	Society of Automotive Engineers
SAMA	Scientific Apparatus Makers Association
SB	Southern Bell
SFWMD	South Florida Water Management District
SMA	Screen Manufacturers Association
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SPI	Society of the Plastics Industry, Inc.
SPIB	Southern Pine Inspection Bureau
SPR	Simplified Practice Recommendation
SSA	Swedish Standards Association
SSBC	Southern Standard Building Code, Southern Building Code Congress
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
TAPPI	Technical Association of the Pulp and Paper Industry
TFI	The Fertilizer Institute
UL	Underwriters Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WEF	Water Environment Federation
WIC	Woodwork Institute of California
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## SECTION 01090 – REFERENCE STANDARDS

### PART 1 GENERAL

#### 1.01 GENERAL

- A. Titles of Sections and Paragraphs: Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.
- B. Applicable Publications: Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the WORK is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.
- C. Specialists, Assignments: In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the CONTRACTOR has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the WORK; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the CONTRACTOR.

#### 1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of other requirements of the Specifications, all work specified herein shall conform to or exceed the requirements of applicable codes and the applicable requirements of the following documents.
- B. References herein to "Building Code" shall mean "Florida Building Code". References to "Mechanical Code" or "Uniform Mechanical Code," "Plumbing Code" or "Uniform Plumbing Code," "Fire Code" or "Uniform Fire Code," shall mean Uniform Mechanical Code, Uniform Plumbing Code and Uniform Fire Code of the International Conference of the Building Officials (ICBO). "Electric Code" or "National Electric Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the WORK is advertised for bids, as adopted by the agency having jurisdiction, shall apply to the WORK herein, including all addenda, modifications, amendments, or other lawful changes thereto.

- C. In case of conflict between codes, reference standards, drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the ENGINEER for clarification and directions prior to ordering or providing any materials or furnishing labor. The CONTRACTOR shall bid for the most stringent requirements.
- D. The CONTRACTOR shall construct the WORK specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein.
- E. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
- F. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

### 1.03 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the CSI/CSC's "MasterFormat" numbering system.
  - 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
  - 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
  - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

- a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

#### 1.04 REGULATIONS RELATED TO HAZARDOUS MATERIALS

- A. The CONTRACTOR is responsible that all work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing the storage and conveyance of hazardous materials, including petroleum products.
- B. Where no specific regulations exist, all chemical, hazardous, and petroleum product piping and storage in underground locations must be installed with double containment piping and tanks, or in separate concrete trenches and vaults, or with an approved lining which cannot be penetrated by the chemicals, unless waived in writing by the OWNER.

#### **PART 2 PRODUCTS (Not Applicable)**

#### **PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## SECTION 01152 – APPLICATIONS FOR PAYMENT

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
  - 1. Division 01 Section "Alteration Project Procedures" for administrative procedures for handling changes to the Contract.
  - 2. Division 01 Section "Measurement and Payment" for administrative requirements governing use of unit prices.
  - 3. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

#### 1.03 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
  - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
  - 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
  - 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    - a. Differentiate between items stored on-site and items stored off-site. For items stored off-site include evidence of insurance or bonded warehousing.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as General Conditions expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

#### 1.05 APPLICATIONS FOR PAYMENT

- A. The General Contractor must meet with the City Representative on or about the 25th of each month. The City Representative will go over the pay items and agree on the quantities and the dollar amounts of the work completed during the month. A copy of the agreed amounts will be signed by the parties and a copy will be left with each representative.
- B. The General Contractor will make up a partial pay request using the City-supplied forms and submit the request to the City Representative before the first of the upcoming month.
- C. Each pay request must be accompanied by a partial release of lien by the General Contractor and by all Subcontractors, suppliers, and for all labor, as outlined below.
  1. Starting with the second (2nd) pay request and for each and every pay request thereafter, the General Contractor shall submit partial release of liens from all Subcontractors, suppliers, and laborers covering the preceding month's request (SEE FOLLOWING EXAMPLE).
  2. EXAMPLE: In the first (1st) pay request, payment is requested by General Contractor for the asbestos contractor and the electrician. The General Contractor must attach his partial release of lien.
  3. For the second (2nd) pay request, the General Contractor must attach his partial release of lien from the asbestos contractor and the electrician for the amounts billed in the 1st pay request; i.e., the General Contractor will be running one (1) month behind with the releases from the Subcontractors, suppliers, etc., until the final pay request.

- D. For each payment application requesting payment for undergrounding allowance for undergrounding work for overhead utilities, written authorization of payment from each utility being requested must be received with payment application.
- E. For the final pay request, the General Contractor will be required to submit FINAL release of liens for ALL Subcontractors, suppliers, etc., and for ALL labor BEFORE FINAL PAYMENT WILL BE MADE.
- F. No partial payments, after the first payment, will be made until all partial release of liens are submitted for the preceding month's billing, as described
- G. Each Application for Payment shall be consistent with previous applications and payments as certified by and paid for by City.
- H. Payment Application Forms: Use City Form "PERIODIC ESTIMATE FOR PARTIAL PAYMENT" as form for Applications for Payment.
  - 1. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. City will return incomplete applications without action.
  - 2. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
  - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- I. Release of Lien: With each Application for Payment, submit release of lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  - 1. Submit partial release of lien on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit final release of lien.
  - 3. City reserves the right to designate which entities involved in the Work must submit release of lien forms.
- J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1. List of subcontractors.
  - 2. Schedule of Values.
  - 3. Contractor's Construction Schedule (preliminary if not final).
  - 4. Products list.
  - 5. Submittals Schedule (preliminary if not final).
  - 6. List of Contractor's staff assignments.
  - 7. Copies of building permits.
  - 8. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.

9. Initial progress report.
  10. Report of preconstruction conference.
- K. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. Evidence that claims have been settled.
  5. Final liquidated damages settlement statement.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## SECTION 01200 – PROJECT MEETINGS

### PART 1 GENERAL

#### 1.01 REQUIREMENTS INCLUDED

- A. CITY's Representative shall schedule and administer a preconstruction meeting, progress meetings at a minimum of every two weeks on a day established by the CITY's Representative and specially called meetings throughout progress of the work.
  - 1. Prepare agenda for meetings.
  - 2. Distribute written notice of each meeting five (5) days in advance of meeting date.
  - 3. Make physical arrangements for meetings.
  - 4. Preside at meetings.
  - 5. Record the minutes; include significant proceedings and decisions.
  - 6. Reproduce and distribute copies of minutes within three days after each meeting.
    - a. To participants in the meeting.
    - b. To parties affected by decisions made at the meeting.
    - c. Furnish three copies of minutes to CITY's Representative.
- B. Representative of CONTRACTOR, subcontractor and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- C. ENGINEER shall attend all meetings.

#### 1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

#### 1.03 PRE-CONSTRUCTION MEETING

- A. Schedule after date of Notice to Proceed.
- B. Location: A central site, convenient for all parties, designated by CITY's Representative.
- C. Attendance:
  - 1. The CONTRACTOR and its superintendent.

2. CITY'S ENGINEER and CITY'S ENGINEER'S professional consultants.
  3. Resident Project Representative.
  4. Representatives of the OWNER.
  5. Major subcontractors.
  6. Major Suppliers.
  7. Governmental representatives as appropriate.
  8. Others as requested by CONTRACTOR, CITY or CITY'S ENGINEER.
- D. Suggested Agenda:
1. Distribution and discussion of:
    - a. List of major subcontractors and suppliers.
    - b. Projected Construction Schedules.
    - c. Shop drawings and other submittals.
    - d. Traffic maintenance plan.
    - e. Community Public Relations.
  2. Critical work sequencing.
  3. Procurement of major equipment and materials requiring a long lead time.
  4. Project Coordination
    - a. Designation of responsible personnel.
  5. Procedures and processing of:
    - a. Field decisions.
    - b. Proposal requests.
    - c. Submittals.
    - d. Change Orders.
    - e. Applications for Payment
  6. Adequacy of distribution of Contract Documents.
  7. Procedures for maintaining Record Documents.
  8. Use of premises:
    - a. Office, work and storage areas.
    - b. CITY's requirements.
  9. Construction facilities, controls and construction aids.

10. Temporary utilities.
11. Safety procedures.
12. Security procedures.
13. Housekeeping procedures.

#### 1.04 PROGRESS MEETINGS

- A. Schedule regular biweekly meetings on a day established by the CITY's Representative as required.
- B. Hold called meetings as required by progress of the work.
- C. Location of the meetings: Project field office of CITY's Representative.
- D. Attendance
  1. CITY's Representative and CITY's professional consultants as needed.
  2. ENGINEER.
  3. Subcontractors as active on the site.
  4. Suppliers as appropriate to the agenda.
  5. Governmental representatives as appropriate.
  6. Others, as requested by CONTRACTOR, CITY or CITY'S ENGINEER.
- E. Suggested Agenda:
  1. Review, approval of minutes of previous meeting.
  2. Review of work progress since previous meeting.
  3. Field observations, problems, and conflicts.
  4. Problems, which impeded Construction Schedule.
  5. Review of off-site fabrication, delivery schedules.
  6. Corrective measures and procedures to regain projected schedule.
  7. Revisions to Construction Schedule.
  8. Progress, schedule, during succeeding work period.
  9. Coordination of schedules.

10. Community Public Relations.
11. Review submittal schedules; expedite as required.
12. Maintenance of quality standards.
13. Pending changes and substitutions.
14. Review proposed changes for:
  - a. Effect on Construction Schedule and on completion date.
  - b. Effect on other contracts of the Project.
15. Other business.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## **SECTION 01311 – CONSTRUCTION PROGRESS DOCUMENTATION**

### **PART 1 GENERAL**

#### **1.01 RELATED DOCUMENTS**

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

#### **1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Preliminary Construction Schedule.
  - 2. Contractor's Construction Schedule.
  - 3. Submittals Schedule.
  - 4. Daily construction reports.
  - 5. Material location reports.
  - 6. Field condition reports.
  - 7. Special reports.
- B. Related Sections include the following:
  - 1. Section 01152 – Applications for Payment
  - 2. Section 01050 – Project Management
  - 3. Section 01340 – Submittal Procedures
  - 4. Section 01311 – Construction Photographs
  - 5. Section 01400 – Quality Control

#### **1.03 DEFINITIONS**

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.

2. Predecessor Activity: An activity that precedes another activity in the network.
  3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
  - C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
  - D. Event: The starting or ending point of an activity.
  - E. Float: The measure of leeway in starting and completing an activity.
    1. Float time is not for the exclusive use or benefit of either City or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
    2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
    3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
  - F. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
  - G. Milestone: A key or critical point in time for reference or measurement.
  - H. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
  - I. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

#### 1.04 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
  1. Scheduled date for first submittal.
  2. Specification Section number and title.
  3. Submittal category (action or informational).
  4. Name of subcontractor.

5. Description of the Work covered.
  6. Scheduled date for Engineer's final release or approval.
- B. Preliminary Construction Schedule: Submit three opaque copies.
1. Approval of cost-loaded preliminary construction schedule will not constitute approval of Schedule of Values for cost-loaded activities.
- C. Preliminary Network Diagram: Submit three opaque copies, large enough to show entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Submit three opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
- E. CPM Reports: Concurrent with CPM schedule, submit three copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
  2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
  3. Total Float Report: List of all activities sorted in ascending order of total float.
- F. Daily Construction Reports: Submit two copies at monthly intervals.
- G. Material Location Reports: Submit two copies at monthly intervals.
- H. Field Condition Reports: Submit two copies at time of discovery of differing conditions.
- I. Special Reports: Submit two copies at time of unusual event.

#### 1.05 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments for performing critical elements of the Work from parties involved.
  2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

## **PART 2 PRODUCTS**

### **2.01 SUBMITTALS SCHEDULE**

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
  - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
  - 2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first 20 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
    - a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
  - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

### **2.02 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL**

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
- C. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
  - 1. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following: The schedule shall clearly indicate the critical path and all activities associated with it. The dependencies shall be clearly delineated.
  - 2. All activities with a time duration exceeding five (5) days shall be shown as separate items.
  - 3. Include procurement process activities for the following long lead items and major items as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 4. Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.

5. Where materials require more than one (1) week fabrication or order time, this order/fabrication time shall be shown.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. City-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  2. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Use of premises restrictions.
    - b. Environmental control.
  3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Subcontract awards.
    - b. Submittals.
    - c. Purchases.
    - d. Fabrication.
    - e. Sample testing.
    - f. Deliveries.
    - g. Installation.
    - h. Tests and inspections.
    - i. Adjusting.
    - j. Curing.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, Final Completion, and Certificate of Occupancy.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.
- G. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.
1. Microsoft Project 2000 for Windows 2000 operating system.

## 2.03 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 10 days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.

- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

## 2.04 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  - 1. List of subcontractors at Project site.
  - 2. List of separate contractors at Project site.
  - 3. Approximate count of personnel at Project site.
  - 4. Equipment at Project site.
  - 5. Material deliveries.
  - 6. High and low temperatures and general weather conditions.
  - 7. Accidents.
  - 8. Meetings and significant decisions.
  - 9. Unusual events (refer to special reports).
  - 10. Stoppages, delays, shortages, and losses.
  - 11. Emergency procedures.
  - 12. Orders and requests of authorities having jurisdiction.
  - 13. Change Orders received and implemented.
  - 14. Construction Change Directives received and implemented.
  - 15. Services connected and disconnected.
  - 16. Equipment or system tests and startups.
  - 17. Partial Completions and occupancies.
  - 18. Substantial Completions authorized.
- B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## 2.05 SPECIAL REPORTS

- A. General: Submit special reports directly to City within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise City in advance when these events are known or predictable.

## **PART 3 EXECUTION**

### 3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Engineer, City Representative, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

**END OF SECTION**

## SECTION 01340 – SUBMITTAL PROCEDURES

### PART 1 GENERAL

#### 1.01 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.

#### 1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
  - 1. Section 01152, Applications for Payment
  - 2. Section 01050, Project Management
  - 3. Section 01311, Construction Progress Documentation
  - 4. Section 01340, Construction Photographs
  - 5. Section 01400, Quality Control
  - 6. Section 01700, Contract Closeout
  - 7. Section 01720, Project Record Documents
  - 8. Divisions 02 through 16 Sections for specific requirements for submittals in those Sections.

#### 1.03 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Engineer's responsive action.
- B. Informational Submittals: Written information that does not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

#### 1.04 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
  - a. City reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow 10 days for review of each resubmittal.
- D. Identification: Place a permanent label or title block on each submittal for identification.
  1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by City.
  3. Include the following information on label for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name and address of Contractor.
    - d. Name and address of subcontractor.
    - e. Name and address of supplier.
    - f. Name of manufacturer.
    - g. Submittal number or other unique identifier, including revision identifier.
      - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
    - h. Number and title of appropriate Specification Section.
    - i. Drawing number and detail references, as appropriate.

- j. Location(s) where product is to be installed, as appropriate.
  - k. General Contractor's stamp of approval must be on all submittals, indicating that the Contractor has reviewed and approved prior to submitting to the City.
- E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return submittals, without review, received from sources other than Contractor.
  - 1. Transmittal Form: Provide locations on form for the following information:
    - a. Project name.
    - b. Date.
    - c. Destination (To:).
    - d. Source (From:).
    - e. Names of subcontractor, manufacturer, and supplier.
    - f. Category and type of submittal.
    - g. Submittal purpose and description.
    - h. Specification Section number and title.
    - i. Drawing number and detail references, as appropriate.
    - j. Transmittal number, numbered consecutively.
    - k. Remarks.
    - l. Signature of transmitter.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked "Approved as submitted" or "Approved as noted".
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, Fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating "Approved as submitted" or "Approved as noted" by Engineer.

## **PART 2 PRODUCTS**

## 2.01 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Standard color charts.
    - e. Manufacturer's catalog cuts.
    - f. Wiring diagrams showing factory-installed wiring.
    - g. Printed performance curves.
    - h. Operational range diagrams.
    - i. Mill reports.
    - j. Standard product operation and maintenance manuals.
    - k. Compliance with specified referenced standards.
    - l. Testing by recognized testing agency.
    - m. Application of testing agency labels and seals.
    - n. Notation of coordination requirements.
  - 4. Submit Product Data before or concurrent with Samples.
  - 5. Number of Copies: Submit five copies of Product Data, unless otherwise indicated. Engineer will return two copies. Mark up and retain one returned copy as a Project Record Document.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
  - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.
    - d. Roughing-in and setting diagrams.
    - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    - f. Shopwork manufacturing instructions.

- g. Templates and patterns.
  - h. Schedules.
  - i. Design calculations.
  - j. Compliance with specified standards.
  - k. Notation of coordination requirements.
  - l. Notation of dimensions established by field measurement.
  - m. Relationship to adjoining construction clearly indicated.
  - n. Seal and signature of professional engineer if specified.
  - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 24 by 36 inches (750 by 1000 mm).
3. Number of Copies: Submit five opaque copies of each submittal. City will retain three copies; remainder will be returned.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of appropriate Specification Section.
  - 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as City's property, are the property of Contractor.
  - 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. City will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  - a. Number of Samples: Submit three sets of Samples. City will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
    - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
    - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
  1. Type of product. Include unique identifier for each product.
  2. Number and name of room or space.
  3. Location within room or space.
  4. Number of Copies: Submit five copies of product schedule or list, unless otherwise indicated. City will return two copies.
    - a. Mark up and retain one returned copy as a Project Record Document.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for Construction Manager's action.
- G. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- H. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- I. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or

equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number of Copies: Submit four copies of subcontractor list, unless otherwise indicated. City will return two copies.
  - a. Mark up and retain one returned copy as a Project Record Document.

## 2.02 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
  1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. City will not return copies.
  2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
  3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."
- B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- D. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- E. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- F. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- G. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- H. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

- I. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- J. Construction Photographs: Comply with requirements specified in Section 01380.

### **PART 3 EXECUTION**

#### **3.01 CONTRACTOR'S REVIEW**

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

#### **3.02 ENGINEER'S ACTION**

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
  - 1. Approved as submitted
  - 2. Approved as noted
  - 3. Revise and resubmit
  - 4. Rejected.
- C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

**END OF SECTION**

## SECTION 01380 – CONSTRUCTION PHOTOGRAPHS

### PART 1 GENERAL

#### 1.01 GENERAL

- A. Employ competent photographer to take construction record photographs periodically, monthly at a minimum, during course of the work.

#### 1.02 RELATED REQUIREMENTS

- A. Section 01010: Summary of Work.
- B. Section 01720: Project Record Documents.

#### 1.03 PHOTOGRAPHY REQUIRED

- A. Provide photographs taken on cutoff date for each scheduled application for Payment.
  - B. Provide photographs taken at each major stage of construction.
  - C. Provide photographs taken of change order work.
  - D. Provide five prints of each view.
  - E. Negatives:
    - 1. Remain property of photographer.
    - 2. Require that photographer maintain negatives for a period of two years from Date of Substantial Completion of entire Project.
    - 3. Photographer shall agree to furnish additional prints to OWNER and the ENGINEER at commercial rates applicable at time of purchase.

#### 1.04 COSTS OF PHOTOGRAPHY

- A. CONTRACTOR shall pay costs for specified photography and prints.
1. Parties requiring additional photography or prints will pay photographer directly.

#### 1.05 DIGITAL PHOTOGRAPHY

At OWNER and ENGINEER's discretion, digital photography may be used for all construction photographs except aerial progress photographs.

## **PART 2 PRODUCTS**

### 2.01 PRINTS

#### A. Color:

1. Paper: Single weight, color print paper.
2. Finish: Smooth surface, glossy.
3. Size: 8-inch x 10-inch.

#### B. Identify each print on back, listing:

1. Name of Project.
2. Specific Location.
3. Date and time of exposure.
4. Name and address of photographer.
5. Photographer's numbered identification of exposure.

## **PART 3 EXECUTION**

### 3.01 TECHNIQUE

#### A. Factual presentation.

#### B. Correct exposure and focus.

1. High resolution and sharpness.
2. Maximum depth-of-field.
3. Minimum distortion.

### 3.02 VIEWS REQUIRED

#### A. Photograph from locations to adequately illustrate condition of construction and state of progress.

#### B. Photographs shall include aerial photographs showing the entire construction area.

### 3.03 DELIVERY OF PRINTS

#### A. Deliver prints to the ENGINEER to accompany each Application for Payment.

#### B. Distribution of prints as soon as processed, is anticipated to be as follows:

1. OWNER (one set).
2. ENGINEER (two sets).
3. Project Record File (one set to be stored by CONTRACTOR).
4. CONTRACTOR (one set).

### 3.04 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement or payment for the work under this section, it shall be included in the price of all other work.

**END OF SECTION**

## SECTION 01400 – QUALITY CONTROL

### PART 1 GENERAL

#### 1.01 DEFINITION

- A. Specific quality control requirements for the WORK are indicated throughout the Contract and Permit Documents. The requirements of this Section are primarily related to performance of the WORK beyond furnishing of manufactured products. The term "Quality Control" includes inspection, sampling and testing, and associated requirements.

#### 1.02 INSPECTION AT PLACE OF MANUFACTURE

- A. Unless otherwise indicated, all products, materials, and equipment shall be subject to inspection by the ENGINEER at the place of manufacture.
- B. The presence of the ENGINEER at the place of manufacturer, however, shall not relieve the CONTRACTOR of the responsibility for furnishing products, materials, and equipment, which comply with all requirements of the Contract Documents. Compliance is a duty of the CONTRACTOR, and said duty shall not be avoided by any act or omission on the part of the ENGINEER.

#### 1.03 SAMPLING AND TESTING

- A. Unless otherwise indicated, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered.
- B. Any waiver by the OWNER of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial WORK, shall not be construed as a waiver of any requirements of the Contract Documents.
- C. Notwithstanding the existence of such waiver, the ENGINEER reserves the right to make independent investigations and tests, and failure of any portion of the WORK to meet any of the requirements of the Contract Documents, shall be reasonable cause for the ENGINEER to require the removal or correction and reconstruction of any such work in accordance with the General Conditions.

#### 1.04 INSPECTION AND TESTING LABORATORY SERVICE

- A. Inspection and testing laboratory service shall comply with the following:
  - 1. CONTRACTOR shall appoint, employ, and pay for services of an independent firm to perform inspection and testing.

2. The independent testing firm will perform inspections, testings, and other services specified in individual specification sections and as required by the ENGINEER or OWNER.
3. Reports will be submitted to the ENGINEER in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
4. The CONTRACTOR shall cooperate with the OWNER and independent testing firm and furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
5. The CONTRACTOR shall notify ENGINEER and any applicable permitting agencies 48 hours prior to the expected time for operations requiring inspection and laboratory testing services, so they can be present at the time of testing
6. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the ENGINEER. The CONTRACTOR shall bear all costs from such retesting at no additional cost to the OWNER.
7. For samples and tests required for CONTRACTOR'S use, the CONTRACTOR shall make arrangements with an independent firm for payment and scheduling of testing. The cost of all sampling and testing shall be included in the Contract Price.
8. CONTRACTOR shall bear all costs incurred should the materials for testing not be ready for testing at time specified/scheduled by CONTRACTOR for test.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. Inspection: The CONTRACTOR shall inspect materials or equipment upon the arrival on the job site and immediately prior to installation, and reject damaged and defective items.
- B. Measurements: The CONTRACTOR shall verify measurements and dimensions of the WORK, as an integral step of starting each installation.
- C. Manufacturer's Instructions: Where installations include manufactured products, the CONTRACTOR shall comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in Contract Documents.

**END OF SECTION**

## SECTION 01410 – TESTING LABORATORY SERVICES

### PART 1 GENERAL

#### 1.01 REQUIREMENTS INCLUDED

- A. CONTRACTOR will employ and pay for the services of an Independent Testing laboratory to perform all required testing: (All required testing services under the Contract and Permit Documents shall be provided by the CONTRACTOR through an independent testing firm.
1. CONTRACTOR shall cooperate with the laboratory to facilitate the execution of its required services.
  2. Employment of the laboratory by the CONTRACTOR for specific testing shall in no way relieve the CONTRACTOR's obligations to perform the work of the Contract as specified.
  3. The tests to be provided by the CONTRACTOR shall include, but not be limited to, the following
    - a. Density
    - b. Proctor
    - c. Limerock Bearing Ratio (LBR)
    - d. Carbonate Content
    - e. Gradation
    - f. Plastic Index and Liquid Limit
    - g. Organic Content
    - h. Concrete Compressive Strength and Slump
    - i. Asphalt Extraction
    - j. Any other tests as required to satisfy an permitting agency requirements.
- B. CONTRACTOR shall pay for all required testing, including bacteriological testing.

#### 1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.

#### 1.03 QUALIFICATION OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E-329.
- C. Authorized to operate in the state in which the project is located.

- D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- E. Testing Equipment
  - 1. Calibrated at reasonable intervals by devices of accuracy traceable to either:
    - a. National Bureau of Standards.
    - b. Accepted values of natural physical constants.

#### 1.04 LABORATORY DUTIES

- A. Cooperate with OWNER's Representative and CONTRACTOR; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
  - 1. Comply with specified standards.
  - 2. Ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify OWNER's Representative and CONTRACTOR of observed irregularities of deficiencies of work or products.
- D. Promptly submit written report of each test and inspection; one copy each to OWNER's Representative, OWNER, CONTRACTOR, and one copy to Record Document File. Each report shall include:
  - 1. Date issued.
  - 2. Project title, OWNER'S project number and Parcel number.
  - 3. Testing laboratory name, address and telephone number.
  - 4. Name and signature of laboratory inspector.
  - 5. Date and time of sampling or inspection.
  - 6. Record of temperature and weather conditions.
  - 7. Date of test.
  - 8. Identification of fill product and specification section.
  - 9. Location of sample or test in the project area (i.e. station and offset or other relevant dimensioning).
  - 10. Type of inspection or test.

11. Results of tests and compliance with Contract Documents.

12. Interpretation of test results, when requested by OWNER's Representative.

E. Perform additional tests as required by the OWNER's Representative.

1.05 LIMITATION OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract documents.
2. Approve or accept any portion of the work.
3. Perform any duties of the CONTRACTOR.

1.06 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel and provide access to work.

B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes, which require control by the Testing Laboratory.

D. Furnish copies of Products test reports as required.

E. Furnish incidental labor and facilities:

1. To provide access to work to be tested.
2. To obtain and handle samples at the project site or at the source of the product to be tested.
3. To facilitate inspections and tests.
4. For storage of test samples.

F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

1. When tests or inspections cannot be performed after such notice, reimburse OWNER for laboratory personnel and travel expenses incurred due to CONTRACTOR's negligence.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION**

3.01 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement or payment for the work under this section. It shall be included in the price for all other work.

**END OF SECTION**

## SECTION 01505 – MOBILIZATION

### PART 1 GENERAL

#### 1.01 GENERAL

- A. Mobilization shall include the obtaining of all permits; moving onto the site of all equipment; temporary buildings, and other construction facilities; and implementing security requirements; all as required for the proper performance and completion of the WORK. Mobilization shall include the following principal items:
1. Moving on to the site of all CONTRACTOR's equipment required for first month operations.
  2. Installing temporary construction power, wiring, and lighting facilities.
  3. Developing construction water supply.
  4. Providing field office trailers for the CONTRACTOR, complete with all specified furnishings and utility services including telephones, telephone appurtenances, and copying machine.
  5. Providing all on-site communication facilities, including telephones and radio pagers.
  6. Providing on-site sanitary facilities and potable water facilities.
  7. Arranging for and erection of CONTRACTOR's work, site access, and storage.
  8. Obtaining all required permits (including Notice of Intent (NOI) and Stormwater Pollution Prevention Plan (SWPPP) permits as needed).
  9. Having all OSHA required notices and establishment of safety programs.
  10. Having the CONTRACTOR's superintendent at the job site full time.
  11. Submitting initial submittals.
  12. Audio-Visual preconstruction record as described in Section 01010.
  13. Project identification and signs.

### PART 2 PRODUCTS (Not Applicable)

### PART 3 EXECUTION

#### 3.01 PAYMENT FOR MOBILIZATION

- A. The CONTRACTOR's attention is directed to the condition that no payment for mobilization, or any part thereof will be approved for payment under the Contract until all mobilization items listed in Paragraph 1.01.A. above have been completed as specified.

**END OF SECTION**

## **SECTION 01510 – TEMPORARY UTILITIES**

### **PART 1 GENERAL**

#### 1.01 GENERAL REQUIREMENTS

- A. Types: The types of utility services required for general temporary use at the project site include the following:

- Water service (potable for certain uses)
- Storm sewer
- Sanitary sewer
- Electric power service
- Telephone service

- B. It shall be the CONTRACTOR's responsibility to provide equipment that is adequate for the performance of the WORK under this Contract within the time specified. All equipment shall be kept in satisfactory operating condition, shall be capable of safety and efficiently performing the required WORK, and shall be subject to inspection and approval by the OWNER's representative at any time within the duration of the Contract. All work hereunder shall conform to the applicable requirements of the OSHA Standards for Construction.

#### 1.02 JOB CONDITIONS

- A. Scheduled Uses: The CONTRACTOR shall, in conjunction with establishment of job progress schedule, establish a schedule for implementation and termination of service for each temporary utility or facility; at earliest feasible time, and when acceptable to OWNER and ENGINEER change over from use of temporary utility service to permanent service.

### **PART 2 PRODUCTS (Not Applicable)**

### **PART 3 EXECUTION**

#### 3.01 INSTALLATION OF POWER DISTRIBUTION SYSTEM

- A. Power: The CONTRACTOR shall provide all necessary power required for its operations under the Contract, and shall provide and maintain all temporary power lines required to perform the WORK in a safe and satisfactory manner.

#### 3.02 INSTALLATION OF LIGHTING

- A. Construction Lighting: All WORK conducted at night or under conditions of deficient daylight shall be suitable lighted to insure proper WORK and to afford adequate facilities for inspection and safe working conditions.

#### 3.03 WATER SUPPLY

- A. General: The OWNER will furnish reasonable quantities of water required by the CONTRACTOR in performance of the WORK under the Contract; however, the CONTRACTOR shall provide all facilities necessary to convey the water from the OWNER-designated source to the points of use in accordance with the requirements of the Contract Document. The CONTRACTOR shall pay all permit and water charges.
- B. Potable Water: All drinking water on the site during construction shall be furnished by the CONTRACTOR and shall be bottled water or water furnished in acceptable metal dispensers. Notices shall be posted conspicuously throughout the site warning the CONTRACTOR's personnel that piped water may be contaminated.
- C. Water Connections: The CONTRACTOR shall not make connection to, or draw water from, any fire hydrant or pipeline without first obtaining permission of the authority having jurisdiction over the use of said fire hydrant or pipeline and from the agency owning the affected water system. For each such connection made, the CONTRACTOR shall first attach to the fire hydrant or pipeline a valve and a meter, if required by the said authority, of a size and type acceptable to said authority and agency. The CONTRACTOR shall pay all permit and water charges.
- D. Removal of Water Connections: Before final acceptance of the WORK on the project, all temporary connections and piping installed by the CONTRACTOR shall be entirely removed, and all affected improvements shall be restored to their original condition, or better, to the satisfaction of the ENGINEER and to the agency owning the affected utility.

#### 3.04 INSTALLATION OF SANITARY FACILITIES

- A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use of CONTRACTOR's employees. Toilets at construction job sites shall conform to the requirements of Subpart D, Section 1926.51 of the OSHA Standards for Construction.
- B. Sanitary and Other Organic Wastes: The CONTRACTOR shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the CONTRACTOR or organic material wasted from any other source related to the CONTRACTOR's operations shall be disposed of away from the site in a manner satisfactory to the ENGINEER and in accordance with all laws and regulations pertaining thereto.

#### 3.05 INSTALLATION OF FIRE PROTECTION

- A. Fire Protection: The construction of the WORK shall be connected with the CONTRACTOR's water supply system and shall be adequately protected against damage by fire. Hose connections and hose, water casks, chemical equipment, or other sufficient means shall be provided for fighting fires in the temporary structures and other portions of the WORK, and responsible persons shall be designated and instructed in the operation such fire apparatus so as to prevent or minimize the hazard of fire. The CONTRACTOR's fire protection program shall conform to the requirements of Subpart F of the OSHA Standards for Construction.

### 3.06 INSTALLATION OF COMMUNICATIONS

- A. Telephone Services: The CONTRACTOR shall provide and maintain at all time during the progress of the WORK not less than one telephone in good working order, at its own field construction office, at or near the site of the WORK included in the Contract. Each such telephone shall be connected to an established exchange for toll service and with all other telephones utilized by the CONTRACTOR.
- B. Telephone Use: The CONTRACTOR shall permit the ENGINEER, the OWNER, or their authorized representatives or employees free and unlimited use of said telephone facilities for all calls that do not involve published toll charges. Calls originated by the ENGINEER, the OWNER, their authorized representatives or employees who involve toll or the CONTRACTOR at the rates charged by the telephone company shall bill message unit charge to the OWNER.

### 3.07 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement or payment for the work under this section, it shall be included in the lump sum price for Mobilization.

**END OF SECTION**

## **SECTION 01520 – CONSTRUCTION AIDS**

### **PART 1 GENERAL**

#### 1.01 REQUIREMENTS INCLUDED

- A. Furnish, install and maintain required construction aids, remove on completion of work.

#### 1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

### **PART 2 PRODUCTS**

#### 2.01 MATERIALS, GENERAL

- A. Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

#### 2.02 CONSTRUCTION AIDS

- A. Provide construction aids and equipment required by personnel and to facilitate execution of the work; scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes and other such facilities and equipment.
  - 1. Refer to respective sections for particular requirements for each trade.
  - 2. Provide protective coverings for finished surfaces.
- B. Maintain facilities and equipment in first-class condition.

### **PART 3 EXECUTION**

#### 3.01 PREPARATION

- A. Consult with OWNER's Representative, review site conditions and factors which affect construction procedures and construction aids including adjacent properties and public facilities which may be affected by execution of the work.

#### 3.02 GENERAL

- A. Comply with applicable requirements specified in sections of Division 2 through 4 (as applicable).
- B. Relocate construction aids as required by progress of construction, by storage or work requirements, and to accommodate legitimate requirements of OWNER and other Contractors employer at the site.

### 3.03 REMOVAL

- A. Completely remove temporary materials, equipment and services:
  - 1. When construction needs can be met by use of permanent construction.
  - 2. At completion of project.
- B. Clean, repair damage caused by installation or by use of temporary facilities.
  - 1. Remove foundations and underground installations for construction aids.
  - 2. Grade areas of site affected by temporary installations to required elevations and slopes, and clean the area.
- C. Restore permanent facilities used for temporary purposes to specified condition.

### 3.04 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement or payment for the work under this section, it shall be included in the price of all other work.

**END OF SECTION**

## SECTION 01530 – PROTECTION OF EXISTING FACILITIES

### PART 1 GENERAL

#### 1.01 GENERAL

- A. The CONTRACTOR shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.
- B. The CONTRACTOR shall verify the exact locations and depths of all utilities shown and the CONTRACTOR shall make exploratory excavations of all utilities that may interfere with the WORK. All such exploratory excavations shall be performed as soon as practicable after award of the contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the CONTRACTOR's work. When such exploratory excavations show the utility location as shown to be in error, the CONTRACTOR shall so notify the ENGINEER.
- C. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility.

#### 1.02 RIGHTS-OF-WAY

- A. The CONTRACTOR shall not do any work that would affect any oil, gas, sewer, or water pipeline; any telephone, telegraph, or electric transmission line; any fence; or any other structure, nor shall the CONTRACTOR enter upon the rights-of-way involved until notified by the ENGINEER that the OWNER has secured authority from the proper party. After authority has been obtained, the CONTRACTOR shall give said party due notice of its intention to begin work, if required by said party, and shall remove, shore, support or otherwise protect such pipeline, transmission line, ditch, fence, or structure or replace the same. When two or more contracts are being executed at one time on the same or adjacent land in such manner that work on one contract may interfere with that on another, the OWNER shall determine the sequence and order of the WORK. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the OWNER to the CONTRACTOR so desiring, to the extent, amount, in the manner, and at the times permitted. No such decision as to the method or time of conducting the WORK or the use of territory shall be made the basis of any claim for delay or damage, except as provided for temporary suspension of the WORK in the General Conditions of the Contract.

#### 1.03 PROTECTION OF STREET OR ROADWAY MARKERS

- A. The CONTRACTOR shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey

or other permanent marker points that will be disturbed by the construction operations have been properly referenced. All survey markers or points disturbed by the CONTRACTOR shall be accurately restored after all street or roadway resurfacing has been completed.

#### 1.04 RESTORATION OF PAVEMENT

- A. General: All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the affected pavement OWNER. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.
- B. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.
- C. Permanent Resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the CONTRACTOR shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.
- D. Restoration of Sidewalks or Private Properties: Wherever sidewalks or private properties and driveways have been removed for purposes of construction, the CONTRACTOR shall place suitable temporary sidewalks or driveways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of times is so fixed, the CONTRACTOR shall maintain said temporary sidewalks or driveways until the final restoration thereof has been made. The CONTRACTOR shall restore all private properties within thirty (30) days after a complaint is received by the OWNER.

#### 1.05 EXISTING UTILITIES AND IMPROVEMENTS

- A. General: The CONTRACTOR shall protect all Underground Utilities and other improvements which may be impaired during construction operations. It shall be the CONTRACTOR's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.
- B. Utilities to be Moved: In the case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon

request of the CONTRACTOR, be notified by the OWNER to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the CONTRACTOR shall notify the ENGINEER a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.

- C. Where the proper completion of the WORK requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is indicated, the CONTRACTOR shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the ENGINEER and the OWNER of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the CONTRACTOR in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.
- D. OWNER's Right of Access: The right is reserved to the OWNER and to the OWNERS of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the WORK of this Contract.
- E. Underground Utilities Indicated: Existing utility lines that are indicated or the locations of which are made known to the CONTRACTOR prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the CONTRACTOR.
- F. Underground Utilities Not Indicated: In the event that the CONTRACTOR damages any existing utility lines that are not indicated or the locations of which are not made known to the CONTRACTOR prior to excavation, a written report thereof shall be made immediately to the ENGINEER. If directed by the ENGINEER, repairs shall be made by the CONTRACTOR under the provisions for changes and extra work contained in the General Conditions.
- G. All costs of locating, repairing damage not due to failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract Documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the work which was interrupted or idled by removal or relocation of such utility facilities, and which was necessarily idled during such work will be paid for as extra work in accordance with the provisions of the General Conditions.
- H. Approval of Repairs: All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement OWNER and the ENGINEER before being concealed by backfill or other work.
- I. Maintaining in Service: All oil and gasoline pipelines, power, and telephone or the communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the WORK shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the

ENGINEER are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The CONTRACTOR shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

- J. Existing Water Services: CONTRACTOR shall protect and provide temporary support for existing water services. Any water service damaged by the CONTRACTOR, shall be replaced at the CONTRACTOR's expense, with a new water service complete with new water main tap.

#### 1.06 TREES WITHIN STREET RIGHTS-OF-WAY AND PROJECT LIMITS

- A. General: The CONTRACTOR shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street rights-of-way and project limits, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or OWNER. All existing trees and shrubs which are damaged during construction shall be trimmed or replaced by the CONTRACTOR or a certified tree company under permit from the jurisdictional agency and/or the OWNER. Tree trimming and replacement shall be accomplished in accordance with the following paragraphs.
- B. Trimming: Symmetry of the tree shall be preserved; no stubs or splits or torn branches left; clean cuts shall be made close to the trunk or large branch. Spikes shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material.
- C. Replacement: The CONTRACTOR shall immediately notify the jurisdictional agency and/or the OWNER if any tree is damaged by the CONTRACTOR's operations. If, in the opinion of said agency or the OWNER, the damage is such that replacement is necessary, the CONTRACTOR shall replace the tree at CONTRACTOR's own expense. The tree shall be of a like size and variety as the tree damaged, or, if of a smaller size, the CONTRACTOR shall pay to the OWNER of said tree a compensatory payment acceptable to the tree OWNER, subject to the approval of the jurisdictional agency or OWNER. The size of the trees shall be not less than 1-inch diameter nor less than 6 feet in height.

#### 1.07 NOTIFICATION BY THE CONTRACTOR

- A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way the CONTRACTOR shall notify the respective authorities representing the OWNERS or agencies responsible for such facilities not less than 3 days nor more than 7 days prior to excavation so that a representative of said OWNERS or agencies can be present during such work if they so desire. The CONTRACTOR shall also notify the Sunshine State One Call Center 1-800-432-4770 at least 2 days, but no more than 14 days, prior to such excavation.

## **PART 2 PRODUCTS**

## 2.01 MATERIALS, GENERAL

- A. Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

## 2.02 FENCING

- A. Materials to CONTRACTOR's option, minimum fence height = 6 feet.

## 2.03 BARRIERS

- A. Materials to CONTRACTOR's option, as appropriate to serve required purpose.

# **PART 3 EXECUTION**

## 3.01 GENERAL

- A. Install facilities of a neat and reasonable uniform appearance, structurally adequate for required purposes.
- B. Maintain barriers during entire construction period.
- C. Relocate barriers as required by progress of construction.

## 3.02 TREE AND PLANT PROTECTION

- A. Preserve and protect existing trees and plants adjacent to work areas.
- B. Consult with OWNER's Representative and remove agreed-on roots and branches which interfere with work.
  - 1. Employ qualified tree surgeon to remove branches, and to treat cuts.
- C. Protect root zones of trees and plants.
  - 1. Do not allow vehicular traffic and parking.
  - 2. Do not store materials or products.
  - 3. Prevent dumping of refuse or chemically injurious materials or liquids.
  - 4. Prevent puddling or continuous running water.
- D. Carefully supervise all work to prevent damage.
- E. Replace trees and plants which are damaged or destroyed due to work operations under this contract.

## 3.03 REMOVAL

- A. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed, and when approved by OWNER's Representative.
- B. Clean and repair damage caused by installation, fill and grade areas of the site to required elevations and slopes, and clean the area.

3.04 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement or payment for the work under this section, it shall be included in the price of all other work.

**END OF SECTION**

## SECTION 01550 – SITE ACCESS AND STORAGE

### PART 1 GENERAL

#### 1.01 HIGHWAY LIMITATIONS:

- A. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the WORK. It shall be the CONTRACTOR's responsibility to construct and maintain any haul roads required for its construction operations.

#### 1.02 TEMPORARY CROSSINGS:

- A. General: Continuous, unobstructed, safe, and adequate pedestrian and vehicular access shall be provided to fire hydrants, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, and hospitals. Safe and adequate public transportation stops and pedestrian crossings at intervals not exceeding 300 feet shall be provided. The CONTRACTOR shall cooperate with parties involved in the delivery of mail and removal of trash and garbage so as to maintain existing schedules for such services. Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time.
- B. Temporary Bridges: Wherever necessary, the CONTRACTOR shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the CONTRACTOR shall secure the written consent of the individuals or authorities concerned to omit such temporary bridges or steel plates, which written consent shall be delivered to the ENGINEER prior to excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the CONTRACTOR shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.
- C. Street Use: Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the WORK hereunder, and it shall so conduct its operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas. No street shall be closed to the public without first obtaining permission of the ENGINEER and proper governmental authority. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise indicated. Toe boards shall be provided to retain excavated material if required by the ENGINEER or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the WORK shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR

to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets, and other drainage facilities.

- D. Traffic Control: For the protection of traffic in public or private streets and ways, the CONTRACTOR shall provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of Broward County and the "Manual of Uniform Traffic Control Devices, Part VI - Traffic Controls for Street and Highway Construction and Maintenance Operations," published by U.S. Department of Transportation, Federal Highway Administration (ANSI D6.1).

The CONTRACTOR shall take all necessary precautions for the protection of the WORK and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The CONTRACTOR shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of the Florida Department of Transportation.

The CONTRACTOR shall submit 3 copies of a traffic control plan to the ENGINEER for approval a minimum of 2 weeks prior to construction. The ENGINEER reserves the right to observe these traffic control plans in use and to make any changes as field conditions warrant. Any changes shall supersede these plans and be done solely at the CONTRACTOR's expense.

The CONTRACTOR shall remove traffic control devices when no longer needed, repair all damage caused by installation of the devices, and shall remove post settings and backfill the resulting holes to match grade.

- E. Temporary Driveway Closure: The CONTRACTOR shall notify the OWNER or occupant (if not OWNER-occupied) of the closure of the driveways to be closed more than one eight-hour work day at least 3 working days prior to the closure. The CONTRACTOR shall minimize the inconvenience and minimize the time period that the driveways will be closed. The CONTRACTOR shall fully explain to the OWNER/occupant how long the work will take and when closure is to start. Total closure time shall not exceed 5 days.

#### 1.03 CONTRACTOR'S WORK AND STORAGE AREA:

- A. The CONTRACTOR shall designate and arrange for the use of a portion of the property, adjacent to the WORK for its exclusive use during the term of the Contract as a storage and shop area for its construction operations relative to this Contract.
- B. The CONTRACTOR shall make its own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the WORK.
- C. The CONTRACTOR shall construct and use a separate storage area for hazardous materials used in constructing the WORK.

- 1. For the purpose of this paragraph, hazardous materials to be stored in the separate area are all products labeled with any of the following terms: Warning,

Caution, Poisonous, Toxic, flammable, Corrosive, Reactive, or Explosive. In addition, whether or not so labeled, the following materials shall be stored in the separate area: diesel fuel, gasoline, new and used motor oil, hydraulic fluid, cement, paints and paint thinners, two-part epoxy coatings, sealants, asphaltic products, glues, solvents, wood preservatives, sand blast materials, and spill absorbent.

2. Hazardous materials shall be stored in groupings according to the Material Safety Data Sheets.
  3. The CONTRACTOR shall develop and submit to the ENGINEER a plan for storing and disposing of the materials above.
  4. The CONTRACTOR shall obtain and submit to the ENGINEER a single EPA number for wastes generated at the site.
  5. The separate storage area shall meet all the requirements of all authorities having jurisdiction over the storage of hazardous materials.
  6. All hazardous materials which are delivered in containers shall be stored in the original containers until use. Hazardous materials which are delivered in bulk shall be stored in containers which meet the requirements of authorities having jurisdiction.
- 1.04 PARKING:
- A. The CONTRACTOR shall:
    1. Provide temporary parking areas for ENGINEER and OWNER's use.
    2. The CONTRACTOR shall direct its employees to park in designated areas secured by the CONTRACTOR.
    3. Traffic and parking areas shall be maintained in a sound condition, free of excavated material, construction equipment, mud, and construction materials. The CONTRACTOR shall repair breaks, potholes, low areas which collect standing water, and other deficiencies.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION**

3.01 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement or payment for the work under this section, it shall be included in the price of Mobilization and of all other work.

**END OF SECTION**

## SECTION 01560 – TEMPORARY CONTROLS

### PART 1 GENERAL

#### 1.01 REQUIREMENTS INCLUDED

- A. Provide and maintain methods, equipment, and temporary construction, as necessary, to provide controls over environmental conditions at the construction site and related area under CONTRACTOR's control; remove physical evidence of temporary facilities at completion of work.

#### 1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

#### 1.03 NOISE CONTROL

- A. Provide all necessary requirements for noise control during the construction period.
  - 1. Noise procedures shall conform to all applicable OSHA requirements and local ordinances having jurisdiction on the work.
  - 2. Noise levels during nighttime hours shall not exceed 55 db measured at the property line of a residence.

#### 1.04 DUST CONTROL

- A. Provide positive methods and apply dust control materials to minimize raising dust from construction operations, and provide positive means to prevent air-borne dust from dispersing into the atmosphere.

#### 1.05 WATER CONTROL

- A. Provide methods to control surface water to prevent damage to the project, the site, or adjoining properties.
  - 1. Control fill, grading and ditching to direct surface drainage away from excavations, pits, tunnels and other construction areas; and to direct drainage to proper runoff.
- B. Provide, operate and maintain hydraulic equipment of adequate capacity to control surface and water.
- C. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas.

#### 1.06 PEST CONTROL

- A. Provide pest control as necessary to prevent infestation of construction or storage area.
  - 1. Employ methods and use materials which will not adversely affect conditions at the site or on adjoining properties.
  - 2. Should the use of pesticides be considered necessary, submit an informational copy of the proposed program to OWNER with a copy to ENGINEER. Clearly indicate:
    - a. The area or areas to be treated.
    - b. The pesticide to be used, with a copy of the manufacturer's printed instructions.
    - c. The pollution preventative measures to be employed.
- B. The use of any pesticide shall be in full accordance with the manufacturer's printed instructions and recommendations.

#### 1.07 RODENT CONTROL

- A. Provide rodent control as necessary to prevent infestation of construction or storage area.
  - 1. Employ methods and use materials, which will not adversely affect conditions at the site or on adjoining properties
  - 2. Should the use of rodenticide be considered necessary, submit an informational copy of the proposed program to OWNER with a copy to OWNER's Representative. Clearly indicate:
    - a. the area or areas to be treated.
    - b. the rodenticide to be used, with a copy of the manufacturer's printed instructions.
    - c. the pollution preventative measures to be employed.
- B. The use of any rodenticide shall be in full accordance with the manufacturer's printed instructions and recommendations.

#### 1.08 DEBRIS CONTROL

- A. Maintain all areas under CONTRACTOR's control free of extraneous debris.
- B. Initiate and maintain a specific program to prevent accumulation of debris at construction site, storage and parking area, or along access roads and haul routes.
  - 1. Provide containers for deposit of debris as specified in Section 01710 - Cleaning.
  - 2. Prohibit overloading of trucks to prevent spillage on access and haul routes.
    - a. Provide periodic inspection of traffic areas to enforce requirements.

- C. Schedule periodic collections and disposal of debris as specified in Section 01710 - Cleaning.
  - 1. Provide additional collections and disposal of debris whenever the periodic schedule is to prevent accumulation.

#### 1.09 POLLUTION CONTROL

- A. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.
- B. Provide equipment and personnel, perform emergency measures required to contain any spillage, and to remove contaminated soils or liquids.
  - 1. Excavate and dispose of any contaminated earth off-site and replace with suitable compacted fill and topsoil.
- C. Take special measures to prevent harmful substances from entering public waters.
  - 1. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams or in sanitary or storm sewers.
- D. Provide systems for control of atmospheric pollutants.
  - 1. Prevent toxic concentrations of chemicals.
  - 2. Prevent harmful dispersal of pollutants into the atmosphere.

#### 1.10 EROSION CONTROL

- A. Plan and execute construction and earthwork, by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas to prevent erosion and sedimentation.
  - 1. Hold the areas of bare soil exposed at one time to a minimum
  - 2. Provide temporary control measures such as berms, dikes and drains.
  - 3. Provide silt screens as required preventing surface water contamination.
- B. Construct fills and waste areas by selective placement to eliminate surface silts or clays, which will erode.
- C. Periodically inspect earthwork to detect any evidence of the start of erosion, apply corrective measures as required to control erosion.
- D. All erosion control procedures must comply with the National Pollutant Discharge Elimination System (NPDES).

### **PART 2 PRODUCTS (Not Applicable)**

### **PART 3 EXECUTION**

3.01 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement or payment for the work under this section; it shall be included in the price of all other work.

**END OF SECTION**

## SECTION 01570 – TRAFFIC REGULATIONS

### PART 1 GENERAL

#### 1.01 REQUIREMENTS INCLUDED

- A. Provide, operate and maintain equipment, services and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow on haul routes, at site entrances, on-site access roads, and parking areas.
- B. Remove temporary equipment and facilities when no longer required, restore grounds to original, or specified conditions.

#### 1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

#### 1.03 TRAFFIC SIGNALS AND SIGNS

- A. Provide and operate traffic control and directional signals or signs required to direct and maintain an orderly flow of traffic in all areas under CONTRACTOR's control, or affected by CONTRACTOR's operations.

#### 1.04 FLAGPERSON

- A. Provide qualified and suitably equipped flag-person when construction operations encroach on traffic lanes, as required for regulation of traffic.

#### 1.05 FLARES AND LIGHTS

- A. Provide flares and lights during periods of low visibility:
  - 1. To clearly delineate traffic lanes and to guide traffic.
  - 2. For use of flag-person in directing traffic.
- B. Provide illumination of critical traffic and parking areas.
  - 1. Maintain free vehicular access to and through parking areas.
  - 2. Prohibit parking on or adjacent to access roads, or in non-designated areas.

#### 1.06 HAUL ROUTES

- A. Consult with OWNER and governing authorities, establish public thoroughfares which will be used as haul routes and site access.
- B. Confine construction traffic to designated haul routes.

- C. Provide traffic control at critical areas of haul routes to expedite traffic flow, to minimize interference with normal public traffic.

1.07 EMERGENCY ACCESS

- A. In order to provide protection to the workers and residents, the Contractor shall maintain emergency access to all adjacent properties at all times during construction. If a road is required to be closed to vehicular traffic and the distance of the closure exceeds 150 feet between stabilized surfaces, or prevents access to properties for a distance that exceeds 150 feet, the Contractor shall provide a 10 foot wide stabilized access way on one side of the trench capable of supporting a Fire Truck. Contractor shall also provide stabilized access ways across the trench or unstabilized area a minimum of 6 feet in width at a spacing not to exceed 100 feet capable of supporting foot traffic. These access ways shall be protected and delineated with lighted barricades or other such devices as approved by the regulatory agency. Both ends of the emergency access way shall be blocked in accordance with the MOT permit approved by the City of Fort Lauderdale and FDOT with signage indicating that this access way is to be used by emergency vehicles only.

No trenches or holes shall be left open after working hours. In the event a trench must be left open after hours, it shall be done so only with the express written permission from the Engineer, and it shall be the Contractor's responsibility to provide proper protection of the open trench or hole as required by the regulatory agency. In addition the Contractor shall provide a security guard at the site whenever the Contractor's personnel are not present, 24 hours per day/ 7 days per week. It shall be the Security Guard's responsibility to protect the open trench or hole from trespassers and to direct emergency personnel on site. The Security Guard shall not have any other responsibilities such as operation pumps or equipment but shall be dedicated to protecting the trench or open hole. The Security Guard shall be equipped with a wireless telephone capable of calling 911 to report an emergency and shall keep that telephone on their person at all times. In addition to this provision the contractor shall maintain trench safety and comply with current OSHA regulations and the Trench Safety Act. The contractor shall maintain and keep all safety barricades, signage, flashers, and detours, in operation condition. A copy of the approved MOT plans, and details, shall be on site at all times.

- B. Measurement and payment for security guard services shall be included in the utility pipe installation unit price. Measurement for temporary emergency access ways will be paid for under the specified line item at the unit price described in the bid schedule.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION**

3.01 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement and payment for work under the section; it shall be included in the lump sum price bid for Maintenance of Traffic.

**END OF SECTION**

**SECTION 01590 – PROJECT SIGN**

**PART 1 GENERAL**

Contractor shall furnish a 4' x 8' sign, below is a sample, not specific to the project. Sign shall be made to be weather resistant and on display for entire length of contract. Shop drawings must be submitted prior to sign construction. The exact style and design of the sign will be provided during the preconstruction meeting.

 **City of Fort Lauderdale**

**Keeping the Ocean in the Ocean**  
Bringing Drier Streets to Hendricks Isle

**What's Happening?**  
The City of Fort Lauderdale is combating poor roadway drainage resulting from seasonal high tides and major rain events.  
[www.fortlauderdale.gov](http://www.fortlauderdale.gov)

**Benefits 5,000 Neighbors**

- Improved vehicular access during high tide and rain events
- Better drainage of roadway
- Enhanced neighborhood

**Cost**  
\$20,000

**Completion**  
August 2013

**Contractor**  
ABC Company

**We're Working On:**

- Installing interconnected underground catch basins
- Cleaning existing drainage pipes, including the outfall pipes
- Removing and replacing the concrete valley gutters that transport water to the catch basins
- Installing drainage valves to help alleviate flooding from high tides

**Fort Lauderdale City Commission**

<b>John P. "Jack" Seiler</b> Mayor	<b>Bruce G. Roberts</b> Vice Mayor, District I	<b>Dean J. Trantalis</b> Commissioner, District II	<b>Bobby B. DuBose</b> Commissioner, District III	<b>Romney Rogers</b> Commissioner, District IV	<b>Lee R. Feldman, ICMA-CM</b> City Manager
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**END OF SECTION**

## SECTION 01600 – MATERIAL AND EQUIPMENT

### PART 1 GENERAL

#### 1.01 REQUIREMENTS INCLUDED

- A. Material and equipment incorporated into the work:
  - 1. Conform to applicable specifications and standards.
  - 2. Comply with size, make, type and quality specified, or as specifically approved in writing by the OWNER's Representative.
  - 3. Manufactured and fabricated products:
    - a. Design, fabricate and assemble in accord with the best engineering and shop practices.
    - b. Manufacture like parts of duplicate units to standard sizes and gauges to be interchangeable.
    - c. Two or more items of the same kind shall be identical, by the same manufacturer.
    - d. Products shall be suitable for service conditions.
    - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
  - 4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

#### 1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

#### 1.03 MANUFACTURER'S INSTRUCTIONS

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to OWNER's Representative. Maintain one set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition and adjust products in strict accordance with such instructions and in conformity with specified requirements.

1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with OWNER's Representative for further instructions.
  2. Do not proceed with work without clear instructions.
- C. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.
- 1.04 TRANSPORTATION AND HANDLING
- A. Arrange deliveries of products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site. Products shall be delivered to the job site on an "as needed" basis.
1. Deliver products in undamaged condition, in manufacturers' original containers or packaging, with identifying labels intact with legible markings.
  2. Immediately upon delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.
  3. Pipe and materials shall not be strung out along installation routes for longer than two (2) weeks prior to installation.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.
- C. Coordinate deliveries to avoid conflict with Work and conditions at site:
1. Work of other contractors, or OWNER.
  2. Limitations of storage space.
  3. Availability of equipment and personnel for handling products.
  4. OWNER's use of premises.
- D. Deliver products in undamaged condition in original containers or packaging, with identifying labels intact and legible.
- E. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.
- F. Immediately on delivery, inspect shipment to assure:
1. Product complies with requirements of Contract Documents and reviewed submittals.
  2. Quantities are correct.

3. Containers and packages are intact, labels are legible.
  4. Products are properly protected and undamaged.
- G. Provide equipment and personnel necessary to handle products, including those provided by OWNER, by methods to prevent soiling or damage to products or packaging.
- H. Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.
- I. Handle products by methods to prevent bending or overstressing.
- J. Lift heavy components only at designated lifting points.

#### 1.05 STORAGE

- A. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.
1. Store products subject to damage by the elements in weather-tight enclosures.
  2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
  3. Store unpacked products on shelves, in bins or in neat piles, accessible for inspection.
- B. Exterior Storage
1. Provide substantial platforms, blocking or skids to support fabricating products above ground, prevent soiling or staining.
    - a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
  2. Store loose granular materials on solid surface such as paved areas, or provide plywood or sheet materials to prevent mixing with foreign matter.
    - a. Provide surface drainage to prevent flow or ponding of rainwater.
    - b. Prevent mixing of refuse or chemically injurious materials or liquids.

#### 1.06 MAINTENANCE OF STORAGE

- A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:
1. State of storage facilities is adequate to provide required conditions.

2. Required environmental conditions are maintained on continuing basis.
3. Surfaces of products exposed to elements are not adversely affected.
  - a. Any weathering of products, coatings and finishes is not acceptable under requirements of Contract Documents.
- B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

#### 1.07 PROTECTION AFTER INSTALLATION

- A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.
- B. Control traffic to prevent damage to equipment and surfaces.
- C. Provide coverings to protect finished surfaces from damage.
  1. Cover projections, wall corners, and jambs, sills and soffits of openings, in areas used for traffic and for passage of products in subsequent work.
  2. Protect finished floors and stairs from dirt and damage.
    - a. In areas subject to foot traffic, secure heavy paper, sheet goods, or other materials in place.
    - b. For movement of heavy products, lay planking or similar materials in place.
    - c. Cover wall and floor surfaces in the vicinity of construction personnel activities and all finished surfaces used by construction personnel.
- D. Waterproofed surfaces
  1. Prohibit use of surfaces for traffic of any kind, and for storage of any products.
  2. When some activity must take place in order to carry out the Contract, obtain recommendations of installer for protection of surface.
    - a. Install recommended protection; remove on completion of that activity.
    - b. Restrict use of adjacent unprotected areas.
- E. Lawns and landscaping
  1. Prohibit traffic of any kind across planted lawn and landscaped areas.
- F. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.

## 1.08 SUBSTITUTIONS AND PRODUCT OPTIONS

### A. Limitations on substitutions.

1. During bidding period, Instructions to Bidders govern times for submitting requests for substitutions under requirements specified in this section.
2. Substitutions will not be considered when indicated on shop drawings or product data submittals without separate formal request, when requested directly by Subcontractor or supplier, or when acceptance will require substantial revision of Contract Documents.
3. Substitute products shall not be ordered or installed without written acceptance.
4. Only one (1) request for substitution for each product will be considered. When substitution is not accepted, provide specified product.

### B. Products List

1. Within 15 days after Contract Date submit to ENGINEER a complete list of major products proposed to be used, with the name of the manufacturer and the installing Subcontractor.

### C. Contractors Options

1. For products specified only by reference standard, select any product meeting that standard.
2. For products specified by naming several products or manufacturers, select any one of the products or manufacturers named or approved equal, which complies with the Specifications.
3. For products specified by naming one or more products or manufacturers and "or approved equal," CONTRACTOR must submit a request as for substitutions for any product or manufacturer not specifically named.

### D. Substitutions

1. For a period of 15 days after Contract Date, ENGINEER will consider written request from CONTRACTOR for substitution of products.
2. Identify product by specification Section and Article Numbers. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and suppliers as appropriate.
3. List similar projects using product, dates of installation, and names of ENGINEER and OWNER.
4. List availability of maintenance services and replacement materials.

5. Submit a separate request for each product, supported with complete data, with drawings and samples as appropriate, including:
  - a. Comparison of the qualities and performance of the proposed substitution with that specified.
  - b. Changes required in other elements of the work because of the substitution.
  - c. Effect on the construction schedule.
  - d. Cost data comparing the proposed substitution with the product specified.
  - e. Any required license fees or royalties.
  - f. Availability of maintenance services, and source of replacement materials.
6. The burden of proof as to the type, function, and quality of any such substitute material or equipment shall be upon the CONTRACTOR.
7. The ENGINEER will be the sole judge as to the type, function, and quality of any such substitute material or equipment and the ENGINEER's decision shall be final.
8. The ENGINEER may require the CONTRACTOR to furnish at the CONTRACTOR's expense additional data about the proposed substitute.
9. The OWNER may require the CONTRACTOR to furnish at the CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.
10. Acceptance by the ENGINEER of a substitute item proposed by the CONTRACTOR shall not relieve the CONTRACTOR of the responsibility for full compliance with the Contract Documents and for adequacy of the substitute item.
11. The CONTRACTOR shall be responsible for resultant changes and all additional costs which the accepted substitution requires in the CONTRACTOR work, the work of its Subcontractors and of other Contractors, and shall effect such changes without cost to the OWNER.

E. Contractors Representation:

1. A request for a substitution constitutes a representation that CONTRACTOR:
  - a. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
  - b. Will provide the same guarantees or bonds for the substitution as for the product specified.

- c. Will coordinate the installation of an accepted substitution into the work, and make such other changes as may be required to make the work complete in all respects.
- d. Waives all claims for additional costs, under CONTRACTOR'S responsibility, which may subsequently become apparent.

F. Submittal Procedures

- 1. Submit three (3) copies of request for substitution.
- 2. ENGINEER will review requests for substitutions with reasonable promptness, and notify CONTRACTOR, in writing, of the decision to accept or reject the requested substitution.
- 3. During the bidding period, ENGINEER will record acceptable substitutions in Addenda.
- 4. After award of Contract, ENGINEER will notify CONTRACTOR, in writing, of decision to accept or reject requested substitutions in Addenda.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION (Not Applicable)**

**END OF SECTION**

## **SECTION 01710 – CLEANING**

### **PART 1 GENERAL**

#### 1.01 REQUIREMENTS INCLUDED

- A. Execute cleaning, during progress of the Work, and at completion of the Work, as required by the General Conditions.

#### 1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

#### 1.03 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

### **PART 2 PRODUCTS**

#### 2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by cleaning material manufacturer.

### **PART 3 EXECUTION**

#### 3.01 DURING CONSTRUCTION

- A. Execute periodic cleaning to keep the work, the site and adjacent properties free from accumulation of waste material, rubbish and windblown debris, resulting from Construction Work.
- B. Provide on-site containers for the collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.
- C. The OWNER's Representative reserves the right to direct the CONTRACTOR to remove waste materials
- D. Mechanical Sweeping: CONTRACTOR shall maintain on site a mechanical sweeping device for removing debris from existing, temporary and permanent pavement.

### 3.02 DUST CONTROL

- A. Perform operations so that dust and other contaminants resulting from Construction Work operations will not cause any damages or maintenance problems to adjacent properties.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.

### 3.03 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Polish glossy surfaces to a clear shine.
- D. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- E. Prior to final completion, or OWNER occupancy, CONTRACTOR shall conduct an inspection of sight-exposed interior and exterior surfaces, and all work areas, to verify the entire work is clean.
- F. All storage and staging areas shall be cleaned and returned to prior conditions or better as per requirements of this section.

### 3.04 MEASUREMENT AND PAYMENT

- A. There shall be no special measurement or payment for the work under this section; it shall be included in the price of all other work.

**END OF SECTION**

## SECTION 01720 – PROJECT RECORD DOCUMENTS

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.

#### 1.03 SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set of marked-up Record Prints.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.
  - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

### PART 2 PRODUCTS

#### 2.01 RECORD DRAWINGS

- A. Record Prints: Maintain one set of black-line white prints of the Contract Drawings and Shop Drawings.
  - 1. Preparation: 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 would be difficult to identify or measure and record 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.
      - 1) Document with photographs.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Changes made by Change Order or Work Change Directive.
    - i. Changes made following Engineer's written orders.
    - j. Details not on the original Contract Drawings.
    - k. Field records for variable and concealed conditions.
    - l. Record information on the Work that is shown only schematically.
  3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
  4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
  7. Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Engineer. Make corrections where required.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  1. Record Prints: Organize Record Prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Identification: As follows:
    - a. Project number.
    - b. Project name.
    - c. Date.
    - d. Designation "PROJECT RECORD DRAWINGS."
    - e. Name of Contractor.

## 2.02 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications 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. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  - 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
  - 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

## 2.03 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  - 1. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  - 2. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

## 2.04 MISCELLANEOUS RECORD SUBMITTALS

- A. 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.

# **PART 3 EXECUTION**

## 3.01 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction.

Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Engineer's reference during normal working hours.

- C. Record Documents of water, sewer and drainage must be provided for the General Contractor by a Professional Land Surveyor and must be satisfactory for approval by the OWNER and shall comply with the latest approved version of the CADD City Standards.
- D. Final pay request will not be processed until Record Documents have been completed and submitted to the City.

**END OF SECTION**

**SECTION 01780  
CONTRACT CLOSEOUT**

**PART 1      GENERAL**

1.01      SUBMITTALS

A.      Informational Submittals:

1. Submit prior to application for final payment.
  - a) Record Documents.
  - b) As-built drawings (signed and sealed hardcopies and electronic format – PDF and CAD files)
  - c) Special Bonds, Special Guarantees, and Service Agreements.
  - d) Consent of Surety to Final Payment.
  - e) Releases or Waivers of Liens and Claims.
  - f) Releases from Agreements.
  - g) Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01025, Measurement and Payment.
  - h) Spare Parts, Special Tools and Extra Materials: As required by individual Specification sections.

B.      Subcontractor Identification Form:

1. Submit form with final pay request.
2. Submit a separate form for each subcontractor used.
3. For Capital Improvement Projects, submit form along with final pay request to the PCM.
4. Form is attached as a Supplement to this Section.

1.02      RECORD DOCUMENTS

A.      Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
2. Accuracy of Records:
  - a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
  - b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.

4. Prior to submitting each request for progress payment, request PCM's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by PCM to recommend whole or any part of Contractor's Application for Payment, either partial or final.

#### 1.03 RELEASES FROM AGREEMENTS

- A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the Owner's construction right-of-way.
- B. In the Event Contractor is Unable to Secure Written Releases:
  1. Inform PCM of the reasons.
  2. Owner or its representatives will examine the site, and Owner will direct Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
  3. Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory Bond in a sum to cover legal claims for damages.
  4. When Owner is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if:
    - (i) Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate claims that Contractor has failed to fulfill terms of side agreement or special easement, or
    - (ii) Contractor is unable to contact or has had undue hardship in contacting grantor.

#### 1.04 AS-BUILT DRAWINGS

- A. Quality Assurance
  1. As-built drawings must meet all minimum City of Fort Lauderdale CAD standards and be submitted in the latest version of AutoCAD available at the time the contract is signed.
  2. As-built drawings will be submitted in both electronic and hard copy forms as follows
    - a. 3 hard copy sets of as-builts will be submitted on 24x36 paper signed, sealed, and dated by a Florida Professional Licensed Surveyor (PLS).
    - b. 1 CD or jump drive which will include both DWG files for the package and a PDF document including the surveyors signature and seal.
  3. As-built drawings will include the following:
    - a. PLS name, business name, license numbers, address, and telephone number
    - b. The following statement must be included:

"I hereby certify that the as-built location information of the potable water, reclaimed water, wastewater and drainage facilities shown on these drawings conforms to the minimum technical standards for land surveying in the State of Florida, Chapter 5J-17.050(10)(i) (Florida

Administrative Code), as adopted by the Department of Agriculture and Consumer Services, Board of Professional Surveyors and Mappers, and that said as-builts are true and correct to the best of our knowledge and belief.”

- c. As-built drawings will contain the information on the design drawings (plan and profile views) plus document changes between the design and construction including correcting all information that is incorrect due to changes during construction. Incorrect or no longer relevant information will be erased or struck through. All location changes constructed materially different (one-tenth foot horizontal, one tenth vertical) than the design location will have their design location struck through and will be redrafted at the constructed location. Design drawing dimensioning will be corrected as necessary.
4. Drawing will be a complete set including cover sheet, index, and any other sheets included in the approved design set. Standard detail sheets are not necessary.

**B. Minimum As-Built Drawing Requirements**

1. Show the location of easements used by the water and wastewater facilities.
2. Indicate pipe joint locations where water and wastewater or reclaimed water piping crosses.
3. Indicated the length of gravity wastewater piping and actual slope between manhole centers.
4. Show all abandoned in place facilities including the extent and method of abandonment.
5. Show elevations to the nearest tenth of a foot for top of pipe for water mains, force mains, and reclaimed water mains at vertical deflection points, all bends, valves and fittings and every 200 feet along straight runs and where they cross all other facilities.
6. Show elevations to the nearest one hundredth of a foot for manhole rims, gravity main inverts at the manhole, force main connections to manholes, lift station top of slab, bottom of wet well, influent pipe invert and control set points.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 MAINTENANCE OF RECORD DOCUMENTS**

**A. General:**

1. Promptly following commencement of Contract Times, secure from Engineer, at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.
2. Delete Engineer title block and seal from all documents.
3. Label or stamp each record document with title, “RECORD DOCUMENTS,” in neat large printed letters.
4. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded. Contractor is

responsible for maintaining up-to-date “red-lined” markups, on site, of all changes including revised locations of buried features and provide access to the City for review at any time.

5. All piping inserts, fittings, and valve locations shall be located by a Florida Licensed Surveyor in accordance with City of Fort Lauderdale surveying standards and per NAVD 88. Contractor shall provide adequate notice to the surveyor to ensure that all locations are accessible, prior to backfill.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by PCM or Engineer.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
  - a. Color Coding:
    - 1) Green when showing information deleted from Drawings.
    - 2) Red when showing information added to Drawings.
    - 3) Blue and circled in blue to show notes.
  2. Date entries.
  3. Call attention to entry by “cloud” drawn around area or areas affected.
  4. Legibly mark to record actual changes made during construction, including, but not limited to:
    - a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
    - b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
    - c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
    - d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
    - e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
  5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
    - a. Clearly identify the item by accurate notes such as “cast iron drain,” “galv. water,” and the like.
    - b. Show, by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).
    - c. Make identification so descriptive that it may be related reliably to Specifications.

D. Coordination with Florida Licensed surveyor:

1. Contractor shall not cover any bends, valves, or fittings installed until they have been located by the survey crews for the purpose of preparing as-built and/or Record Drawings.
2. If the above conditions are not met, for any reason, Contractor shall bear the cost of potholing the constructed installation to allow for the locations.

3.02 FINAL CLEANING

A. At completion of the Work or of a part thereof and immediately prior to Contractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire site or parts thereof, as applicable.

1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner and PCM.
2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
4. Clean all windows.
5. Clean and wax wood, vinyl, or painted floors.
6. Broom clean exterior paved driveways and parking areas.
7. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
8. Rake clean all other surfaces.
9. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.
10. Leave water courses, gutters, and ditches open and clean.
- 11.

B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

C. Meet all requirements of Section 02575, Surface Restoration.

3.03 SUPPLEMENTS

A. The supplements listed below, following "END OF SECTION," are part of this Specification.

1. Subcontractor Identification Form.

**END OF SECTION**



## **SUBCONTRACTOR IDENTIFICATION FORM**

This form shall be completed by all City of Fort Lauderdale Prime Contractors who subcontracted out any portion of his/her City contract. The form shall be forwarded to the City of Fort Lauderdale's Public Services Department (Engineering and Architectural Services) with the prime contractor's final pay request. A separate form is to be completed and submitted for each subcontractor. Please telephone (954) 761-5057 or 761-5083, if you have any questions regarding this form.

1) CITY OF FORT LAUDERDALE PROJECT NO. \_\_\_\_\_

2) PROJECT DESCRIPTION \_\_\_\_\_

3) SUBContractor \_\_\_\_\_

\_\_\_\_\_  
*Business Name*

\_\_\_\_\_  
*Address*

\_\_\_\_\_  
*Telephone & Fax Nos.*

\_\_\_\_\_  
*Email Address/Company Website (if applicable)*

4) SUBCONTRACTOR'S PRINCIPAL OFFICER \_\_\_\_\_

5) CLASSIFICATION OF WORK SUBCONTRACTED OUT \_\_\_\_\_

6) COST OF WORK SUBCONTRACTED OUT \_\_\_\_\_

7) Please check the item(s) which properly identify the ownership status of the subcontractor's firm:

Subcontractor firm is not a MBE or WBE

Subcontractor firm is a MBE, as at least 51 percent is owned and operated by one or more socially and economically-disadvantaged individuals:

American Indian     Asian     Black     Hispanic     White

Subcontractor firm is a WBE, as at least 51 percent is owned and operated by one or more women.

American Indian     Asian     Black     Hispanic     White

8) **PRIME Contractor** \_\_\_\_\_

\_\_\_\_\_  
**NAME & TITLE OF PRIME CONTRACTOR'S REPRESENTATIVE COMPLETING THIS FORM** (*Please Print*)

\_\_\_\_\_  
*(Telephone No.)*

\_\_\_\_\_  
*(Fax No.)*

\_\_\_\_\_  
*(Email Address)*

**SIGNATURE** \_\_\_\_\_ **DATE** \_\_\_\_\_

*Prime Contractor's Representative*



## SECTION 02200 - SITE PREPARATION

### **PART 1 GENERAL**

#### 1.01 DEFINITIONS

- A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.
- B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.
- C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2 inches caliper to a depth of 12 inches below subgrade.
- D. Scalping: Removal of sod without removing more than upper 3 inches of topsoil.
- E. Stripping: Removal of topsoil remaining after applicable scalping is completed.
- F. Project Limits: Areas, as specified, within which Work is to be performed.

#### 1.02 QUALITY ASSURANCE

- A. Obtain Engineer's approval of staked clearing, grubbing, and stripping limits, prior to commencing clearing, grubbing, and stripping.

#### 1.03 SCHEDULING AND SEQUENCING

- A. Prepare site only after adequate erosion and sediment controls are in place. Limit areas exposed uncontrolled to erosion during installation of temporary erosion and sediment controls.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION**

#### 3.01 GENERAL

- A. Clear, grub, and strip areas actually needed for waste disposal, borrow, or site improvements within limits specified.
- B. Property obstructions which are to remain in-place, such as buildings, sewers, drains, water or gas pipes, bridges, etc., are to be carefully protected from damage.
- C. Do not injure or deface vegetation that is not designated for removal. All branches potentially interfering with construction operations shall be pruned prior to starting work and following approval of the Engineer and the City of Fort Lauderdale Urban Forester.

### 3.02 LIMITS

- A. As Follows, but not to Extend beyond Project Limits.
  - 1. Excavation Including Trenches: 5 feet beyond top of cut slopes or shored wall.
  - 2. Fill:
    - a. Clearing and Grubbing: 5 feet beyond toe of permanent fill.
    - b. Stripping and Scalping: 2 feet beyond toe of permanent fill.
  - 3. Waste Disposal:
    - a. Clearing: 5 feet beyond perimeter.
    - b. Scalping and Stripping: Not required.
    - c. Grubbing: Around perimeter as necessary for neat finished appearance.
  - 4. Overhead Utilities:
    - a. Clearing, Grubbing Scalping, and Stripping: Wherever grading is required, including borrow pits, ditches, etc.
  - 5. Other Areas: As shown.
- B. Remove rubbish, trash, and junk from entire area within Project limits.

### 3.03 TEMPORARY REMOVAL OF INTERFERING PLANTINGS

- A. Remove and store, as specified in Section 02930, Trees, Plants, and Ground Covers, shrubs and trees that are not designated for removal but do interfere with construction or could be damaged by construction activities.
- B. Photograph and document location, orientation, and condition of each plant prior to its removal. Record sufficient information to uniquely identify each plant removed and to assure accurate replacement.

### 3.04 CLEARING

- A. Clear areas within limits specified.
- B. Fell trees so that they fall away from facilities and vegetation not designated for removal.
- C. Cut stumps not designated for grubbing 12 inches below the ground surface.
- D. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

### 3.05 GRUBBING

- A. Grub areas within limits specified.

### 3.06 SCALPING

- A. Do not remove sod until after clearing and grubbing is completed and resulting debris is removed.
- B. Scalp areas within limits specified.

### 3.07 STRIPPING

- A. Do not remove topsoil until after scalping is completed.
- B. Strip areas within limits to minimum depths specified. Do not remove subsoil with topsoil.
- C. Stockpile strippings, meeting requirements of Section 02911, Soil Preparation, for topsoil, separately from other excavated material.

### 3.08 TREE REMOVAL OUTSIDE CLEARING LIMITS

- A. Remove Within Project Limits:
  - 1. Dead, dying, leaning, or otherwise unsound trees that may strike and damage Project facilities in falling.
  - 2. Trees designated by Engineer.
- B. Cut stumps off flush with ground, remove debris, and if disturbed, restore surrounding area to its original condition.

### 3.09 TREE TOPPING

- A. Top trees designated by Engineer so remaining portion will not strike facilities in falling. Where topping will remove more than 1/2 of a tree's crown, remove entire tree.
- B. Treat wounds resulting from topping in accordance with standard horticultural practice to preserve the natural character of the tree.

### 3.10 PRUNING

- A. Remove branches below the following heights:
  - 1. Sixteen feet above roadways and shoulders.
  - 2. Nine feet above sidewalks.
  - 3. Six feet above roofs.
- B. Prune only after planting and in accordance with standard horticultural practice to preserve the natural character of the plant. Perform in presence of the Engineer. Remove all dead wood, suckers, and broken or badly bruised branches. Use only clean, sharp tools. Do not cut lead shoot.

### 3.11 DISPOSAL

- A. Clearing and Grubbing Debris:
  - 1. Woody debris may be chipped. Chips may be sold to Contractor's benefit or used for landscaping onsite as mulch or uniformly mixed with topsoil, provided that resulting mix will be fertile and not support combustion. Maximum dimensions of chipped material used onsite shall be 1/4-inch by

- 2 inch. Dispose of chips that are unsaleable or unsuitable for landscaping or other uses with unchipped debris.
2. Limit offsite disposal of clearing and grubbing debris to locations that are approved by federal, state, and local authorities, and that will not be visible from Project.
- B. Scalpings: As specified for clearing and grubbing debris.
- C. Strippings:
1. Dispose of strippings that are unsuitable for topsoil or that exceed quantity required for topsoil offsite or in waste disposal areas approved by Engineer.
  2. Stockpile topsoil in sufficient quantity to meet Project needs. Dispose of excess strippings as specified for clearing and grubbing.

**END OF SECTION**

## SECTION 02240 - DEWATERING

### PART 1 GENERAL (NOT USED)

### PART 2 PRODUCTS (NOT USED)

### PART 3 EXECUTION

#### 3.01 GENERAL

- A. The Contractor shall be responsible for design, installation, and operation of a dewatering system to dewater specified excavations.
  - 1. The dewatering system shall be designed in accordance with the Best Management Practices (BMP's) adopted by FDEP.
  - 2. Inspection and control of dewatering system operations will be in accordance with the FDEP guidelines established in the Florida Erosion and Sediment Control Inspector's Manual (current edition).
- B. Continuously manage and control excavation water recharge in order to facilitate and not impede construction activities at all times, including weekends, holidays, and during periods of work stoppages, and furnish and install, and operate, a contingency backup dewatering system to maintain control of excavation water levels to facilitate construction (i.e.; no construction delays).

#### 3.02 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements specified in Section 01300, Submittals, and the requirements of this Section.
- B. Provide name, address, and phone numbers of all subcontractors.
- C. The Contractor shall submit a Dewatering Best Management Practices (BMP) Plan prior to the start of excavation expected to include dewatering operations. The Plan shall provide detailed descriptions of dewatering procedures to be utilized to meet the requirements of this Section. Methodologies to control dewatering discharge contamination include, but are not limited to:
  - 1. Holding tanks of adequate size and volume.
  - 2. Wellpointing systems.
  - 3. Sump pumping systems.
  - 4. Chemical precipitation of particulates.
  - 5. Filter systems and siltation controls.
  - 6. Outfall booms.

#### 3.03 SURFACE WATER CONTROL

- A. Remove surface runoff controls when no longer needed.

- B. Seal off or berm catch basins in the area of construction to prevent discharge of untreated dewatering effluent or runoff from unstabilized construction areas into storm drains.
- C. All drain inlets or catch basins used for dewatering discharge shall be provided with silt and sediment removal barriers as approved by the Engineer.
  - 1. All barriers shall be cleaned regularly to avoid sediment discharge into the storm drain system.
  - 2. Construction activities will be stopped at no cost to the Owner until sediment controls are properly maintained, installed, and in compliance with the dewatering permit.
  - 3. All barriers shall be removed upon issuance of a hurricane warning.

### 3.04 DEWATERING SYSTEMS

- A. Design, furnish, and install, operate, and maintain a dewatering system of sufficient size and capacity to permit excavation and subsequent construction activities in water-free conditions, and to lower and maintain the excavation area groundwater level a minimum of 2 feet below the lowest point of excavation. The dewatering system shall be designed and operated such that the system continuously maintains excavations water levels so as to maintain the excavation water level in order to allow for the initiation and completion of excavation backfill compaction and restoration activities.
- B. Dewatering systems shall include, but is not limited to, furnishing and installing wells or well points, and or other equipment and appurtenances as may be necessary, including system components or equipment, installed outside the outermost perimeter of the excavation limits, and sufficiently below lowest point of excavation, to maintain the specified or required groundwater elevation.
- C. Open trench pumping maybe permitted upon the approval of the Engineer.
- D. Design and Operate Dewatering Systems:
  - 1. To prevent loss of ground as water is removed.
  - 2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.
  - 3. Avoid surface water pollution or discharge of sediment to storm drain systems or waterways.
- E. Provide supplemental ditches and sumps only as necessary to collect water from local seeps. Do not use ditches and sumps as primary means of dewatering. The Contractor shall not direct any flow of water over pavement surfaces. Discharge of water shall be conducted as approved by the local, state, and federal agencies and the Engineer.
- F. Provide controls to prevent surface water from entering excavation pits, trenches, or stockpiled materials.

### 3.05 PIPELINES CONSTRUCTED UNDER WATER

- A. In the event that it is found that the water in a trench cannot be lowered by ordinary means, i.e., well points and pumps, an alternate construction method may be proposed by the Contractor. Complete details, specifications, manufacturer's descriptive literature, installation lists and any other pertinent data regarding the proposed alternate method shall be submitted as an alternate by the Contractor to the Engineer within 5 calendar days of the time that the Contractor anticipates using such alternate method.
- B. If the Engineer approves the alternate method in writing, it may be used, so long as the Work is performed in a manner which, in the opinion of the Engineer, conforms to the method and procedure as set forth in the information supplied by the Contractor in his original application for use of an alternate method. The Engineer may revoke approval of the alternate method if at any time, in his opinion, the Work is not conforming to any applicable portion of these Specifications.
- C. No pipeline shall be laid under water without approval of the Engineer.
- D. If the dewatering system is eliminated or the effort reduced, and the pipe is laid underwater, additional pipe zone material will be required as backfill to the water table elevation, or to the level it was reduced to.

### 3.06 DISPOSAL OF WATER

- A. All water generated, pumped, or removed from excavations as a result of excavation dewatering activities shall be collected, containerized, and managed prior to discharge and or treatment at an approved discharge point or facility, in accordance with Broward County Code of Regulation, Sections 27-27, 27-193(a), 27-193(b)(3)a and 27-196. Contractor shall secure, obtain, and pay for all necessary local, state, and federal permits, licenses, fees, and or approvals to discharge water or perform onsite or offsite treatment and disposal. Treat water collected by dewatering operations as required by regulatory agencies, prior to discharge.
- B. Discharge water as permitted, and in regulatory compliance with Contractor obtained discharge permits/licenses.
  - 1. All discharge activities shall be performed so as to prevent silt and sediment discharge and eliminate any soil erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.
  - 2. Maximum allowable turbidity of discharges to surface waters or storm drains will be 10 NTU's.
  - 3. Sump discharges cannot be discharged directly to storm drains or surface waters without treatment.
- C. Affected storm sewer outfalls shall be protected with floating silt booms as approved by the Broward County Planning and Environmental Regulation Division (BCPERD) and the Engineer. All accumulated debris resulting from the dewatering discharge collecting in the boom shall be removed on a daily basis.

- D. Visible silt plumes emanating from the area around the outfalls will be considered a failure of the silt and sediment removal measures and may result in a Notice of Violation issued by BCPERD. The Contractor will be responsible for all fines associated with the violation of the dewatering permit conditions issued to the Contractor.
- E. Failure to control dewatering discharges as described above and as detailed in the Florida Erosion and Sediment Control Inspector's Manual, may result in an order to cease dewatering operations until the discharge problems are corrected. No claims will be accepted for costs or delays associated with unacceptable dewatering discharge practices.

### 3.07 WELL POINT REMOVAL

- A. Well point holes shall be filled with sand which shall be washed into the hole.
- B. Well point holes located within asphalt pavement surfaces or concrete pavements, shall be filled with sand to the subgrade. The remaining hole shall be filled with nonshrink grout.

### 3.08 CONTAMINATED GROUNDWATER AND DISPOSAL REQUIREMENTS

- A. If Contractor suspects, witnesses, or identifies, groundwater contamination at any time during the performance of the Work, Contractor shall notify the Engineer immediately. Results will be obtained by the onsite mobile laboratory.
- B. If analytical testing (by Engineer or Engineer-designated laboratory or subcontractor) documents and indicates elevated concentrations above FDEP action levels (Chapter 62-777, Florida Administrative Code) as verified by the Engineer, dewatering operations will be suspended until appropriate treatment and or construction measures can be implemented. Contractor shall not resume operations until notified to do so in writing by the Engineer and construction of the remaining sewer pipelines in that area will be installed in the wet or normal construction activities shall be resumed in another areas determined by the ENGINEER. There shall be no delay or mobilization claim associated with moving to another project area, unless all other Work has been completed. In addition, the local agency will be immediately notified via telephone and in writing by the Engineer. Dewatering activities in the area will not proceed until review of the matter with the local agency is resolved and written authorization is issued.

- C. Treatment of the groundwater will include three options depending on the magnitude of the contamination in the trench or as determined by the Engineer: Granular Activated Carbon (GAC) Treatment Vessels, Mobile Air Stripping Units, or Vacuum Truck Removal and Disposal or other method as approved by the Engineer. The Contractor will provide a submittal list of all qualified groundwater remediation subcontractors for GAC vessel treatment/portable air stripping unit and vacuum truck disposal including phone numbers, contact names, and addresses prior to start of construction. The selected groundwater treatment/recycling facility for hauling contaminated groundwater shall also be identified.
- D. If contaminated groundwater in the dewatering trench is encountered, the remediation operations will begin once local agency approval is obtained. Contaminated water will be disposed first into a high volume holding (FRAC) tank and then treated through a GAC unit/portable air stripper or recovered into vacuum hauling trucks for disposal.
- E. Effluent water from the treatment system will be analyzed by the onsite mobile laboratory to confirm that concentrations are below regulatory limits. Effluent water will then be directed to a pre-approved alternative location as determined by local agency and/or the Engineer.
- F. A Dewatering Plan describing the dewatering approach, groundwater monitoring, and remediation alternative is attached.

**END OF SECTION**

## **SECTION 02260 - EXCAVATION SUPPORT AND PROTECTION**

**PART 1 GENERAL (NOT USED)**

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. The Contractor shall be responsible to design, provide, and maintain shoring, sheeting, and bracing as necessary to support the sides of excavations and to prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.
- B. Consider all available geotechnical information available when designing the excavation support system.

3.02 REMOVAL OF EXCAVATION SUPPORT

- A. Remove excavation support in a manner that will maintain support as excavation is backfilled.
- B. Do not begin to remove excavation support until support can be removed without damage to existing facilities, completed Work, or adjacent property.
- C. Remove excavation support in a manner that does not leave voids in the backfill.

3.03 TRENCHES

- A. For trench excavation exceeding 5 feet in depth, provide adequate safety system meeting requirements of the Occupational Safety and Health Administration's (OSHA), Trench Safety Standards, 29 C.F.R., S.1926.650, Subpart P, and all subsequent revisions or updates adopted by the Department of Labor and Employment Security.

**END OF SECTION**

## SECTION 02315 - FILL AND BACKFILL

### PART 1 GENERAL

#### 1.01 DEFINITIONS

- A. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade preparation.
- B. Completed Course: A course or layer that is ready for next layer or next phase of Work.
- C. Lift: Loose (uncompacted) layer of material.
- D. Geosynthetics: Geotextiles, geogrids, or geomembranes.
- E. Well-Graded:
  - 1. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
  - 2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
  - 3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.
- F. Influence Area: Area within planes sloped downward and outward at 60-degree angle from horizontal measured from:
  - 1. 1-foot outside outermost edge at base of foundations or slabs.
  - 2. 1-foot outside outermost edge at surface of roadways or shoulder.
  - 3. 0.5-foot outside exterior at spring line of pipes or culverts.
- G. Borrow Material: Material from required excavations or from designated borrow areas on or near site.
- H. Selected Backfill Material: Materials available onsite that Engineer determines to be suitable for specific use.
- I. Imported Material: Materials obtained from sources offsite, suitable for specified use.
- J. Structural Fill: Fill materials as required under structures, pavements, and other facilities.

- K. Embankment Material: Fill materials required to raise existing grade in areas other than under structures.

**PART 2 PRODUCTS**

2.01 EARTHFILL

- A. Excavated material from required excavations and designated borrow sites, free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.
- B. Material containing more than 10 percent gravel, stones, or shale particles is unacceptable.
- C. Provide imported material of equivalent quality, if required to accomplish Work.

2.02 GRANULAR FILL

- A. Use graded aggregate base material of uniform quality throughout, substantially free from vegetable matter, shale, lumps and clay balls, and having a Limerock Bearing Ratio value of not less than 100.
- B. Aggregate is composed of limestone, marble, or dolomite.
- C. Use material retained on the No. 10 sieve composed of aggregate meeting the following requirements:
  - 1. Soundness Loss, Sodium, Sulfate: AASHTO T 104, 15 percent.
  - 2. Percent Wear: AASHTO T 96 (Grading A) 45 percent.

Sieve Size	Percent by Weight Passing
2 inch	100
1-1/2 inch	95 to 100
¾ inch	65 to 90
3/8 inch	45 to 75
No. 4	35 to 60
No. 10	25 to 45
No. 50	5 to 25
No. 200	0 to 10

2.03 WATER FOR MOISTURE CONDITIONING

- A. Free of hazardous or toxic contaminates, or contaminants deleterious to proper compaction.

## 2.04 FOUNDATION STABILIZATION ROCK

- A. General: Materials may be either limerock, shell rock, cemented coquina, or shell base sources approved by the Department.
- B. Specific Requirements for Limerock: For limerock, carbonates of calcium and magnesium shall be at least 70 percent. Materials having a plasticity index of more than ten or a liquid limit greater than 40 shall not be used as a stabilizer. The gradation of limerock shall be FDOT No. 57 stone or such that 97 percent of these materials will pass a 3-1/2 inch sieve.
- C. Crushed Shell: Crushed shell for this use shall be mollusk shell (i.e., oysters, mussels, clams, cemented coquina). Steamed shell will not be permitted.
  - 1. This shell shall Meet the Following Requirements:
    - a. Material having a plasticity index of more than ten or a liquid limit greater than 40 shall not be used as a stabilizer.
    - b. At least 97 percent by weight of the total material shall pass a 3-1/2 inch sieve and at least 50 percent by weight of the total material shall be retained on the No. 4 sieve.
    - c. Not more than 20 percent by weight of the total material shall pass the No. 200 sieve. The determination of the percentage passing the No. 200 sieve shall be by washing only.
    - d. In the event that the shell meets the above requirements without crushing, crushing will not be required.

## PART 3 EXECUTION

### 3.01 GENERAL

- A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.
- B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.
- C. During filling and backfilling, keep level of fill and backfill around each structure and buried tank even.
- D. If Pipe, Conduit, Duct Bank, or Cable is to be Laid Within Fill or Backfill:
  - 1. Fill or backfill to an elevation 2 feet above top of item to be laid.
  - 2. Excavate trench for installation of item.
  - 3. Install bedding, if applicable, as specified in Section 02320, Trench Backfill.
  - 4. Install item.
  - 5. Backfill pipe zone and remaining trench, as specified in Section 02320, Trench Backfill, before resuming filling or backfilling specified in this Section.

- E. Tolerances:
  - 1. Final Lines and Grades: Within a tolerance of 0.1 foot, unless dimensions or grades are shown or specified otherwise.
  - 2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.
- F. Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs, piping, and other facilities, caused by settlement of fill or backfill material.

### 3.02 BACKFILL UNDER AND AROUND STRUCTURES

- A. Under Facilities: Within influence area beneath structures, slabs, pavements, curbs, piping, conduits, duct banks, and other facilities, backfill with granular fill, unless otherwise shown. Place granular fill in lifts of 6-inch maximum thickness and compact each lift to a density of at least 100 percent of the maximum density as determined by AASHTO T99, Method C.

### 3.03 FILL

- A. Outside Influence Areas Beneath Structures, Pavements, Curbs, Slabs, Piping, and Other Facilities: Unless otherwise shown, place earthfill as follows:
  - 1. Allow for proper thickness of topsoil where required.
  - 2. Maximum 8-inch thick lifts.
  - 3. Place and compact fill across full width of embankment.
  - 4. Compact to a density of at least 80 percent of the maximum density as determined by AASHTO T99, Method C.
  - 5. For the outer layer of all fill where plant growth will be established, DO NOT COMPACT. Leave this layer in a loose condition to a minimum depth of 6 inches.
  - 6. Dress completed embankment with allowance for topsoil, crest surfacing, and slope protection, where applicable.

### 3.04 SITE TESTING

- A. Gradation:
  - 1. One sample from each 1,500 tons of finished product or more often as determined by Engineer, if variation in gradation is occurring, or if material appears to depart from Specifications.
  - 2. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.
  - 3. Remove material placed in Work that does not meet Specification requirements.
- B. In-Place Density Tests: In accordance with AASHTO T99, Method C. During placement of materials, test as follows:
  - 1. Earthfill: One test per 400 feet of pipe run.
  - 2. Granular Fill: One test per 400 feet of pipe run.

3. Foundation Stabilization Rock: One test per lift.

### 3.05 REPLACING OVEREXCAVATED MATERIAL

- A. Replace excavation carried below grade lines shown or established by Engineer as follows:
  1. Beneath Footings: Granular fill.
  2. Beneath Fill or Backfill: Same material as specified for overlying fill or backfill.
  3. Beneath Slabs-On-Grade: Granular fill.
  4. Trenches:
    - a. Unauthorized Overexcavation: Either foundation stabilization rock or granular pipe base material, as specified in Section 02320, Trench Backfill.
    - b. Authorized Overexcavation: Foundation stabilization rock.
  5. Permanent Cut Slopes (Where Overlying Area is Not to Receive Fill or Backfill):
    - a. Flat to Moderate Steep Slopes (3 to 1, Horizontal Run: Vertical Rise or Flatter): Earthfill.
    - b. Steep Slopes (Steeper than 3 to 1):
      - 1) Correct over-excavation by transitioning between over-cut areas and designed slope adjoining areas, provided such cutting does not extend offsite or outside easements and right-of-ways, or adversely impacts existing facilities, adjacent property, or completed Work.
      - 2) Backfilling overexcavated areas is prohibited unless, in Engineer's opinion, backfill will remain stable, and overexcavated material is replaced as compacted earthfill.

**END OF SECTION**

## SECTION 02316 - EXCAVATION

### PART 1 GENERAL

#### 1.01 QUALITY ASSURANCE

- A. Provide adequate survey control to avoid unauthorized over-excavation.

#### 1.02 WEATHER LIMITATIONS

- A. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

#### 1.03 SEQUENCING AND SCHEDULING

- A. Clearing, Grubbing, and Stripping: Complete applicable Work specified in Section 02200, Site Preparation, prior to excavating.
- B. Contractor shall call the utility companies 72 hours before excavation, see Section 01040, Coordination for each utility company phone number and contact person.

### PART 2 PRODUCTS (NOT USED)

### PART 3 EXECUTION

#### 3.01 GENERAL

- A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.
- B. It shall be the Contractor's responsibility to notify business establishments and residents not less than 72 hours prior to construction. Contractor shall, wherever necessary, provide temporary sidewalks and driveway entrances at his own expense, including safe bridges over trenches and fencing around excavations for pedestrian protection.
- C. Provide adequate survey control to avoid unauthorized overexcavation. Do not overexcavate without written authorization of Engineer. If the Contractor excavates beyond the limits shown or specified, the Contractor shall replace such excavation at his own expense. Replace overexcavated material as specified in Section 02315, Fill and Backfill.
- D. Where muck, rock, clay, or other material within the limits of excavation is unsuitable in its original position, excavate such material to the cross-sections shown or specified. Backfill with suitable material and shape to the required cross-section.

E. Remove or protect obstructions as shown on the Drawings.

### 3.02 UNCLASSIFIED EXCAVATION

A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

### 3.03 TRENCH WIDTH

A. Minimum Width of Trenches:

1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
  - a. Less than 4-Inch Outside Diameter or Width: 18 inches.
  - b. Greater than 4-Inch Outside Diameter or Width: 18 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.
2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.
3. Increase trench widths by thicknesses of sheeting, if used.
4. The maximum trench width shall not exceed the minimum stated width of the trench unless approved by the Engineer. Restoration for excavation beyond the minimum required width shall be at the Contractor's sole expense.

### 3.04 EMBANKMENT AND CUT SLOPES

- A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross-sections shown, with proper allowance for topsoil or slope protection, where shown.
- B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.
- C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and right-of-ways, or adversely impacts existing facilities, adjacent property, or completed Work.

### 3.05 STOCKPILING EXCAVATED MATERIAL

- A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.
- B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.
- C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads, streets, public thoroughfares, or access to fire hydrants.

- D. Do not stockpile excavated material adjacent to trenches and other excavations unless excavation sideslopes and excavation support systems are designed, constructed, and maintained for stockpile loads.
- E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.06 DISPOSAL OF SPOIL

- A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.
- B. Dispose of debris resulting from removal of underground facilities as specified in Section 02220, Demolition, for demolition debris.
- C. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk as specified in Section 02200, Site Preparation, for clearing and grubbing debris.

**END OF SECTION**

## SECTION 02319 - SUBGRADE PREPARATION

### **PART 1 GENERAL**

#### 1.01 DEFINITIONS

- A. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.
- B. Subgrade: Layer of existing soil after completion of clearing, grubbing, scalping of topsoil prior to placement of fill, roadway structure or base for floor slab.
- C. Proof-Rolling: Testing of subgrade by compactive effort to identify areas that will not support the future loading without excessive settlement.

#### 1.02 QUALITY ASSURANCE

- A. Notify Engineer when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION**

#### 3.01 GENERAL

- A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.
- B. Bring subgrade to proper grade and cross-section and uniformly compact surface.
- C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.
- D. Maintain prepared ground surface in finished condition until next course is placed.

#### 3.02 COMPACTION

- A. Under Earthfill: Compact upper 6 inches to minimum of 80 percent of the maximum density as determined by AASHTO T99, Method C.
- B. Under Pavement , Floor Slabs On Grade, or Granular Fill Under Structures: Compact the upper 6 inches or as shown on the Drawings, to minimum of 100 percent of the maximum dry density as determined by AASHTO T180.

3.03 MOISTURE CONDITIONING

- A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.
- B. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods, to hasten drying process.

3.04 TESTING

- A. Proof-roll subgrade with equipment specified in Article Compaction to detect soft or loose subgrade or unsuitable material, as determined by Engineer.

3.05 CORRECTION

- A. Soft or Loose Subgrade:
  - 1. Adjust moisture content and recompact, or
  - 2. Over excavate as specified in Section 02316, Excavation, and replace with suitable material from the excavation, as specified in Section 02315, Fill and Backfill.
- B. Unsuitable Material: Over excavate as specified in Section 02316, EXCAVATION, and replace with suitable material from the excavation, as specified in Section 02315, Fill and Backfill.

**END OF SECTION**

## SECTION 02320 -TRENCH BACKFILL

### PART 1 GENERAL

#### 1.01 DEFINITIONS

- A. Base Rock: Granular material upon which manhole bases and other structures are placed.
- B. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.
- C. Imported Material: Material obtained by the Contractor from source(s) offsite.
- D. Lift: Loose (uncompacted) layer of material.
- E. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable or duct bank.
- F. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.
- G. Selected Backfill Material: Material available onsite that Engineer determines to be suitable for a specific use.
- H. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Well-Graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.

### PART 2 PRODUCTS

#### 2.01 MARKING TAPE

- A. Plastic:
  - 1. Inert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.
  - 2. Thickness: Minimum 4 mils.
  - 3. Minimum Width: 2 inches.
  - 4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
  - 5. Manufacturers and Products:
    - a. Reef Industries; Terra Tape.
    - b. Allen; Markline.
- B. Metallic:

1. Solid aluminum foil, visible on unprinted side, encased in a protective high visibility, inert polyethylene plastic jacket.
  2. Foil Thickness: Minimum 5.5 mils.
  3. Width: 2 inches.
  4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
  5. Joining Clips: Tin or nickel-coated furnished by tape manufacturer.
  6. Manufacturers and Products:
    - a. Reef Industries; Terra "D".
    - b. Allen; Detectatape.
- C. Color: In accordance with APWA Uniform Color Code for Temporary Marking of Underground Facilities.

Color <sup>a</sup>	Facility
Red	Electric power lines, cables, conduit, and lightning cables
Orange	Communicating alarm or signal lines, cables, or conduit
Yellow	Gas, oil, steam, petroleum, or gaseous materials
Green	Sewers and drain lines
Blue	Water, irrigation, and slurry lines
<sup>a</sup> As specified in ANSI Z53.1, Safety Color Code.	

2.02 TRENCH STABILIZATION MATERIAL

- A. Foundation stabilization rock as specified in Section 02315, Fill and Backfill.

2.03 BEDDING MATERIAL AND PIPE ZONE MATERIAL

- A. Granular fill as specified in Section 02315, Fill and Backfill.

2.04 EARTH BACKFILL

- A. Earth fill as specified in Section 02315, Fill and Backfill.

**PART 3 EXECUTION**

3.01 TRENCH PREPARATION

- A. Water Control:
  1. As specified in Section 02240, Dewatering.
  2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.
  3. Provide continuous water control until trench backfill is complete.
- B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

- C. Where the trench has been dewatered, backfilling must be done before the pumps are shut off so that the pipe will not float. Any pipe which has been displaced because of floatation will be removed and installed correctly at the Contractor's expense.

### 3.02 TRENCH BOTTOM

- A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.
- B. Soft Subgrade: If subgrade is encountered that may require removal to prevent pipe settlement, notify Engineer. Engineer will determine depth of overexcavation, if any, required.

### 3.03 TRENCH STABILIZATION MATERIAL INSTALLATION

- A. Rebuild trench bottom with trench stabilization material as directed by the Engineer.
- B. Place material over full width of trench in 6-inch lifts to required grade, providing allowance for bedding thickness.
- C. Compact each lift so as to provide a firm, unyielding support for the bedding material prior to placing succeeding lifts.

### 3.04 BEDDING

- A. Furnish granular fill or imported bedding material as directed by the Engineer.
- B. Place over the full width of the prepared trench bottom in two equal lifts when the required depth exceeds 8 inches.
- C. Hand grade and compact each lift to provide a firm, unyielding surface.
- D. Minimum thickness from the following depths below the bottom to the springline of the pipe are as follows, except increase depths listed by 6 inches in areas of rock excavation:
  - 1. Pipe, 15 Inches and Smaller: 4 inches.
  - 2. Pipe, 18 Inches to 36 Inches: 6 inches.
  - 3. Pipe, 42 Inches and Larger: 8 inches.
  - 4. Conduit: 3 inches.
  - 5. Direct-Buried Cable: 3 inches.
  - 6. Duct Banks: 3 inches.
- E. Check grade and correct irregularities in bedding material. Loosen top 1 to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe, conduit, direct-buried cable, or duct bank.

- F. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.
- G. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

### 3.05 BACKFILL PIPE ZONE

- A. Furnish granular fill or imported bedding material as directed by the Engineer.
- B. Upper Limit of Pipe Zone Shall Not Be Less Than Following:
  - 1. Pipes:
    - a. Up to 12-Inch Diameter: 6 inches above top of pipe.
    - b. Greater than 12-Inch Diameter: 12 inches above top of pipe, unless shown otherwise.
  - 2. Conduit: 3 inches, unless shown otherwise.
  - 3. Direct-Buried Cable: 3 inches, unless shown otherwise.
  - 4. Duct Bank: 3 inches, unless shown otherwise.
- C. Restrain pipe, conduit, cables, and duct banks as necessary to prevent their movement during backfill operations.
- D. Place material simultaneously in lifts on both sides of pipe and, if applicable, between pipes, conduit, cables, and duct banks installed in same trench. Compact to 90 percent density as determined by AASHTO T99.
  - 1. Pipes 10 Inches and Smaller Diameter: First lift less than or equal to 1/2 pipe diameter but not less than 3 inches. .
  - 2. Pipes Over 10-Inch Diameter: Maximum 6-inch lifts.
- E. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by "walking in" and slicing material under haunches with a shovel to ensure that voids are completely filled before placing each succeeding lift. Compact material in pipe zone to at least 98 percent maximum density as determined by AASHTO T180.
- F. After the full depth of the pipe zone material has been placed as specified, compact the material by a minimum of three passes with a vibratory plate compactor only over the area between the sides of the pipe and the trench walls. Contractor shall exercise proper care to ensure that no pipe joints will be broken, damaged, or disturbed through the use of any compacting equipment.
- G. Do not use power-driven impact compactors to compact pipe zone material.
- H. Where approved by the Engineer, hydraulic compaction of the pipe zone material and granular trench backfill may be used providing density testing requirements are met. A submittal describing the method of hydraulic compaction will be required.

### 3.06 MARKING TAPE INSTALLATION

- A. Continuously install marking tape along centerline of all buried piping, on top of last lift of pipe zone material. Coordinate with piping installation drawings.
  - 1. Metallic Marking Tape: Install with nonmetallic piping and waterlines.
  - 2. Plastic Marking Tape: Install with metallic piping.

### 3.07 BACKFILL ABOVE PIPE ZONE

#### A. General:

- 1. Process excavated material to meet specified gradation requirements.
- 2. Adjust moisture content as necessary to obtain specified compaction.
- 3. Do not allow backfill to free fall into the trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over the top of pipe.
- 4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
- 5. Backfill to grade with proper allowances for topsoil, crushed rock surfacing, and pavement thicknesses, wherever applicable.
- 6. Backfill around structures with same class backfill as specified for adjacent trench unless otherwise shown or specified.
- 7. Hydraulic compaction may be allowed based upon approval by the Engineer of the Contractor's detailed compaction and testing procedures.

#### B. Backfill for Areas in Landscaped Areas:

- 1. Place in lifts not exceeding 12-inch thickness.
- 2. Mechanically compact each lift to a minimum of 80 percent of the maximum density prior to placing succeeding lifts.

- C. Backfill for Areas Under Facilities and Pavements: Backfill trench above the pipe zone with granular backfill in lifts not exceeding 12 inches. Compact each lift to a minimum of 98 percent of the maximum density compaction as determined by AASHTO Method T180, 100% for Broward County rights of way, prior to placing succeeding lifts.

### 3.08 ALTERNATE METHOD OF CONSTRUCTION

- A. When high water tables, porous soils or other limitations to dewatering are encountered, the Contractor may request the approval of the Engineer for an alternate method of construction.
- B. Use of alternative methods shall not relieve the Contractor of the work, result in increased costs to the Owner or reductions in the quality of the work as defined by testing and acceptance requirements.
- C. Removal of water requirements will be waived and the pipe and appurtenances will be permitted to be installed underwater.

- D. Excavation shall be performed in accordance with Section 02316, Excavation, to the specified limits. The excavation shall be cleared of silt and other fines.
- E. Pipe bedding shall be placed from the bottom of the excavation to 6 inches above the top of the pipe. The bedding shall be granular fill as described in Section 02315 Fill and Backfill.
- F. Select backfill material shall be used to backfill the trench from the top of the bedding to a level 1 foot above the standing water level in the trench. Select material shall be FDOT # 57 stone or granular fill as described in Section 02315, Fill and Backfill. This lift shall be compacted in accordance with the provisions of this Section after which the remainder of the backfill can proceed as normal.
- G. If the above described method is used, all backfill material used below the water table shall not be released into the trench until the bucket or container is less than 1 foot above the water level. Pipe bedding and pipe zone material as defined above shall not be dumped or pushed into the trench.

### 3.09 MAINTENANCE OF TRENCH BACKFILL

- A. After each section of trench is backfilled, maintain the surface of the backfilled trench even with the adjacent ground surface until final surface restoration is completed.
- B. Other Areas: Add excavated material where applicable and keep the surface of the backfilled trench level with the adjacent ground surface.
- C. Water shall be applied to the unstabilized trench backfill to control dust as directed by the Engineer.
- D. Placement of lime rock base course and prime coat shall occur no longer than 5 days following trench backfill or as soon there after as record information is available to verify that pipe inverts and slopes are acceptable.

### 3.10 SETTLEMENT OF BACKFILL

- A. Settlement of trench backfill, or of fill or facilities constructed over trench backfill within the warranty period for the project will be considered a result of defective compaction of trench backfill.

**END OF SECTION**

## SECTION 02481 - TREE RELOCATION AND PROTECTION

### PART 1 GENERAL

#### 1.01 WORK TO BE PERFORMED AND WORK INCLUDED

- A. Provide the Following:
  - 1. Protection and care of existing trees and palms to remain within the project boundaries.
  - 2. Labor, materials, equipment, and services to complete all protection work as shown on the Drawings, as specified herein, or both.

#### 1.02 RELATED WORK

- A. Section 02315, Fill and Backfill.
- B. Section 02911, Soil Preparation.
- C. Section 02920, Sodding.

#### 1.03 APPLICABLE STANDARDS AND SPECIFICATIONS

- A. Comply with the following standards and specifications for all materials, methods, and workmanship unless otherwise noted:
  - 1. Codes and Standards of the American Association of Nurserymen.
  - 2. Codes and Standards of the National Arborists Association.
  - 3. Codes and Standards of the International Society of Arboriculturists.

#### 1.04 PERMITS

- A. The CONTRACTOR shall secure and pay for any permits, including tree relocation permits, required in order to complete the work under this Section.

#### 1.05 DESCRIPTION

- A. Existing trees to remain shall be protected with barricades during construction. Trees or shrubs to remain which are scarred or destroyed shall be replaced at the direction of the City Forester with the same species, size, and quality at no cost to the City.

1.06 GUARANTEES

A. The Contractor Shall Guarantee His Work in the Following Way:

1. Any tree or palm that dies or is deemed in unacceptable condition for one year following final project acceptance shall be removed by the Contractor, including root ball, and backfilling of pit, at no cost to the Owner.
2. The Contractor shall provide a comparable specimen at no additional cost to the City.
3. The guarantee shall be enforced if it is deemed by the City Forester that tree mortality or decline is a product of negligence by the Contractor.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 EXCAVATING NEAR EXISTING TREES

- A. Maintain a minimum 6-foot clearance from all tree trunks except palm trees.
- B. Use a 24-inch minimum depth saw cut in pavement or dirt/gravel roadway before start of excavation in areas where there are large trees close to the construction area. No coating application is required after saw cutting roots.

**END OF SECTION**

## SECTION 02500 - CONVEYANCE PIPING - GENERAL

### PART 1 GENERAL

#### 1.01 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with manufacturer's recommendations and as specified in the individual Specification(s) following this Section.
- B. Marking at Plant: Mark each pipe and fitting at plant. Include date of manufacture, manufacturer's identification, specification standard, diameter of pipe, pipe class, and other information required for type of pipe.
- C. Pipe, specials, and fittings received at Project site in damaged condition will not be accepted.
- D. Gasket Storage: Store rubber gaskets in cool, well ventilated place and do not expose to direct rays of sun. Do not allow contact with oils, fuels, petroleum, or solvents.
- E. Handling:
  - 1. Heavy canvas, or nylon slings of suitable strength shall be used for lifting and supporting materials. Do not use chains or cables.
  - 2. Lifting pipe during unloading or lifting into trench shall be done using two slings placed at quarter point of pipe section. Pipe may be lifted using one sling near center of pipe, provided pipe is guided to prevent uncontrolled swinging and no damage will result to pipe or harm to workmen. Slings shall bear uniformly against pipe.
  - 3. Pipe and fittings shall not be stored on rocks or gravel, or other hard material that might damage pipe. This includes storage area and along pipe trench.

### PART 2 PRODUCTS

#### 2.01 PIPE

- A. As specified in the individual Specification(s) following this Section and as shown on the Drawings.
- B. Color Coding for Water Mains:
  - 1. All pipe used for water main applications shall be color-coded blue in accordance with FAC 62-555.320(21)(b)(3).
  - 2. Continuous blue stripes, parallel to the axis of the pipe, shall be applied using tape or paint applied to the dry pipe exterior surface.
  - 3. Pipe striped during manufacture shall have stripes applied at 90-degree intervals around the pipe that remain intact following installation of the pipe.

4. Pipe striped during installation shall be in a continuous line along the top of the pipe. Pipes 24 inches and greater shall have two additional stripes on each side.
5. Aboveground water main piping shall be color-coded or marked similar to underground piping.

## 2.02 JOINTS

- A. As specified in the individual Specification(s) following this Section.

## 2.03 COUPLINGS

- A. General:

1. Coupling linings for use in potable water systems shall be in conformance with NSF 61B. Linings for wastewater piping shall be in accordance with the provisions of Section 02502, Ductile Iron Pipe and Fittings.
2. Couplings shall be rated for appropriate operating pressure and hydrostatic test pressure.
3. Exposed, bolted, sleeve-type couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.
4. Buried, bolted, sleeve-type couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.

- B. For Pipe with Plain Ends:

1. Bolted, sleeve-type couplings, in accordance with AWWA C219.
2. Fabricated steel, mechanical slip-type expansion joints, in accordance with AWWA C221.

- C. Unless thrust restraint is provided by other means, bolted, sleeve-type couplings shall be harnessed. Harness details shall be in accordance with requirements of appropriate reference standard or as shown on Drawings.

- D. For Pipe with Grooved Ends:

1. Grooved couplings, in accordance with AWWA C606. System shall provide for flexible or rigid joints as shown on Drawings.
2. Exposed couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.
3. Buried couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.

- E. For Pipe with Flanged Ends:

1. Flanged coupling adapters, in accordance with AWWA C219.
2. Dismantling joints for connecting flanged pipe shall be AWWA C219 compliant. Studs and nuts provided to seal gasket shall be separate and independent from tie-bar restraint system.

- F. Bolting Materials: As recommended by coupling manufacturer for specified conditions.

#### 2.04 SLEEVES

- A. Sleeves shall be long or short pattern as appropriate to the application conforming to AWWA C110.
- B. Sleeves shall be mechanical joint with restraint if required, provided by external mechanical joint restraints.
- C. Sleeves shall have a minimum pressure rating of 250 psi.
- D. Linings and coatings ductile iron sleeves shall be in accordance with the provisions of Section 02502, Ductile Iron Pipe and Fittings.

#### 2.05 SERVICE SADDLES

- A. Service saddles shall be ductile iron with double stainless steel straps conforming to AWWA C-111/A.21.11-00.

#### 2.06 SLAB, FLOOR, WALL, AND ROOF PENETRATIONS

- A. Modular Mechanical Seal:
  - 1. Type: Interconnected synthetic rubber links shaped and sized to continuously fill annular space between pipe and wall sleeve opening.
  - 2. Assemble interconnected rubber links with Type 316 stainless steel bolts, nuts, and pressure plates.
  - 3. Size modular mechanical seals according to manufacturer's instructions for the size of pipes shown to provide a watertight seal between pipe and wall sleeve opening.
  - 4. Manufacturers and Products:
    - a. Thunderline/LinkSeal, Div. Of PSI, Houston, TX; Link Seal.
    - b. Calpico, Inc., South San Francisco, California; Sealing Linx.
    - c. Advance Products and Systems, Lafayette, Louisiana; Innerlynx.
- B. Wall Sleeves:
  - 1. Diameter, ends, and length shall be as shown on Drawings.
  - 2. Shall include integral seep ring to minimize seepage between metal sleeve and concrete.
- C. Wall Couplings:
  - 1. Diameter, ends, and length shall be as shown on Drawings.
  - 2. Wall couplings shall provide flexible mechanical joint.
  - 3. Body and end rings shall be coated with fusion bonded epoxy.
  - 4. Body shall include integral seep ring.
  - 5. Shall comply with AWWA C219.

- D. If core drilling is required for penetrations of existing concrete walls or slabs, locations of drilling shall be determined by radiograph to avoid damage to reinforcing steel and conduits.

## 2.07 FLANGES, FLANGE GASKETS, AND BOLTING MATERIALS

- A. As specified in individual Specifications following this Section.
- B. Flanges, bolting materials, and flange gaskets for steel flanges shall conform to AWWA C207.
- C. Flanges, bolting materials, and flange gaskets for ductile iron flanges shall conform to AWWA C110 and C115.

## 2.08 INSULATING FLANGES AND COUPLINGS

- A. Dielectric Flange Manufacturers:
  - 1. Pipeline Seal and Insulator, Inc.; Houston, Texas.
  - 2. Central Plastics Co.; Shawnee, Oklahoma.
  - 3. Calpico, Inc.; South San Francisco, California.
- B. Insulating Flanges:
  - 1. Bolt holes sized as required.
  - 2. Manufacturers and Products:
    - a. Dresser Industries; Style 39.
    - b. Baker Coupling Company, Inc.; Series 216.

## 2.09 PIPE LOCATING TAPE

- A. As specified in Section 02320, Trench Backfill.

## 2.10 PIPE BEDDING AND PIPE ZONE MATERIAL

- A. Granular material as specified in Section 02320, Trench Backfill.

## 2.11 TRENCH STABILIZATION MATERIAL

- A. As specified in Section 02320, Trench Backfill.

# **PART 3 EXECUTION**

## 3.01 GENERAL

- A. Notify Engineer at least 2 weeks prior to field fabrication of pipe or fittings.
- B. Furnish feeler gauges of proper size, type, and shape for use during installation for each type of pipe furnished.
- C. Distributing Materials: Place materials along trench only as will be used each day, unless otherwise approved by Engineer. Placement of materials shall

not be hazardous to traffic or to general public, obstruct access to adjacent property, or obstruct others working in area.

### 3.02 EXAMINATION

- A. Verify size, material, joint types, elevation, and horizontal location of existing pipeline to be connected to new pipeline or new equipment.
- B. Inspect size and location of structure penetrations to verify adequacy of wall pipes, sleeves, and other openings.
- C. Damaged Coatings and Linings: Repair using coating and lining materials in accordance with manufacturer's instructions.

### 3.03 PREPARATION

- A. Prepare trench as specified in Section 02316, Excavation.
- B. Unless otherwise permitted by Engineer, maximum length of open trench shall not exceed 400 feet.
- C. Trench Grade:
  - 1. Grade bottom of trench by hand to specified line and grade, with proper allowance for pipe thickness and pipe base, when specified. Trench bottom shall form a continuous and uniform bearing and support for pipe between bell holes.
  - 2. Before laying each section of pipe, check grade and correct irregularities found. Grade may be disturbed for removal of lifting tackle.
- D. Pipe Bedding: Place and compact pipe bedding material as follows:
  - 1. Install to full width of trench, from the following depths below bottom to springline of pipe:
    - a. For Pipe 12-Inch Diameter: 4 to 6 inches.
    - b. For Pipe Larger than 12-Inch Diameter: 6 to 8 inches.
  - 2. Compact to at least 98 percent of its maximum density as determined by AASHTO T180.
  - 3. Ensure that no unfilled or uncompacted areas occur beneath pipe.
- E. Bell (Joint) Holes: At each joint, dig bell holes of ample dimensions in bottom of trench, and at sides where necessary, to permit joint to be made properly and to permit easy visual inspection of entire joint.

### 3.04 INSTALLATION

- A. General:
  - 1. Provide and use proper implements, tools, and facilities for safe and proper prosecution of Work.
  - 2. Lower pipe, fittings, and appurtenances into trench, piece by piece, by means of a crane, slings, or other suitable tools and equipment, in such

- a manner as to prevent damage to pipe materials, protective coatings and linings.
3. Do not drop or dump pipe materials into trench.
  4. Join pipe and fittings in accordance with manufacturer's instructions, unless otherwise shown or specified.
  5. Install individual pipe lengths in according to approved lay diagram. Misplaced pipe shall be removed and replaced.
  6. Inspect pipe and fittings before installation, clean ends thoroughly, remove foreign matter and dirt from inside.
  7. Flanged Joints:
    - a. Install perpendicular to pipe centerline.
    - b. Bolt Holes: Straddle vertical centerline, aligned with connecting equipment flanges or as shown on Drawings.
    - c. Use torque-limiting wrenches to provide uniform bearing and proper bolt tightness.
    - d. Flange Type: Use flat-faced flange when joining with flat-faced ductile or cast iron flange.
  8. Couplings:
    - a. Install in accordance with manufacturer's written instructions.
    - b. Before coupling, clean pipe holdback area of oil, scale, rust, and dirt.
    - c. Do not remove pipe coating. If damaged, repair before joint is made.
    - d. Clean and lubricate gaskets before installation.
    - e. Tighten coupling bolts progressively, drawing up bolts on opposite sides gradually until bolts have uniform tightness.
- B. Cleaning Pipe and Fittings:
1. Remove lumps, blisters, and excess coating from bell and spigot ends of each pipe. Wire brush outside of spigot and inside of bell and wipe clean, dry, and free from oil and grease before pipe is laid.
  2. Wipe ends of mechanical joint pipe and fittings and of rubber gasket joint pipe and fittings clean of dirt, grease, and foreign matter.
- C. Laying Pipe:
1. Direction of Laying: Lay pipe with bell end facing in direction of laying. For lines on an appreciable slope, face bells upgrade at discretion of Engineer.
  2. Mechanical Joint, Push-On Joint, and Restrained Joint Pipe: After first length of pipe is installed in trench, secure pipe in-place with approved backfill material tamped under and along sides to prevent movement. Keep ends clear of backfill. After each section is jointed, place backfill as specified to prevent movement.
  3. Take precautions necessary to prevent floating of pipe prior to completion of backfill operation.
  4. When using movable trench shield, take necessary precautions to prevent pipe joints from pulling apart when moving shield ahead.
  5. Do not allow foreign material to enter pipe while it is being placed in trench.

6. Close and block open end of last laid section of pipe to prevent entry of foreign material or creep of gasketed joints when laying operations are not in progress, at close of day's work, or whenever workers are absent from job.
  7. Pipe shall be installed in a straight alignment and deflections made as required after the joint has been completed.
- D. Joining Push-On Joint Pipe and Mechanical Joint Fittings:
1. Join pipe with push-on joints and mechanical joint fittings in strict accordance with manufacturer's recommendations.
  2. Provide special tools and devices, such as, special jacks, chokers, and similar items required for installation.
  3. Lubricate all pipe gaskets and pipe ends using lubricant furnished by pipe manufacturer. No substitutes will be permitted.
  4. Clean ends of fittings of dirt, mud, and foreign matter by washing with water and scrubbing with a wire brush, after which, slip gland and gasket on plain end of pipe. Lubricate end of pipe to facilitate sliding gasket in place, then guide fitting onto spigot of pipe previously laid.
- E. Cutting Pipe:
1. General: Cut pipe for inserting valves, fittings, or closure pieces in a neat and workmanlike manner without damaging pipe or lining and so as to leave a smooth end, at right angles to axis of pipe.
  2. Pipe: Cut pipe with milling type cutter or saw. Do not flame cut.
  3. Dressing Cut Ends: Dress cut end of mechanical joint pipe to remove sharp edges or projections, which may damage rubber gasket. Dress cut ends of push-on joint pipe by beveling, as recommended by manufacturer.
- F. Buried Pressure Pipe:
1. Concrete Encased or Embedded Pipe: Do not encase joints in concrete unless specifically shown on Drawings.
  2. Placement:
    - a. Keep trench dry until pipe laying and joining is completed. If the excavation cannot be effectively dewatered the Contractor shall propose alternate pipe installation methodology for approval by the Engineer prior to proceeding. All requirements of Section 02320, Trench Backfill, will remain in effect.
    - b. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.
    - c. Measure for grade at pipe invert, not at top of pipe.
    - d. Excavate trench bottom and sides of ample dimensions to permit proper joining, welding, visual inspection, and testing of entire joint.
    - e. Prevent foreign material from entering pipe during placement.
    - f. Close and block open end of last laid pipe section when placement operations are not in progress and at close of day's work.

- g. In general, lay pipe upgrade with bell ends pointing in direction of laying.
  - h. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:
    - 1) Shorter pipe lengths.
    - 2) Special mitered joints.
    - 3) Standard or special fabricated bends.
  - i. Check gasket position with feeler gauge to assure proper seating.
  - j. After joint has been made, check pipe alignment and grade.
  - k. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.
  - l. Prevent uplift and floating of pipe prior to backfilling.
3. Tolerances:
- a. Deflection From Horizontal Line: Maximum 2 inches.
  - b. Deflection From Vertical Line: Maximum 1 inch.
  - c. Joint Deflection: Maximum of 75 percent of manufacturer's recommendation.
  - d. Horizontal position of pipe centerline on alignment around curves maximum variation of 1 foot from position shown.
4. Cover Over Top of Pipe: Minimum 3 feet, unless otherwise shown.
5. Disposal of Excess Excavated Material: As specified in Section 02316, Excavation.

G. Line and Grade:

- 1. No high points will be allowed between air valves on pressure piping.
- 2. Maintain pipe grade between invert elevations to provide minimum clearance at air valve locations from existing ground surface to top of pipe.
- 3. Install air valves as shown on the Drawings and as verified in the field and field verify intervening low points. When field conditions warrant, exceptions may be made upon approval of Engineer.
- 4. Deviations exceeding 1/2 inch from specified line or 1/4 inch from specified grade will not be allowed without express approval of Engineer.
- 5. Pipeline sections that are not installed to elevations shown or installed as approved by Engineer shall be reinstalled to proper elevation.

3.05 THRUST RESTRAINT

- A. Location: At pipeline tees, plugs, valves, caps, bends, and locations where unbalanced forces exist, and as shown on the Drawings.
- B. All pressure pipe will be restrained at all valves and fittings. Provide additional restraint as shown on the Drawings.
- C. Use of thrust blocks is not permitted.

### 3.06 CORROSION PROTECTION

- A. Buried Pipe: As specified in the individual Specifications following this Section.
- B. Notify Engineer at least 3 days prior to start of surface preparation, coating application, and corrosion protection work.

### 3.07 PLACEMENT OF PIPE LOCATING TAPE

- A. Place pipe locating tape in accordance with Section 02320, Trench Backfill.

### 3.08 PIPE BEDDING AND PIPE ZONE MATERIAL

- A. Place pipe bedding and pipe zone material in accordance with Section 02320, Trench Backfill.

### 3.09 FIELD QUALITY CONTROL – INSPECTION AND TESTING

#### A. General:

1. Notify Engineer in writing at least 15 days in advance of testing. Perform testing in presence of Engineer.
2. Using water as test medium, all newly installed pipelines shall successfully pass hydrostatic leakage test prior to acceptance.
3. Conduct field hydrostatic test on buried piping after trench has been completely backfilled. Testing may, as approved by Engineer, be done prior to placement of asphaltic concrete or roadway structural section.
4. Contractor may, if field conditions permit and as approved by Engineer, partially backfill trench and leave joints open for inspection and conduct initial service leak test. Final field hydrostatic test shall not, however, be conducted until backfilling has been completed as specified above.
5. Supply of Temporary Water: In accordance with Section 01500, Construction Facilities and Temporary Controls.
6. Install restraint as necessary to prevent movement of pipe and protect adjacent piping or equipment. Make necessary taps in piping prior to testing.
7. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
8. New Piping Connected to Existing Piping: Isolate new piping with grooved-end pipe caps, blind flanges, or other means as acceptable to Engineer.
9. Service connections for water mains are to be installed to the angle stop prior to disinfection and testing of the installed main.
10. Fire hydrant leads are to be installed to the shut-off valve prior to disinfection and testing of the installed main.

#### B. Tapping Sleeve and Valve:

1. Install mechanically restrained test plug with relief port.
2. Test tapping sleeve and valve prior to performing tap.
  - a. Test at 150 psi for 15 minutes.

- b. Successful test will be no visible leakage.
- 3. Test sleeve and valve together with valve open.

C. Hydrostatic Testing Procedure:

- 1. Furnish testing equipment, as approved by Engineer, which provides observable and accurate measurements of leakage under specified conditions.
- 2. Maximum Filling Velocity: 0.25 foot per second calculated based on full area of pipe.
- 3. Expel air from piping system during filling.
- 4. Test Pressure: 150 psi as measured at low point of pipeline.
- 5. Apply and maintain specified test pressure with hydraulic force pump. Valve off piping system when test pressure is reached.
- 6. Maintain hydrostatic test pressure continuously for 2 hours minimum, adding makeup water only as necessary to restore test pressure.
- 7. Determine actual leakage by measuring quantity of water necessary to maintain specified test pressure for duration of test.

D. Maximum Allowable Leakage:

$$Q = \frac{LD(P)^{1/2}}{148,000}$$

where:

- Q = Quality of makeup water, in gallons per hour.
- L = Length of pipe section tested, in feet.
- D = Nominal diameter of pipe, in inches.
- P = Average test pressure during hydrostatic test, in pounds per square inch.

3.10 CLEANING AND DISINFECTION

- A. Pipelines shall be kept clean during installation. Following assembly and testing, and prior to disinfection and final acceptance, flush pipelines with water at 2.5 fps minimum flushing velocity until foreign matter is removed.
- B. Water shall be obtained from a potable, City source and shall be metered. The City shall be notified at least 2 working days prior to the intended use such that the meter can be installed. The Contractor shall pay the City for all water used. Water cost shall be incidental to the related pipeline installation work items.
- C. Flushing shall be accomplished by partially opening and closing valves several times under expected line pressures with velocities adequate to remove foreign materials from the pipe, valves, and hydrants.
- D. If impractical to flush large diameter pipe at 2.5 fps, clean pipe by use of pipe pig as approved by Engineer. Multiple passes of pipe pig may be required to adequately clean line.

- E. Remove accumulated debris through blowoffs 2 inches and larger or by removing spools and valves from piping. If hydrants are used, they must be adequately flushed and cleaned prior to being put into service.
- F. Disinfection of Water Mains: As specified in Section 02519, Disinfection of Water Systems.

3.11 REPAIR OF DAMAGED PIPING

- A. All existing piping damaged by the Contractor as a result of construction activities shall be repaired by the Contractor.
  - 1. The Utilities Department shall be notified of all water main and force main damage and for all control valve operation.
  - 2. Damage to unmarked mains shall be considered additional work or will be repaired by the Owner.
  - 3. Damage to marked mains shall be repaired at no additional cost to the Owner.
- B. Cleaning and disinfection of water main repairs shall be in accordance with the provisions of Section 02519, Disinfection of Water Systems.
- C. If the Owner is required to make repairs for damaged mains that are the responsibility of the Contractor, the cost of the work will be charged to the Contractor.

**END OF SECTION**

## SECTION 02518 - WATER SERVICE CONNECTIONS

### PART 1 GENERAL

#### 1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this Section:
1. American Society for Testing and Materials (ASTM):
    - a. A120, Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless for Ordinary Uses.
    - b. B32, Standard Specification for Solder Metal.
    - c. B88, Standard Specification for Seamless Copper Water Tube.
    - d. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Material.
  2. Federal Specification (FS):
    - a. WW-P-406, Pipe, Steel (Seamless and Welded For Ordinary Use).
    - b. WW-V-54D, Valve, Gauge, Bronze (125, 150, and 200 Pounds, Screwed Flanged, Soldered End, for Land Use).
  3. American Water Works Association (AWWA): C800, Underground Service Line Valves and Fittings.

### PART 2 PRODUCTS

#### 2.01 SERVICE CONNECTION

- A. Furnish components same size as nominal designation of service pipe. For example, a 2-inch connection may consist of, but may not be limited to:
1. Two-inch corporation stop.
  2. Two-inch angle valve.
  3. Two-inch tees, bends, and adapters.
  4. Two-inch ball valve.
  5. Two-inch meter couplings.
- B. Single and double service connections shall be 1-½ inch diameter tubing, reducing to 1 inch at the meter stop. Larger diameters shall be as shown on the Drawings. Unless shown on the Drawings, all meter stops shall be 1 inch with outlet size based on meter size.
- C. All fittings and components to be provided with Mueller 110 compression joint, Ford Quick joint, or approved equal.

2.02 SERVICE SADDLES

Mainline Material	Characteristics	Manufacturer
DI or PVC Pressure Pipe	Double-strap; Mueller tap; neoprene gaskets; double stainless steel straps, epoxy coated	Ford Type FC-202; or equal specific to mainline material

2.03 CORPORATION STOPS

Service Size	Characteristics	Manufacturer & Model
2 inch	Brass AWWA I.P thread at inlet and conductive compression connection for CTS OD tubing including the stainless steel liner Mueller No. 506141	Mueller No. B-25028; or equal
1-½ inch	Brass AWWA I.P thread at inlet and conductive compression connection for CTS OD tubing including the stainless steel liner Mueller No. 506139	Mueller No. B-25028; or equal
1 inch	Brass AWWA I.P thread at inlet and conductive compression connection for CTS OD tubing including the stainless steel liner Mueller No. 504385	Mueller No. B-25028; or equal

2.04 COUPLINGS

Service Size	Characteristics	Manufacturer & Model
All Sizes	Three-part union; copper-to-copper for connecting new copper service pipe to existing copper service pipe; other coupling as required to connect new copper service to existing other-than-copper pipe; compression connection outlet	Mueller or Ford compression connection or equal

2.05 FLEXIBLE COUPLINGS

- A. Characteristics: Straight cast couplings.
- B. Manufacturer: Smith-Blair; Model No. 441.

2.06 UNIONS

- A. Characteristics: Copper-to-copper union.
- B. Manufacturers:
  - 1. Mueller Co.; Model H-15400.
  - 2. Hays Manufacturing Co.; Model 5615.

2.07 MISCELLANEOUS FITTINGS

- A. Characteristics: Miscellaneous fittings, reducers, and adapters all with Mueller No. 110 compression connection, Ford Quick Joint; or equal.
- B. Manufacturers:
  - 1. Mueller Co.:
    - a. H-15381 Service Tee.
    - b. H-15343 Y Branch.
    - c. H-15526 Quarter Bend.
  - 2. Hays Manufacturing Co.

2.08 ANGLE METER STOPS

Service Size	Characteristics	Manufacturer & Model
2 inch	Ground key angle meter stop, conductive compression for CTS OD tubing, including the stainless steel liner Mueller No. 506141, and Mueller No. 110 compression connection	Mueller No. H-14277; or equal
1-1/2 inch	Ground key angle meter stop, conductive compression for CTS OD tubing, including the stainless steel liner Mueller No. 506139, and Mueller No. 110 compression connection	Mueller No. H-14277; or equal
1 inch	Ground key angle meter stop, conductive compression for CTS OD tubing, including the stainless steel liner Mueller No. 504385, and Mueller No. 110 compression connection	Mueller No. H-14259; or equal

2.09 BALL VALVES

Service Size	Characteristics	Manufacturer & Model
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<b>Service Size</b>	<b>Characteristics</b>	<b>Manufacturer &amp; Model</b>
3 inches or less	Bronze body, quarter turn	B-25209 Mueller 300 Ball Curb Valve with 110 compression connection; or equal

2.10 PRESSURE REDUCING VALVES

- A. Manufacturer shall be Mueller Co.; Model H-9300, No. 2, 2 inches with strainer, or equal where shown on the Drawings.

2.11 METER BOXES, VAULTS, AND COVERS

<b>Service Size</b>	<b>Characteristics</b>	<b>Manufacturer &amp; Model</b>
All Services	Straight-wall HDPE with cast iron reading lid; 17 inches by 30 inches minimum for 1.5- and 2-inch services 13 inches by 24 inches for all smaller services	CDR Systems, Inc., Associated Plastics, Inc.; or approved equal.

2.12 METERS

<b>Service Size</b>	<b>Characteristics</b>	<b>Manufacturer &amp; Model</b>
All Services	Meters to be supplied by OWNER	—

2.13 COPPER TUBING

- A. Size: 3/4-inch and 1-inch service connections.
- B. Characteristics:
1. Type K, soft, seamless.
  2. Conform to ASTM B88.
  3. Commercially pure wrought copper solder joint fittings.
  4. Joints:
    - a. 95-5 coreless wire solder.
    - b. Conform to ASTM B32, Grade 95 TA.

2.14 POLYETHYLENE PLASTIC PIPE

- A. Size: 3/4-, 1-, 1-1/2-, and 2-inch services.
- B. Characteristics:

1. Manufactured from ultra-high molecular weight, high density polyethylene 3408.
  2. Conforming to ASTM 2737.
  3. Working Pressure: 200 psi.
  4. Standard dimension ratio of 9.
- C. Manufacturer shall be Phillips Products Co.; Driscopipe 5100; or equal.
- D. All PE tubing shall have a No. 12-gauge, single-strand, coated, copper wire wrapped around the pipe or on top of the pipe fastened with a No. 12-gauge coated, copper wire every 10 feet.

### **PART 3 EXECUTION**

#### **3.01 GENERAL**

- A. Install service connections, excluding meters, during or after construction of the main.
- B. Install complete service with angle stop installed in the meter box with meter end plugged.
- C. Water Meters: Installed by others.
- D. Depth of cover over the service pipe shall be minimum 30 inches.
- E. No connection shall be made to the main until pressure and bacteriological tests have been conducted and approved by the Owner.

#### **3.02 CONNECTION TO MAIN**

- A. Clean exterior of main of dirt and other foreign matter that may impair the quality of the completed connection. Disinfect all fittings in chlorine solution prior to assembly. See Section 02519, Disinfection of Water Systems, for disinfection requirements.
- B. Place service clamp at desired location.
- C. Clamp by tightening alternate nuts progressively.
- D. Do not place service clamp within 1 foot of pipe joint, or another clamp.
- E. Make taps with adapters for the size main being tapped.
- F. All connections to mains shall be made under the direction of the OWNER.
- G. All meter service connections shall be bronze from a plug valve. No gate valves shall be used on services 2 inches or less.

H. For Existing Services:

1. Remove and dispose of old meter boxes where directed, fill and restore area to match surroundings. Abandon the old service and properly terminate open ends. The Contractor shall be compensated for removal and replacement of meter boxes under the appropriate Bid items.
2. Where the existing meter and box are to be maintained, connect the new services with appropriate fittings to the existing meter.

I. Test for leaks and flush new piping to remove debris.

3.03 UNDERCROSSING OF HARD SURFACE ROADS

- A. Bore or jack undercrossings, except where new water mains and other work is being performed.
- B. PE service tubing shall be installed in a Schedule 40 PVC or SDR PE casing under all roadways to a distance of one foot beyond the edge of pavement.

3.04 COPPER TUBING

- A. Cut square ends, ream clean, flare, and makeup tightly.
- B. Prevent the tube from kinking or buckling on short radius bends. If tube should kink or buckle, cut out kinked or buckled sections and splice with brass fitting.

3.05 POLYETHYLENE PLASTIC PIPE

- A. Install in conformance with manufacturer's recommendations.

3.06 METER BOXES

A. Installation:

1. Construct enclosures plumb, and flush with existing ground surface unless shown otherwise.
2. Use standard extension sections to adjust to grade.
3. Meter boxes to be installed in sidewalk or 2-½ feet from the right-of-way line.
4. Place lightly compacted earth backfill inside meter box to depth shown.
5. Backfill around meter vaults as specified in Section 02320, Trench Backfill.
6. Install piping such that the meter can be installed in a horizontal position with dial at required depth below cover.
7. Meters will be installed by the OWNER.
8. Corporation Stops: OPEN position.
9. Angle Stops: CLOSED position.

### 3.07 TESTING

- A. Inspect service connections for leakage under normal system pressure and in conjunction with the testing of new water mains. Joints shall be watertight before acceptance.
- B. Test Duration: As specified in Section 02500, Conveyance Piping - General.
- C. Inspect for leaks and repair before backfilling and final testing.

### 3.08 DISINFECTION OF SERVICE CONNECTIONS

- A. Disinfection of water service connections will be performed in conjunction with the disinfection of the water main in accordance with the provisions of Section 02519, Disinfection of Water Systems.
- B. Flush new tubing before connecting to existing tubing or meter stop, by opening corporation stop, allowing water to run for 2 minutes.
- C. Extra chlorine will be put into the system by Owner during service connection transfers to provide adequate disinfection capacity when above procedures are executed.

**END OF SECTION**

## **SECTION 02519 - DISINFECTION OF WATER SYSTEMS**

### **PART 1 GENERAL**

#### **1.01 GENERAL**

- A. All work under this Section to be done in the presence of the Owner's Representatives.
- B. Existing valves and connections to the water system are to be operated by the Owner's staff only.

### **PART 2 PRODUCTS**

#### **2.01 WATER FOR DISINFECTION AND TESTING**

- A. Clean, uncontaminated, and potable.
- B. Owner will supply potable quality water. Contractor shall convey in disinfected pipelines or containers.

#### **2.02 CONTRACTOR'S EQUIPMENT**

- A. Furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.
- B. Provide protection as required by AWWA Standards C651, C652, C653, and/or C654 against cross-connections.

### **PART 3 EXECUTION**

#### **3.01 GENERAL**

- A. Disinfection procedures shall conform to AWWA Standards C651, C652, C653, and/or C654 and this Specification.
- B. Disinfect the following items installed or modified under this Project, intended to hold, transport, or otherwise contact potable water:
  - 1. Pumps.
  - 2. Tanks.
  - 3. Wells.
  - 4. Filters.

5. Pipelines: Disinfect new pipelines that connect to existing pipelines up to point of connection.
  6. Disinfect surfaces of materials that will contact finished water, both during and following construction, using one of the methods described in AWWA C652 and C653. Disinfect prior to contact with finished water. Take care to avoid recontamination following disinfection.
- C. Prior to application of disinfectants, clean pump, tank, filters, wellhead works and pipelines of loose and suspended material. Flush pipelines until clear of suspended solids and color. Use water suitable for flushing and disinfecting.
  - D. Conform to AWWA C651 for pipes and pipelines, C652 for tanks and reservoirs, C653 for water treatment plants and filters, and C654 for wells, except as modified in these Specifications. AWWA Specification requirements will be made available to the Contractor upon request.
  - E. Allow freshwater and disinfectant solution to flow into pipe or vessel at a measured rate so that chlorine-water solution is at specified strength. Do not place concentrated commercial disinfectant in pipeline or other facilities to be disinfected before it is filled with water.

### 3.02 SEQUENCING AND SCHEDULING

- A. Commence Initial Disinfection After Completion of Following:
  1. Installation of water services, valves, and hydrant leads.
  2. Completion and acceptance of internal painting of system(s).
  3. Hydrostatic and pneumatic testing, pressure testing, functional and performance testing and acceptance of pipelines, pumping systems, structures, and equipment.
  4. Disinfection of:
    - a. Pumps and associated system piping.
    - b. Treatment plant basins and processes used to supply water to system.
- B. Provide 48 hour's notice to Owner's Representative for scheduling of valve operation, sampling, or laboratory testing.

### 3.03 PIPING AND PIPELINES

- A. Flushing:
  1. Before disinfecting, flush and/or pig as required all foreign matter from pipe in accordance with AWWA C651. Provide hoses, temporary pipes, ditches, and other conduits as needed to dispose of flushing water without damage to adjacent properties.
  2. Flush service connections and hydrants. Flush distribution lines prior to flushing hydrants and service connections.
  3. Flush pipe through flushing branches and remove branches after flushing is completed.

4. Operate new valves during flushing process at least twice during each flush.
- B. Disinfecting Procedure: In accordance with AWWA C651. The piping and appurtenances shall be sterilized by introducing the sterilizing agent into the water which is being pumped into the system in such a manner that the entire system involved will be filled with water containing a minimum chlorine concentration of 50 ppm at any point. The water shall be allowed to remain in the system for a minimum contact period of 24 hours before the system is flushed out.
- C. Pipelines larger than 36 inches in diameter may be disinfected by spraying in accordance with the method described in AWWA C652.
- D. Sampling Points: Provide sampling points on all water mains at the end of each water main and at a maximum spacing of 1,500 feet.
- E. Water mains can be put into service when the chlorine concentration is less than 0.1 ppm free chlorine and 3.0 ppm total chlorine.

#### 3.04 DAMAGED WATER MAINS

- A. All pipe and fittings used to repair a damaged water main or service shall be swabbed or sprayed with hypochlorite as specified above.
  1. Hypochlorite concentration shall range from 4 to 12 percent.
  2. Hypochlorite solution must remain in contact with all pipe and fittings for a minimum of 10 minutes.

#### 3.05 PUMPS

- A. Disinfecting Solutions: Minimum free chlorine concentration of 100 ppm.
- B. Application:
  1. Inject disinfecting solution into pump and associated piping and circulate for a minimum 3 hour period of time. At end of 3 hour period, solution shall have a strength of at least 50 ppm free chlorine.
  2. Operate valves and pump appurtenances during disinfection to ensure that disinfecting solution is dispersed into all parts of pump and lines.
  3. If disinfecting solution contained in pump has a residual free chlorine concentration less than 50 ppm after the 3 hour retention period, reclean pump, reapply disinfecting solution, and retest until a satisfactory test result is obtained.
  4. After chlorination, flush water from pump until water through the unit is chemically and bacteriologically equal to permanent source of supply.

#### 3.06 TANKS AND RESERVOIRS

- A. Cleaning:

1. Clean interior surfaces using water under pressure before sterilizing. Isolate tank and/or reservoir from system to prevent contaminating materials from entering the distribution system. Cleaning shall:
    - a. Remove all deposits of foreign nature.
    - b. Remove all biological growths.
    - c. Clean the slopes, walls, top, and bottom.
    - d. Avoid damage to the structure.
    - e. Avoid pollution or oil deposits by workers and equipment.
  2. Dispose of water used in cleaning in accordance with applicable regulations before adding disinfecting solution to tank and/or reservoir.
- B. Disinfecting Procedure: In accordance with AWWA C652, unless herein modified. Parts of structures, such as ceilings or overflows that cannot be immersed, shall be spray or brush disinfected.

### 3.07 FILTERS

- A. Prior to disinfection, remove foreign material from filtration structures. Clean using fire hoses and tools suitable for adequate scrubbing and cleaning. Pump or drain scrub water from structures.
- B. Disinfection Procedure: In accordance with AWWA C653, unless herein modified.
- C. Disinfect the Following Components:
1. Influent pipes and channels.
  2. Filter structure.
  3. Filter media and underdrains.
  4. Filter effluent pumping.
  5. Backwash supply piping.
  6. Finished water piping.
  7. Potable water piping.
- D. Clean other new facilities designed to hold or transport process water prior to disinfection of filter system including:
1. Raw water piping.
  2. Flocculation and sedimentation basins.

### 3.08 WELLS

- A. Disinfection Procedures: In accordance with AWWA C654, unless herein modified.
1. After well has been completed and tested, it shall be cleaned of all foreign substances. Swab the inner lining using alkalis, if necessary, to remove oil, grease, or other extraneous matter.
  2. Use chlorine solution of a volume and strength so that a concentration of at least 50 ppm of free chlorine is contained in well.

3. Chlorine solution shall be poured into well and well surged for at least 5 minutes. After 4 hours, well shall be pumped or bailed until chlorine concentration is less than 5 ppm.
4. Tack weld capping plate to casing after well has been disinfected and pumped out.
5. Take care to prevent the entrance into well of dirt or other contamination while installing pump.
6. Before being placed into the well thoroughly wash pump bowl, column, and air line, first with clear water and then with chlorinated solution in accordance with AWWA C654.
7. Chlorinate well in accordance with AWWA C654 and applicable State standards. In case of a discrepancy between AWWA and State standard, the strictest requirement shall apply.

### 3.09 DISPOSAL OF HEAVILY CHLORINATED WATER

- A. Do not allow flow into a waterway without neutralizing disinfectant residual.
- B. See the appendix of AWWA C651, C652, C653, and/or C654 for acceptable neutralization methods.

### 3.10 TESTING

- A. After tanks, reservoirs, filters, pumps, channels, and pipelines have been cleaned, disinfected, and refilled with potable water, Owner will take water samples and have them analyzed for conformance to bacterial limitations for public drinking water supplies.
- B. Sampling and testing shall be in accordance with AWWA C-651 and FAC 62-555.340. Any main installed, tested and put into service shall pass all required testing as a single unit. If any single sampling point on the main fails, all testing shall be repeated (at no additional cost) until all sampling points pass.
- C. Bacteriological samples must be collected on two consecutive days. The Contractor will coordinate and provide a means of sampling for City personnel to collect the samples. Samples will be analyzed by the City's laboratory. Failure to provide adequate notice and any subsequent delay in sampling will not be considered grounds for project delay.
- D. If minimum samples required above are bacterially positive, disinfecting procedures and bacteriological testing shall be repeated until bacterial limits are met at no additional cost.

**END OF SECTION**

## SECTION 02575 - SURFACE RESTORATION

### PART 1 GENERAL

#### 1.01 STANDARD SPECIFICATIONS

- A. When referenced in this Section, shall mean Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, current edition.

#### 1.02 INTENT

- A. Specific surface restoration requirements are detailed in this and other sections.
- B. For work areas disturbed by the Contractor for convenience, the area affected shall be restored in kind.
  - 1. The costs of this restoration shall be incidental to the cost of the Work.
  - 2. Payment for restoration outside the limits of work shall be repaired at the Contractor's expense.

#### 1.03 WORK INCLUDED

- A. This Section covers the Work necessary to replace all pavement, curbs, sidewalks, rock surfacing, and other street features damaged either directly or indirectly by the operations incidental to the construction described in other sections of these Specifications.
- B. Where the materials, construction procedures, degree of compaction of materials, and the method of control and testing, as required in these Specifications differ from the Standard Specifications requirements, the more stringent requirements shall apply.
- C. The intent of the Drawings is to provide a full lane, permanent trench repair for all work crossing or running parallel with roadways. Temporary restoration to provide a passable surface is also required.
- D. Overlay of asphalt pavement may be required as shown on the Drawings.
- E. Provide finished gradation and grassing in accordance with Section 02920, Sodding.

#### 1.04 OPTIMUM MOISTURE CONTENT

- A. "Optimum moisture content" shall be determined by the ASTM standard specified to determine the maximum dry density for relative compaction.

## 1.05 TEMPORARY TRENCH REPAIR OR STABILIZATION

- A. Following pipe installation and prior to permanent trench repair or asphalt replacement, temporary trench repair will be defined as one of the following:
  - 1. Installation of flowable fill as described in this Section and Section 02772, Asphalt Concrete Pavement.
  - 2. Installation of the compacted base course and an asphalt prime coat as described in this Section and Section 02772, Asphalt Concrete Pavement.
- B. Temporary trench repair shall be maintained in accordance with the requirements of this Section and Section 02772, Asphalt Concrete Pavement, until the final trench repair or asphalt surface is installed to provide a dust-free, drivable, and safe roadway surface.

## **PART 2 PRODUCTS**

### 2.01 GENERAL

- A. All materials for replacement of existing base course and asphalt surfacing shall conform to the Standard Specifications except as modified herein.
- B. The Contractor will be responsible for furnishing satisfactory materials that meet the Specifications and shall provide such tests during the course of the Work as are necessary to assure that the quality of the material used meets the Specifications.

### 2.02 LIME ROCK BASE COURSE

- A. Aggregate quality and gradation shall meet the requirements of Section 911 of the Standard Specifications.

### 2.03 BITUMINOUS PRIME AND TACK COAT

- A. Prime Coat: Material shall be cutback asphalt, Grade RC-70 or RC-250 meeting the requirements of Section 916-2 of the Standard Specifications, or approved equal.
- B. Tack Coat: Material shall be emulsified asphalt, Grade RS-2, SS-1, or SS-1H meeting the requirements of Section 916-4 of the Standard Specifications.
- C. Tack coats used for temporary trench stabilization shall be sanded to prevent damage to vehicles.

### 2.04 ASPHALT CONCRETE

- A. The asphalt concrete for trench leveling, restoration and overlay shall be Type S-III, meeting the requirements of Section 331 of the Standard Specifications and Section 02772, Asphalt Concrete Pavement.

- B. Aggregate: The aggregate shall meet the requirements of Section 331 of the Standard Specifications.
- C. Submit test results from commercial testing laboratories to the Engineer to show that the materials meet the quality and gradation requirements.

2.05 FLOWABLE FILL

- A. Provide flowable fill with a mix design meeting the requirements of Section 121 of the (FDOT) Standard Specifications for excavatable, flowable fill. Flowable fill may be allowed as a substitute for compacted base upon approval of the Engineer, at no additional cost.

2.06 CONCRETE

- A. Concrete shall be 3,000 psi minimum concrete meeting the requirements of Section 345 of the Standard Specifications.
- B. Concrete Forms: All forms for curbs and sidewalks shall be either 2-inch dimensioned lumber, plywood, or metal forms. Forms on the face of the curb shall have no horizontal form joints within 7 inches of the top of the curb.
- C. Curing Compound: Meeting the requirements of Section 925 of the Standard Specifications.
- D. Reinforcing Steel: Conform to ASTM A615, Grade 60.

2.07 TRAFFIC MARKINGS

- A. All traffic striping markings (i.e., lane, edge of pavement, directional, informational, etc.) damaged by the Contractor during construction shall be replaced with new painted items in meeting the requirements of Section 971 of the Standard Specifications.
- B. Raised reflective pavement markers (rpm's) damaged by the Contractor during construction shall be replaced with new rpm's meeting the requirements of Section 706 of the Standard Specifications.
- C. The Contractor shall place and maintain temporary striping markings throughout the course of the work until the permanent striping marking is placed on the final roadway surface.
- D. The Contractor shall provide painted traffic striping at all intersections including stop bars and crosswalks as required whether they are currently stripped or not. It shall be the Contractor's responsibility to take a complete inventory and provide the appropriate permanent striping after the completion of the Work.

## **PART 3 EXECUTION**

### **3.01 CONSTRUCTION PROCEDURE**

- A. The Engineer reserves the right to vary the type of resurfacing as best serves the interest of the Owner. Trench backfill shall be as specified in Section 02320, Trench Backfill.
- B. Replace all bituminous and concrete roadway pavement damaged or removed under this Contract with asphalt concrete regardless of original type. Pavement thickness shall be in accordance with the Drawings.
- C. In addition to the requirements set forth herein, the work shall conform to the applicable workmanship requirements of the state and county highway or municipal specifications.
- D. Water to control dust shall be used as directed by the Engineer until the trench repair has been stabilized. If control of dust is inadequate by these means, the Engineer may direct the immediate application of a prime or tack coat in accordance with the provisions of this Section, at no additional cost to the Owner. The Engineer reserves the right to delay additional excavation activities until dust control measures are adequate.
- E. Base course and prime coat shall be installed to provide temporary trench stabilization within 5 working days of trench backfill or as soon thereafter as the as-built conditions and pipe slopes have been verified.
- F. Final, permanent trench repair, and paving shall be installed within 3 weeks of pipe verification and temporary trench stabilization, unless flowable fill is used for temporary trench repair, in accordance with the provisions of this Section.

### **3.02 REMOVAL OF PAVEMENT, SIDEWALK, CURBS, AND GUTTERS**

- A. Removal of all pavement, sidewalks, curbs, and gutters shall conform to Section 02220, Demolition, and payment for removal shall be included in that Section. Payment for removal is incidental to the cost of pipe installation except where required for water and sewer service installation.

### **3.03 CUTTING EXISTING PAVEMENT**

- A. Where new pavement abuts existing pavement, the old pavement shall be trimmed by saw cutting to a straight line. Any pavement which has been damaged or which is broken and unsound shall be removed to provide a smooth, sound edge for joining new pavement.

### **3.04 STREET MAINTENANCE**

- A. Maintain all trenches as specified in this section and under Section 02320, Trench Backfill.

### 3.05 CONSTRUCTION OF BASE COURSE

- A. Base course shall be constructed in accordance with Section 200 of the Standard Specifications.
- B. Compact base materials to a minimum of 98 percent of the maximum density as determined by AASHTO T180. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer. Where the base is constructed in more than one course, the density shall be obtained in each lift.
- C. Alternately, and with the approval of the Engineer, the Contractor shall provide a minimum 10 inches of excavatable, flowable fill. The flowable fill shall be placed up to 1 ½ inches from the top of the existing pavement or to the fill line without vibration or compaction. Flowable fill shall not be placed during periods of inclement weather and rainfall. Provide a means to confine the material within the designated space. Flowable fill installed in accordance with this provision shall comply with temporary pavement restoration provisions.

### 3.06 BITUMINOUS PRIME AND TACK COAT

- A. The bituminous prime coat shall be applied to the lime rock base immediately following the placement of the compacted base course. The prime coat shall be maintained with additional coats as determined by the Engineer as temporary restoration until the final asphalt surface is installed. Additional prime coats will be provided at no cost to the Owner.
- B. The lime rock base shall be hard planed with a blade grader immediately prior to the application of the prime coat.
- C. The rate of application of the bituminous prime coat shall meet the requirements of Section 916-2 of the Standard Specifications.
- D. The bituminous tack coat shall be applied to existing asphalt surfaces prior to the placement of new asphalt, between layers of asphalt concrete surface courses, surfaces of concrete footings that will come in contact with the asphalt concrete pavement, and vertical faces of all longitudinal and transverse joints that have become compacted or cooled.
- E. The rate of application for the bituminous tack coat shall meet the requirements of Section 916-4 of the Standard Specifications.

### 3.07 ASPHALT CONCRETE PAVEMENT REPLACEMENT

- A. Preparation for Paving:
  - 1. A prime coat shall be applied over the full length of the roadway, and asphalt concrete pavement shall not be placed until the prime coat has cured as per the manufacturer's recommendations.

2. Should any holes, breaks, or irregularities develop in the roadway surface after the prime coat has been applied, they shall be patched with asphalt concrete immediately in advance of placing the asphalt concrete.
  3. After the maintenance, patching, or repair work has been completed and immediately prior to placing the asphalt concrete pavement, the surface of the prime coat shall be swept clean of all dirt, dust, or other foreign matter.
- B. The proposed pavement reconstruction schedule consists of immediately paving over trenches as soon as possible after it has been determined that subbase and base have achieved required compactions. The base course will be brought up to the elevations indicated on the Drawings and asphalt placed to bring grade up to match existing pavement elevations as shown on the Drawings.
- C. For deep excavations where the pavement repair constitutes a full lane or roadway, workmanship shall conform to the standards and details of new road way construction.
1. Existing pavement more than 2 feet wide beyond the trench area shall be left in place and a full overlay applied to the limits of the existing road width.
  2. Existing base beyond the trench area shall be left in place.
  3. Full lane or width roadways shall have a consistent cross-section and straight edge of pavement delineation's.

### 3.08 CONNECTIONS WITH EXISTING FACILITIES

- A. Where the bituminous pavement is to be connected with an existing roadway surface or other facility, the Contractor will be required to modify the existing roadway profile in such a manner as to produce a smooth riding connection to the existing facility. The Contractor shall meet existing neat lines where required.
- B. Where it is necessary to remove existing asphalt surfaces or oil mat surfaces to provide proper meet lines and riding surfaces, the Contractor shall sawcut the existing surface so that there will be sufficient depth to provide a minimum of 1 inch of asphalt concrete, and the waste material shall be disposed of to the satisfaction of the Engineer. Prior to placing the asphalt concrete, these areas shall be tacked. Meet lines shall be straight and the edges vertical. The edges of meet line cuts shall be painted with liquid asphalt or emulsified asphalt prior to placing asphalt concrete. After placing the asphalt concrete, the meet line shall be sealed by painting with a liquid asphalt or emulsified asphalt and immediately covered with clean, dry sand.

### 3.09 CONSTRUCTION OF COURSES

- A. The asphalt concrete pavement shall be constructed in one or more courses as shown on the Drawings.
1. Rolling shall continue until all roller marks are eliminated and compacted to 100 percent of the laboratory compacted mixture has been obtained.

### 3.10 SURFACE TOLERANCE

- A. Tests for conformity with the specified grade shall be made by the Contractor immediately after initial compression. Any variation shall be immediately corrected by the removal or addition of materials and by continuous rolling.
- B. The completed surface of the pavement shall be of uniform texture, smooth, uniform as to grade, and free from defects of all kinds. The completed surface shall not vary more than 1/8 inch from the lower edge of a 12-foot straightedge placed on the surface along the centerline or across the trench.
- C. After completion of the final rolling, the smoothness and grade of the surface shall again be tested by the Contractor.
- D. When deviations in excess of the above tolerances are found, the pavement surface shall be corrected as stated in Section 330-12.4 of the Standard Specifications.
- E. All areas in which the surface of the completed pavement deviates more than twice the allowable tolerances described above shall be removed and replaced to the satisfaction of the Engineer.
- F. All costs involved in making the corrections of defects described above shall be borne by the Contractor and no compensation will be made for this Work.

### 3.11 SAMPLES

- A. If directed by the Engineer, the Contractor shall without additional charge, provide the Engineer with test results of samples of asphalt concrete cut from the completed pavement or the individual courses thereof for each occurrence. Provide a minimum of three test cores located as directed by the Engineer. He shall also provide the Engineer with test results of samples of the uncompressed asphalt concrete mixtures and all materials incorporated in the Work.

### 3.12 WEATHER CONDITIONS

- A. Asphalt shall not be applied to wet material. Asphalt shall not be applied during rainfall or any imminent storms that might adversely affect the construction. The Engineer will determine when surfaces and materials are dry enough to proceed with construction. Asphalt concrete shall not be placed during heavy rainfall or when the surface upon which it is to be placed is wet.

### 3.13 PROTECTION OF STRUCTURES AND ADJUSTMENT OF APPURTENANCES

- A. Provide whatever protective coverings may be necessary to protect the exposed portions of bridges, culverts, curbs, gutters, posts, guard fences, road signs, and any other structures from splashing oil and asphalt from the paving operations. Remove any oil, asphalt, dirt, or any other undesirable matter that may come upon these structures by reason of the paving operations.
- B. Where water valve boxes, manholes, catch basins, or other underground utility appurtenances are within the area to be surfaced, the Contractor shall adjust the tops of these facilities to conform with the proposed surface elevations. The Contractor shall notify the proper authority and either raise or lower the appurtenances or make arrangements with that authority for having the facilities altered at the Contractor's expense before proceeding with the resurfacing. The Contractor will be responsible for making certain that appurtenances are brought to proper grade to conform with finished surface elevations and any delays experienced from such obstructions will be considered as incidental to the paving operation. No additional payment will be made. Protect all covers during asphalt application. All adjustments shall be made in accordance with the requirements of the respective utility.
- C. To extend manhole use grade rings as specified, do not use leveling rings. Remove the frame and cover, rebuild the manhole top to raise it so that the new height meets the overlay elevations and then replace the frame and cover in accordance with Section 02533, Manholes, and the Drawings.

### 3.14 EXCESS MATERIALS

- A. Dispose of all excess materials. Make arrangements for the disposal and bear all costs or retain any profit incidental to such disposal.

### 3.15 CONTRACTOR'S RESPONSIBILITY

- A. Settlement of replaced pavement over trenches within the warranty period shall be considered the result of improper or inadequate compaction of the subbase or base materials. The Contractor shall promptly repair all pavement deficiencies noted during the warranty period at the Contractor's sole expense.

### 3.16 SIDEWALKS AND CURBS

- A. Replace concrete sidewalks and curbs to the same section width, depth, line, and grade as that removed or damaged or as shown on the Drawings. The minimum thickness of sidewalks shall be 4 inches and 6 inches in driveways. Cut ends of existing curb to a vertical plane. Prior to replacing the sections, properly backfill and compact the trench to prevent subsequent settlement.
- B. Replace concrete sidewalks at scored joints and make replacement in a manner that will avoid a patched appearance. Provide a minimum 2-inch thick compacted leveling course of clean sand or gravel of quality hereinbefore specified. Finish concrete surface similar to the adjacent sidewalks.

### 3.17 DRIVEWAYS AND WALKS

- A. Replace asphalt driveways and walks in accordance with Paragraph Asphalt Concrete Pavement Replacement.
- B. Replace concrete and paver driveways in kind, using similar materials of construction. Concrete driveways shall consist of a reinforced, 6-inch section installed in accordance with Section 02771, Concrete Curbs and Sidewalks.

### 3.18 PAINTING TRAFFIC STRIPES

- A. All areas having traffic stripes prior to paving shall be repainted. Temporary traffic painting shall be applied immediately after asphalt pavement has been placed. Permanent traffic painting may be applied only after the proper curing time for the asphalt. Painting traffic stripes (temporary and permanent) shall meet the requirements of Section 710 of the Standard Specifications.

### 3.19 INSTALLATION OF RAISED REFLECTIVE PAVEMENT MARKERS

- A. All areas having raised reflective pavement markers prior to paving shall have those markers replaced. Temporary pavement markers shall be applied immediately after asphalt pavement has been placed. Permanent pavement markers may be applied only after the proper curing time for the asphalt. Pavement markers and adhesive (temporary and permanent) shall meet the requirements of Section 706 of the Standard Specifications.
- B. Spacing: As shown in the Roadway and Traffic Design Standards for Design, Construction, Maintenance and Utility operations on the State Highway System by the State of Florida, Department of Transportation, current edition.

### 3.20 PAVEMENT REPAIR

- A. All damage to pavement as a result of work under this Contract shall be repaired in a manner satisfactory to the Engineer and at no additional cost to the Owner. The repair shall include preparation of the subgrade, placing and compaction of the lime rock base and placement of the final asphalt surface as described in this Section.
- B. The width of all repairs shall extend at least 12 inches beyond the limit of the damage with the edge of pavement left saw cut to a true edge with no irregularities. For county roads and city streets recently constructed or overlaid, the repair may be required to be full-lane width as shown on the Drawings.

**END OF SECTION**

## SECTION 02710 - LIMEROCK BASE

### PART 1 GENERAL

#### 1.01 DEFINITIONS

- A. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross section.
- B. Completed Lift: Compacted with uniform surface reasonably true to cross-section.

### PART 2 PRODUCTS

#### 2.01 LIMEROCK BASE ROCK

- A. The material used in limerock base shall be material classified as Miami Oolite Formation.
- B. The minimum of carbonates of calcium and magnesium in the limerock shall be 70 percent. The maximum percentage of water-sensitive clay material shall be 3.
- C. Limerock material shall be uniform in color and not contain cherty or other extremely hard pieces, or lumps, balls, or pockets of sand or clay size material in sufficient quantities as to be detrimental to the proper bonding, finishing, or strength of the limerock base.
- D. The limerock base shall be uniformly graded from coarse to fine with 97 percent passing a 3-1/2-inch sieve, 80 percent passing a 2-inch sieve. The fine material shall consist entirely of dust of fracture. All crushing or breaking up, which might be necessary in order to meet such size requirements, shall be done before the material is placed on the road.
- E. Physical Qualities:
  - 1. Liquid Limit, AASHTO T89: Maximum 35 percent.
  - 2. Nonplastic.
  - 3. Limerock material shall have an average limerock bearing ratio (LBR) value of not less than 100.

#### 2.02 SOURCE QUALITY CONTROL

- A. Contractor: Perform tests necessary to locate acceptable source of materials meeting specified requirements.
- B. Final approval of aggregate material will be based on materials' test results on installed materials.

- C. Should separation of coarse from fine materials occur during processing or stockpiling, immediately change methods of handling materials to correct uniformity in grading.

### **PART 3 EXECUTION**

#### **3.01 SUBGRADE PREPARATION**

- A. As specified in Section 02319, Subgrade Preparation.
- B. Obtain Engineer's acceptance of subgrade before placement of limerock base rock.
- C. Do not place base materials on soft, muddy subgrade.

#### **3.02 EQUIPMENT**

- A. Use mechanical rock spreaders, equipped with a device that strikes off the rock uniformly to laying thickness, capable of producing even distribution. For areas where the use of a mechanical spreader is not practicable, the Contractor may spread the rock using bulldozers or blade graders.

#### **3.03 HAULING AND SPREADING**

- A. Hauling Materials:
  - 1. The limerock shall be transported to the point where it is to be used and dumped on the end of the preceding spread.
  - 2. Do not haul over surfacing in process of construction.
  - 3. Loads: Of uniform capacity.
  - 4. Maintain consistent gradation of material delivered; loads of widely varying gradations will be cause for rejection.
- B. Spreading Materials:
  - 1. Distribute material to provide required density, depth, grade and dimensions with allowance for subsequent lifts.
  - 2. Produce even distribution of material upon roadway without segregation.
  - 3. Should segregation of coarse from fine materials occur during placing, immediately change methods of handling materials to correct uniformity in grading.

#### **3.04 CONSTRUCTION OF COURSES**

- A. General: Complete each lift in advance of laying succeeding lift to provide required results and adequate inspection.
- B. Limerock Base:
  - 1. Maximum Completed Lift Thickness: 6 inches or equal thickness.
  - 2. Completed Course Total Thickness: As shown.
  - 3. Spread lift on preceding course to required cross-section.

4. Lightly blade and roll surface until thoroughly compacted.
5. Blade or broom surface to maintain true line, grade, and cross-section.

C. Gravel Surfacing:

1. Maximum Completed Lift Thickness: 6 inches or equal thickness.
2. Completed Course Total Thickness: As shown.
3. Spread on preceding course in accordance with cross-section shown.
4. Blade lightly and roll surface until material is thoroughly compacted.

### 3.05 ROLLING AND COMPACTION

- A. Commence compaction of each layer of base after spreading operations and continue until density of 98 percent of maximum density has been achieved as determined by AASHTO T 180.
- B. Roll each course of surfacing until material shall not creep under roller before succeeding course of surfacing material is applied.
- C. Commence rolling at outer edges of surfacing and continue toward center; do not roll center of road first.
- D. When the material does not have the proper moisture content to ensure the required density, wet or dry, as required. When adding water, uniformly mix it in by disking to the full depth of the course that is being compacted. During wetting or drying operations, manipulate as a unit, the entire width and depth of the course that is being compacted.
- E. Place and compact each lift to required density before succeeding lift is placed.
- F. Bind up preceding course before placing leveling course. Remove floating or loose stone from surface.
- G. Blade or otherwise work surfacing as necessary to maintain grade and cross-section at all times, and to keep surface smooth and thoroughly compacted.
- H. Surface Defects: Remedy surface defects by loosening and rerolling. Reroll entire area, including surrounding surface, until thoroughly compacted.
  1. Finished Surface: True to grade and crown before proceeding with surfacing.

### 3.06 SURFACE TOLERANCES

- A. Finished Surface of Base Course and Leveling Course: Within plus or minus 0.04-foot of grade shown at any individual point.
- B. Compacted Surface of Leveling Course: Within 0.04-foot from lower edge of 10-foot straightedge placed on finished surface, parallel to centerline.
- C. Overall Average: Within plus or minus 0.01-foot from crown and grade specified.

3.07 FIELD QUALITY CONTROL

A. In-Place Density Tests:

1. Construct base course so areas shall be ready for testing.
2. Allow reasonable length of time for Engineer to perform tests and obtain results during normal working hours.

3.08 CLEANING

- A. Remove excess material; clean stockpile areas of aggregate.

**END OF SECTION**

## SECTION 02761 - PAVEMENT MARKING

### PART 1 GENERAL

#### 1.01 STANDARD SPECIFICATIONS

- A. When referenced in this section, shall mean Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, current edition.

#### 1.02 DELIVER, STORAGE, AND PROTECTION

- A. Packaging and Labeling: All coatings and traffic marking materials shall be shipped in strong containers plainly marked with the weight in pounds per gallon, the volume of coatings and traffic marking materials content in gallons, the color, user information, date of manufacture, LOT, batch and DOT code number. Each batch manufactured shall have a unique number. A true statement of the percentage composition of the pigment, the proportion of pigment to vehicle, and the name and address of the manufacturer, also shall be shown. The label shall warn the user of any special handling or precautions of the material, as recommended by the manufacturer. Any package not so marked will not be accepted for use under these Specifications.
- B. Storage: Any coatings and traffic marking materials which, although inspected and approved at the point of manufacture, hardens or livers in the containers so that it cannot be readily broken up with a paddle to a smooth, uniform painting consistency, will be rejected. All materials shall have a container storage life of one year from date of manufacture. Any coatings and traffic marking materials not acceptable for proper application will be rejected, even though it conforms to these Specifications in all other respects.
- C. Mixing: All paints except aluminum shall be delivered to the project completely mixed, and ready to be used without additional oil or thinner. Gasoline shall not be used for thinner under any circumstances.

### PART 2 PRODUCTS

#### 2.01 PAINT

- A. Color: White, yellow, or blue traffic paint meeting the requirements of Section 971 of the Standard Specifications.
- B. Homogeneous, easily stirred to smooth consistency, with no hard settlement or other objectionable characteristics during a storage period of 6 months.

#### 2.02 THERMOPLASTIC STRIPING

- A. White or yellow thermoplastic striping material meeting the requirements of Section 971-17 of the Standard Specifications.

## 2.03 RAISED REFLECTIVE MARKERS

- A. Metallic or nonmetallic, or prismatic reflector type, of permanent colors retaining color and brightness under action of traffic.
- B. Rounded surfaces presenting a smooth contour to traffic. The minimum area of each reflective face shall be 2-1/2 inches squared.
- C. Marker and adhesive epoxy in accordance with ASTM D4280
- D. Markers shall meet the requirements of Section 970 (Class B) of the Standard Specifications.

## 2.04 GLASS SPHERES

- A. Glass spheres shall be of a composition designed to be highly resistant to traffic wear and to the effects of weathering.
- B. In accordance with AASHTO M247, Type I with moisture resistant coating or a formulation specified by the traffic striping material manufacturer and Section 971-14 of the Standard Specifications.

## **PART 3 EXECUTION**

### 3.01 SURFACE PREPARATION

- A. Cleaning:
  - 1. Thoroughly clean surfaces to be marked before application of pavement marking material.
  - 2. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water or a combination of these methods.
  - 3. Completely remove rubber deposits, surface laitance, existing paint markings, and other coatings adhering to pavement with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion.
  - 4. Scrub areas of old pavement affected with oil or grease with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application.
  - 5. Surfaces shall be completely free of dry dirt and ice, and dry of water at the time of application of any of the materials specified herein.
  - 6. Oil-Soaked Areas: After cleaning, seal with cut shellac to prevent bleeding through the new paint.
  - 7. Reclean surfaces when Work has been stopped due to rain.
  - 8. Existing Pavement Markings:
    - a. Remove existing pavement markings that may interfere or conflict with newly applied marking patterns, or that may result in a misleading or confusing traffic pattern.
    - b. Do not apply thermoplastic markings over existing preformed or thermoplastic markings.

- c. Perform grinding, scraping, sandblasting or other operations so finished pavement surface is not damaged.
- B. Pretreatment for Early Painting: Where early painting is required on rigid pavements, pretreat with an aqueous solution containing 3 percent phosphoric acid and 2 percent zinc chloride.
- C. New Concrete Pavement:
  1. Allow a minimum cure time of 30 days before cleaning and marking.
  2. Clean by either sandblasting or water blasting to the following results:
    - a. No visible evidence of curing compound on peaks of textured concrete surface.
    - b. No heavy puddled deposits of curing compound in valleys of textured concrete surface.
    - c. Remaining curing compound is intact, with loose and flaking material completely removed.
    - d. Peaks of textured pavement surface are rounded in profile and free of sharp edges and irregularities.
  3. Allow a minimum drying time of 24 hours after water blasting before applying thermoplastic markings.

### 3.02 ALIGNMENT FOR MARKINGS

- A. The Contractor shall be responsible for all measurements, reference points and marks, string lining, and any other steps required in establishing pavement marking locations and alignment. On tangents and on curves up to 1 degree, the alignment of the marking shall not deviate from the string line by more than 1 inch. On curves exceeding 1 degree, the maximum permissible deviation shall be 2 inches. All alignment width and location shall conform to the details shown on the Drawings.

### 3.03 PAINT APPLICATION

- A. General:
  1. Thoroughly mix pigment and vehicle together prior to application, and keep thoroughly agitated during application.
  2. Do not add thinner.
  3. Apply only when air and pavement temperatures are above 40 degrees F and less than 95 degrees F. Maintain paint temperature within these same limits.
  4. Apply only when surface is dry.
  5. Do not apply when conditions are windy to the point of causing overspray or fuzzy line edges.
  6. New Asphalt Pavement: Allow a minimum pavement cure time as recommended by the manufacturer before applying paint.
  7. Provide guide lines and templates to control paint application.
  8. Take special precautions in marking numbers, letters, and symbols.
  9. Sharply outline edges of markings and apply without running or spattering.

- B. Rate of Application:
  - 1. Reflective Markings:
    - a. Paint: Apply evenly, 105 plus or minus 5 square feet per gallon.
    - b. Glass Beads: Apply uniformly, 6 plus or minus 0.5 pounds of glass spheres per gallon of paint.
  - 2. Nonreflective Markings: Apply paint evenly to pavement surface at a rate of 105 plus or minus 5 square feet per gallon.
  - 3. On new pavement or new asphalt surface treatments, apply two coats of paint at a uniform rate of 210 square feet per gallon.
- C. Drying:
  - 1. Provide maximum drying time to prevent undue softening of bitumen and pickup, displacement, or discoloration by traffic.
  - 2. If drying is abnormally slow, discontinue painting operations until cause is determined and corrected.

### 3.04 THERMOPLASTIC MARKING APPLICATION

- A. Following specified surface preparation, prime and apply marking and glass beads to provide a reflectorized strip as shown on Drawings.
- B. The material shall be applied to the pavement by the extrusion method only, wherein one side of extrusion shaping die is the pavement and the other sides are formed by suitable equipment for heating and controlling the flow of the material.
- C. Application Temperatures:
  - 1. Pavement Surface: Minimum 40 degrees F and rising.
  - 2. Thermoplastic: Minimum 375 degrees F, maximum 425 degrees F.
- D. Primer:
  - 1. On portland cement concrete and existing asphalt pavements, apply epoxy resin primer/sealer according to the thermoplastic manufacturer's recommendations.
  - 2. All primer/sealer to dry prior to applying thermoplastic.
- E. Thermoplastic Marking:
  - 1. Extrude in a molten state, free of dirt or tint. at a thickness of 0.10 to 0.15 inch for lane lines and 0.07 to 0.10 inch for edge or other lines in accordance with FDOT 711-4.3.
  - 2. Apply centerline, skipline, edgeline, and other longitudinal type markings with a mobile applicator.
  - 3. Apply special markings, crosswalks, stop bars, legends, arrows, and similar patterns with a portable, extrusion-type applicator.
- F. Glass Bead Application:

1. Immediately after marker application, mechanically apply such that the beads are held by and imbedded in the surface of the molten material.
  2. Application Rate: One pound per 20 square feet of compound.
- G. Cool completed marking to ambient temperature prior to allowing vehicular traffic.

### 3.05 INSTALLATION OF RAISED REFLECTIVE MARKERS

- A. Apply markers to the bonding surface using bituminous adhesives only.
- B. Apply the adhesive to the binding surface (not the marker) so that 100 percent of the bonding area of the marker will be covered.
- C. Align markers carefully, projecting no more than 3/4-inch above level of pavement. Reflective face of the marker shall be perpendicular to a line parallel to the roadway centerline. Do not install markers over longitudinal or transverse joints of the bonding surface.
- D. Spacing: As shown on the Drawings.
- E. Immediately remove excess adhesive from the bonding surface and exposed surface of the marker.
- F. Use only a mineral spirits meeting Federal Specifications TT-T-291 to remove adhesive from exposed faces of markers.

### 3.06 GLASS BEAD APPLICATION

- A. Apply immediately following application of paint.
- B. Use evenly distributed, drop-on application method.
- C. Rate: 10 pounds per gallon of paint.

### 3.07 PROTECTION

- A. The CONTRACTOR shall erect adequate warning signs and/or provide sufficient number of flagmen, and take all necessary precautions for the protection of the materials and safety of the public.
- B. Protect surfaces from disfiguration by paint spatters, splashes, spills, or drips.

### 3.08 CLEANUP

- A. Remove paint spatters, splashes, spills, or drips from Work and staging areas and areas outside of the immediate Work area where spills occur.

**END OF SECTION**

## SECTION 02771 - CONCRETE CURBS AND SIDEWALKS

### PART 1 GENERAL (NOT USED)

### PART 2 PRODUCTS

#### 2.01 EXPANSION JOINT FILLER

- A. 1/2-inch thick, preformed asphalt-impregnated, expansion joint material meeting AASHTO M153 Type I, II, or III, or AASHTO M213, or cellulose fiber types meeting the requirements of AASHTO M213, except the asphalt content is acceptable provided they contain minimum of 0.2 percent copper pentachlorophenate as a preservative and 1 percent water proofing wax.

#### 2.02 CONCRETE

- A. Ready-mixed meeting ASTM C94, Option A, with compressive strength of 3,000 psi at 28 days.
- B. Maximum Aggregate Size: 1-1/2 inch.
- C. Slump: 2 to 4 inches.

#### 2.03 CURING COMPOUND

- A. Liquid membrane-forming, clear or translucent, suitable for spray application and meeting ASTM C309, Type 1.

### PART 3 EXECUTION

#### 3.01 FORMWORK

- A. Lumber Materials:
  - 1. 2-inch dressed dimension lumber, or metal of equal strength, straight, free from defects that would impair appearance or structural quality of completed curb and sidewalk.
  - 2. 1-inch dressed lumber or plywood may be used where short-radius forms are required.
- B. Metals: Steel in new undamaged condition.
- C. Setting Forms:
  - 1. Construct forms to shape, lines, grades, and dimensions.
  - 2. Stake securely in place.
- D. Bracing:
  - 1. Brace forms to prevent change of shape or movement resulting from placement.

2. Construct short-radius curved forms to exact radius.
- E. Tolerances:
1. Do not vary tops of forms from gradeline more than 1/8 inch when checked with 10-foot straightedge.
  2. Do not vary alignment of straight sections more than 1/8 inch in 10 feet.

### 3.02 PLACING CONCRETE

- A. Prior to placing concrete, remove water from excavation and debris and foreign material from forms.
- B. Place concrete as soon as possible, and within 1-1/2 hours after adding cement to mix without segregation or loss of ingredients, and without splashing.
- C. Place, process, finish, and cure concrete in accordance with applicable requirements of ACI 304, and this section. Wherever requirements differ, the more stringent shall govern.
- D. To compact, vibrate until concrete becomes uniformly plastic.
- E. All edges shall be smooth and rounded.

### 3.03 SIDEWALK CONSTRUCTION

- A. Thickness:
  1. 4 inches in walk areas.
  2. 6 inches in driveway and commercial areas.
- B. Connection to Existing Sidewalk:
  1. Remove old concrete back to an existing contraction joint.
  2. Clean the surface.
  3. Apply a neat cement paste immediately prior to placing new sidewalk.
- C. Expansion Joints: Place at maximum 20-foot intervals, at adjacent curb expansion joint, where sidewalk ends at curb, and around posts, poles, or other objects penetrating sidewalk. Install expansion joint filler at each joint.
- D. Contraction Joints:
  1. Provide transversely to walks at locations opposite contraction joints in curb.
  2. Dimensions: 3/16-inch by 1-inch weakened plane joints.
  3. Construct straight and at right angles to surface of walk.
- E. Finish:

1. Broom surface with fine-hair broom at right angles to length of walk and tool at edges, joints, and markings.
2. Ensure that the surface variations are not more than ¼ inch under a 10-foot straightedge, or more than 1/8 inch on a 5-foot transverse section.
3. Mark walks transversely at 5-foot intervals, or in pattern shown on Drawings, with jointing tool; finish edges with rounded steel edging tool.
4. Apply curing compound to exposed surfaces upon completion of finishing.
5. Protect sidewalk from damage and allow to cure for at least 7 days.

**END OF SECTION**

## SECTION 02772 - ASPHALT CONCRETE PAVEMENT

### PART 1 GENERAL

#### 1.01 STANDARD SPECIFICATIONS

- A. When referenced in this Section shall mean Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, current edition.

#### 1.02 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Independent Testing Laboratory: In accordance with ASTM E329.
  - 2. Asphalt concrete mix formula shall be prepared by an approved certified independent laboratory under the supervision of a certified asphalt technician.

#### 1.03 ENVIRONMENTAL REQUIREMENTS

- A. Temperature: Do not apply asphalt materials or place asphalt mixes when ground temperature is lower than 10 degrees C (50 degrees F), or air temperature is lower than 4 degrees C (40 degrees F). Measure ground and air temperature in shaded areas away from heat sources or wet surfaces.
- B. Moisture: Do not apply asphalt materials or place asphalt mixes when application surface is wet.

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- A. Prime Coat: Cut-back asphalt, Grades RC-70 or RC-250 meeting the requirements of Section 916-2 of the Standard Specifications.
- B. Tack Coat: Emulsified asphalt, Grade RS-2, SS-1, or SS-1H meeting the requirements of Section 916-4 of the Standard Specifications. The bituminous material shall be heated to a suitable consistency as directed by the Engineer.
- C. Sand (Blotter Material): Clean, dry, with 100 percent passing a 4.75 mm (No. 4) sieve, and a maximum of 10 percent passing a 75 mm (No. 200) sieve.

#### 2.02 ASPHALT CONCRETE MIX

- A. General:
  - 1. Mix formula shall not be modified except with the written approval of Engineer.
  - 2. Source Changes:

- a. Should material source(s) change, establish a new asphalt concrete mix formula before the new material(s) is used.
  - b. Perform check tests of properties of the plant-mix bituminous materials on the first day of production and as requested by Engineer to confirm that properties are in compliance with design criteria.
  - c. Make adjustments in gradation or asphalt content as necessary to meet design criteria.
- B. Asphalt Concrete: Type S-III or SP-9.5 (coarse) meeting the requirements in Section 334 of the Standard Specifications.
- C. Composition: Hot-plant mix of aggregate, mineral filler, and paving grade asphalt cement. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that the resulting mixture meets the grading requirements of the mix formula.
- D. Aggregate:
  - 1. The aggregate shall meet the requirements in Section 334 of the Standard Specifications.
    - a. Mineral Filler shall meet the requirements of Section 917 of the Standard Specifications
- E. Asphalt Cement: Paving Grade AC-30 meeting the requirements of Section 916 of the Standard Specifications.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Traffic Control: Minimize inconvenience to traffic, but keep vehicles off freshly treated or paved surfaces to avoid pickup and tracking of asphalt.
- B. Driveways: Repave driveways from which pavement was removed. Leave driveways in as good or better condition than before start of construction.

3.02 LINE AND GRADE

- A. Provide and maintain intermediate control of line and grade, independent of the underlying base to meet finish surface grades and minimum thickness.
- B. Shoulders: Construct to line, grade, and cross-section shown.

3.03 PREPARATION

- A. Prepare subgrade as specified in Section 02319, Subgrade Preparation.
- B. Existing Roadway:
  - 1. Modify profile by grinding, milling, or overlay methods as approved, to provide meet lines and surfaces and to produce a smooth riding connection to existing facility.

2. Resurface entire roadway following adjustment of base and asphalt grades.
  3. Paint edges of meet line with tack coat prior to placing new pavement.
- C. Thoroughly coat edges of contact surfaces (curbs, manhole frames) with emulsified asphalt or asphalt cement prior to laying new pavement. Prevent staining of adjacent surfaces.

### 3.04 PAVEMENT APPLICATION

- A. General: Place asphalt concrete mixture on an approved, prepared base in conformance with this Section.
- B. Prime Coat:
1. Heat cut-back asphalt between 100 degrees F and 150 degrees F prior to application.
  2. Apply uniformly to clean, dry surfaces. Avoiding overlapping of applications.
  3. Do not apply when moisture content of upper 3 inches of base exceeds optimum moisture content of base, or if free moisture is present.
  4. Application Rate: Minimum 0.1 gallons per square yard of surface area.
  5. Remove or redistribute excess material.
  6. Allow a minimum of 5 full days for curing of primed surface before placing asphalt concrete.
- C. Tack Coat:
1. Apply uniformly to clean, dry surfaces. Avoiding overlapping of applications.
  2. Do not apply more tack coat than necessary for the day's paving operation.
  3. Touch up missed or lightly coated surfaces and remove excess material.
  4. Application Rate:
    - a. Minimum 0.05 gallons to maximum 0.12 gallons of asphalt (residual if diluted emulsified asphalt) per square yard of surface area.
    - b. Apply at rate, within range specified, sufficient to assure good bonding, but not so heavy that surplus asphalt flushes into asphalt concrete being placed.
- D. Pavement Mix:
1. Prior to Paving:
    - a. Sweep primed surface free of dirt, dust, or other foreign matter.
    - b. Patch holes in primed surface with asphalt concrete pavement mix.
    - c. Blot excess prime material with sand.
  2. Place asphalt concrete pavement mix in lifts as shown.
  3. Compacted Lift Thickness:
    - a. Minimum: Twice the maximum aggregate size, but in no case less than 3/4 inch. Minimum thickness for Type S-111 and SP-9.5 is 1.5 inches.
    - b. Maximum: 4 inches.
  4. Total Compacted Thickness: As shown.

5. Apply such that meet lines are straight and edges are vertical.
6. Collect and dispose of segregated aggregate from raking process. Do not scatter material over finished surface.
7. Joints:
  - a. Offset edge of each layer a minimum of 6 inches so joints are not directly over those in underlying layer.
  - b. Offset longitudinal joints in roadway pavements, so longitudinal joints in wearing layer coincide with pavement centerlines and lane divider lines.
  - c. Form transverse joints by cutting back on previous day's run to expose full vertical depth of layer.
8. Succeeding Lifts: Apply tack coat to pavement surface between each lift.
9. After placement of pavement, seal meet line by painting a minimum of 6 inches on each side of the joint with cut-back or emulsified asphalt. Cover immediately with sand.

E. Compaction:

1. Roll until roller marks are eliminated and compacted to 100 percent of the laboratory compacted mixture.
2. Joint Compaction:
  - a. Place top or wearing layer as continuously as possible.
  - b. Pass roller over unprotected end of freshly laid mixture only when placing of mix is discontinued long enough to permit mixture to become chilled.
  - c. Cut back previously compacted mixture when Work is resumed to produce a slightly beveled edge for full thickness of layer.
  - d. Cut away waste material and lay new mix against fresh cut.

F. Tolerances:

1. General: Conduct measurements for conformity with crown and grade immediately after initial compression. Correct variations immediately by removal or addition of materials and by continuous rolling.
2. Completed Surface or Wearing Layer Smoothness:
  - a. Uniform texture, smooth, and uniform to crown and grade.
  - b. Maximum Deviation: 1/8 inch from lower edge of a 12-foot straightedge, measured continuously parallel and at right angle to centerline.
  - c. If surface of completed pavement deviates by more than twice the specified tolerances, remove and replace wearing surface.
3. Transverse Slope Maximum Deviation: 1/4 inch in 12 feet from the rate of slope shown.
4. Finished Grade:
  - a. Perform a field differential level survey on a maximum 50-foot grid and along all grade breaks.
  - b. Maximum Deviation: 0.02 foot from the grade shown.

G. Seal Coat:

1. General: Apply seal coat of paving grade or emulsified asphalt to finished surface at longitudinal and transverse joints, joints at abutting pavements,

areas where the asphalt concrete was placed by hand, patched surfaces, and other areas as directed by the Engineer.

2. Preparation:
  - a. Maintain surfaces that are to be sealed free of holes, dry, and clean of dust and loose material.
  - b. Seal in dry weather and when the temperature is above 35 degrees F.
3. Application:
  - a. Fill cracks over 1/16 inch in width with an asphalt-sand slurry or approved crack sealer prior to sealing.
  - b. When sealing patched surfaces and joints with existing pavements, extend minimum 6 inches beyond edges of patches.

### 3.05 PATCHING

#### A. Preparation:

1. Remove damaged, broken, or unsound asphalt concrete adjacent to patches. Trim to straight lines exposing smooth, sound, vertical edges.
2. Prepare patch subgrade as specified in Section 02319, Subgrade Preparation.

#### B. Application:

1. Patch Thickness: 3 inches or thickness of adjacent asphalt concrete, whichever is greater.
2. Place asphalt concrete mix across full width of patch in layers of equal thickness.
3. Spread and grade asphalt concrete with hand tools or mechanical spreader, depending on size of area to be patched.

#### C. Compaction:

1. Roll patches with power rollers capable of providing compression of 200 to 300 pounds per linear inch. Use hand tampers where rolling is impractical.
2. Begin rolling top course at edges of patches, lapping adjacent asphalt surface at least 1/2 the roller width. Progress toward center of patch overlapping each preceding track by at least 1/2 the width of roller.
3. Make sufficient passes over entire area to remove roller marks and to produce desired finished surface.

#### D. Tolerances:

1. Finished surface shall be flush with and match grade, slope, and crown of adjacent surface.
2. Tolerance: Surface smoothness shall not deviate more than plus 1/4 inch or minus 0 when a straightedge is laid across patched area between edges of new pavement and surface of old surfacing.

### 3.06 FIELD QUALITY CONTROL

- A. General: Provide services of an approved certified independent testing laboratory to conduct tests.
- B. Field Density Tests:
  - 1. Perform tests from cores or sawed samples.
  - 2. Measure with properly operating and calibrated nuclear density gauge.
  - 3. Maximum Density: In accordance with ASTM D2041, using a sample of mix taken prior to compaction from the same location as the density test sample.
- C. Testing Frequency:
  - 1. Quality Control Tests:
    - a. Asphalt Content, Aggregate Gradation: Once per every 500 tons of mix or once every 4 hours, whichever is greater.
    - b. Mix Design Properties, Measured Maximum (Rice's) Specific Gravity: Once every 1,000 tons or once every 8 hours, whichever is greater.
  - 2. Density Tests: Once every 500 tons of mix or once every 4 hours, whichever is greater.

**END OF SECTION**

## SECTION 02911 - SOIL PREPARATION

### PART 1 GENERAL

#### 1.01 SEQUENCING AND SCHEDULING

- A. Rough grade areas to be planted or seeded prior to performing Work specified under this Section.

### PART 2 PRODUCTS

#### 2.01 TOPSOIL

- A. General: Uniform mixture of 50 percent sand and 50 percent muck in a loose friable condition, free from objects larger than 1-1/2 inches maximum dimension, and free of subsoil, roots, grass, other foreign matter, hazardous or toxic substances, and deleterious material that may be harmful to plant growth or may hinder grading, planting, or maintenance.
- B. Textural Amendments: Amend as necessary to conform to required composition.
- C. Source: Import topsoil if onsite material fails to meet specified requirements or is insufficient in quantity.

#### 2.02 SOURCE QUALITY CONTROL

- A. Topsoil Analysis/Testing: Performed by county or state soil testing service or approved certified independent testing laboratory.
- B. Should soil tests prove the topsoil to alkaline or above the accepted minimum for salt content, the topsoil shall be removed and replaced by acceptable material at Contractor's expense.

### PART 3 EXECUTION

#### 3.01 SUBGRADE PREPARATION

- A. The subgrade shall be 4 inches lower than finished grade with 2 inches of topsoil added to sod areas.
- B. Scarify subgrade to minimum depth of 6 inches where topsoil is to be placed.
- C. Remove stones over 2-1/2 inches in any dimension, sticks, roots, rubbish, and other extraneous material.
- D. Limit preparation to areas which will receive topsoil within 2 days after preparation.

### 3.02 TOPSOIL PLACEMENT

- A. Topsoil Thickness:
  - 1. Sodded Areas: 2 inches.
  - 2. Planting Beds: 6 inches.
- B. Do not place topsoil when subsoil or topsoil is excessively wet or otherwise detrimental to the Work.
- C. Mix soil amendments with topsoil before placement or spread on topsoil surface and mix thoroughly into entire depth of topsoil before planting or seeding.
- D. Uniformly distribute to within 1/2-inch of final grades. Fine grade topsoil eliminating rough or low areas and maintaining levels, profiles, and contours of subgrade.
- E. Remove stones exceeding 1-1/2 inches, roots, sticks, debris, and foreign matter during and after topsoil placement.
- F. Remove surplus subsoil and topsoil from site. Grade stockpile area as necessary and place in condition acceptable for planting or seeding.

**END OF SECTION**

## SECTION 02920 – SODDING

### PART 1 GENERAL

#### 2.01 DEFINITIONS

- A. Maintenance Period: Begin maintenance immediately after each area is planted (sod) and continue for a period of 8 weeks after all planting under this Section is completed.
- B. Satisfactory Stand:
  - 1. Grass or Section of Grass that has:
    - a. No bare spots larger than 3 square feet.
    - b. Not more than 10 percent of total area with bare spots larger than 1 square foot.
    - c. Not more than 15 percent of total area with bare spots larger than 6 square inches.

#### 2.02 DELIVERY, STORAGE, AND PROTECTION

- A. Sod:
  - 1. Do not harvest if sod is excessively dry or wet to the extent survival may be adversely affected.
  - 2. Harvest and deliver sod only after laying bed is prepared for sodding.
  - 3. Roll or stack to prevent yellowing.
  - 4. Deliver and lay within 24 hours of harvesting.
  - 5. Keep moist and covered to protect from drying from time of harvesting until laid.

#### 2.03 WEATHER RESTRICTIONS

- A. Perform Work under favorable weather and soil moisture conditions as determined by accepted local practice.

#### 2.04 SEQUENCING AND SCHEDULING

- A. Prepare topsoil as specified in Section 02911, Soil Preparation, before starting Work of this Section.
- B. Complete Work under this Section within 10 days following completion of soil preparation.
- C. Notify Engineer at Least 3 Days in Advance of:
  - 1. Each material delivery.
  - 2. Start of planting activity.

- D. Planting Season: Those times of year that are normal for such Work as determined by accepted local practice.

## 2.05 MAINTENANCE SERVICE

- A. Contractor: Perform maintenance operations during maintenance period to include:
  - 1. Watering: Keep surface moist.
  - 2. Washouts: Repair by filling with topsoil, and replace sodded areas.
  - 3. Mowing: Mow to 2 inches after grass height reaches 3 inches, and mow to maintain grass height from exceeding 3 1/2 inches.
  - 4. Resod unsatisfactory areas or portions thereof immediately at the end of the maintenance period if a satisfactory stand has not been produced, at which time maintenance period shall recommence.
  - 5. Resod during next planting season if scheduled end of maintenance period falls after September 15.

## PART 2 PRODUCTS

### 3.01 FERTILIZER

- A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose. Minimum percentage of plant food by weight.
- B. Mix:
  - 1. Nitrogen: Sixteen.
  - 2. Phosphoric Acid: Four.
  - 3. Potash: Eight.

### 3.02 SOD

- A. Unless a particular type of sod is called for, sod may be of either St. Augustine Floritam or Bahia grass, at the Contractor's option.
  - 1. Use Bahia grass where no irrigation system exists.
  - 2. Use St. Augustine Floritam here an irrigation system is in use.
- B. Strongly rooted pads, capable of supporting own weight and retaining size and shape when suspended vertically from a firm grasp on upper 10 percent of pad.
  - 1. Grass Height: Normal.
  - 2. Strip Size: Supplier's standard, commercial size rectangles.
  - 3. Soil Thickness: Uniform; 1-inch plus or minus 1/4-inch at time of cutting.
  - 4. Age: Not less than 10 months or more than 30 months.
  - 5. Condition: Healthy, green, moist; free of diseases, nematodes and insects, and of undesirable grassy and broadleaf weeds. Yellow sod, or broken pads, or torn or uneven ends will not be accepted
  - 6. Any netting contained within the sod shall be certified by the manufacturer to be bio-degradable within a period of 3 months from installation.

## **PART 3 EXECUTION**

### **4.01 PREPARATION**

- A. Grade Areas to Smooth, Even Surface with Loose, Uniformly Fine Texture:
  - 1. Roll and rake, remove ridges, fill depressions to meet finish grades.
  - 2. Limit such Work to areas to be planted within immediate future.
  - 3. Remove debris, and stones larger than 1 1/2 inches diameter, and other objects that may interfere with planting and maintenance operations.
- B. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface to dry off before seeding. Do not create muddy soil.
- C. Restore prepared areas to specified condition if eroded or otherwise disturbed after preparation and before planting.
- D. Limit preparation to those areas that can be sodded within 72 hours after preparation.

### **4.02 FERTILIZER**

- A. Apply evenly over area in accordance with manufacturer's instructions. Mix into top 2 inches of top soil.
- B. Application Rate: 20 pounds per 1,000 square feet (1,000 pounds per acre).

### **4.03 SODDING**

- A. Do not plant dormant sod, or when soil conditions are unsuitable for proper results.
- B. Pre-wet the area prior to placing sod. Lay sod to form solid mass with tightly fitted joints; butt ends and sides, do not overlap:
  - 1. Stagger strips to offset joints in adjacent courses.
  - 2. Work from boards to avoid damage to subgrade or sod.
  - 3. Tamp or roll lightly to ensure contact with subgrade; work sifted soil into minor cracks between pieces of sod, remove excess to avoid smothering adjacent grass.
  - 4. Complete sod surface true to finished grade, even, and firm.
- C. Fasten sod on slopes to prevent slippage with wooden pins 6 inches long driven through sod into subgrade, until flush with top of sod. Install at sufficiently close intervals to securely hold sod.
- D. Water sod with fine spray immediately after planting. During first month, water daily or as required to maintain moist soil to depth of 4 inches.

4.04 FIELD QUALITY CONTROL

- A. Eight weeks after sodding is complete and on written notice from Contractor, Engineer will, within 15 days of receipt, determine if the sod has been satisfactorily established.
- B. If the sod is not satisfactorily established, Contractor shall replace the sod and repeat the requirements of this Section.

**END OF SECTION**

## SECTION 02930 - TREES, PLANTS, AND GROUND COVERS

### PART 1 GENERAL

#### 1.01 DEFINITIONS

##### A. Measurement:

1. In size grading Balled and Burlapped (B & B), caliper takes precedence over height.
2. Take trunk caliper 6 inches above the ground level (up to and including 4-inch caliper size) and 12 inches above the ground level for larger trees.
3. Measure size of container-grown stock by height and width of plant.
4. Measure herbaceous perennials pot size, not top growth.

#### 1.02 DELIVERY, STORAGE, AND HANDLING

- A. Cover plants during shipment with a tarpaulin or other suitable covering to minimize drying.
- B. Balled and Burlapped Plants: Wrap each ball firmly with burlap and securely bind with twine, cord, or wire for shipment and handling. Drum-lace balls with a diameter of 30 inches or more.
- C. As specified herein for transplanting.

#### 1.03 MAINTENANCE

- A. Commence to maintain plant life immediately after planting and maintain for a minimum of one growing season, and until plants are well established and exhibit a vigorous growing condition.
- B. In Accordance with Accepted Submittal on Care and Maintenance of Plants and as Follows:
  1. Maintain by watering, pruning, cultivating, and weeding as required for healthy growth. Restore planting saucers.
  2. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required.
  3. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free of insects and disease.
  4. Remove guys, stakes, and other supports at end of maintenance service.
  5. Maintenance includes temporary protection fences, barriers, and signs as required for protection.
  6. Coordinate watering to provide deep root watering to newly installed trees.

#### 1.04 SCHEDULING AND SEQUENCING

- A. Plant Deliveries: Notify ENGINEER at least 3 days in advance of each delivery.

- B. Planting Season: Conduct planting during times of year that are normal for such work as determined by accepted local practice.
- C. Plant trees and shrubs after final grades are established and before planting of lawns or grasses.

## **PART 2 PRODUCTS**

### **2.01 PLANT MATERIALS**

- A. Provide quantity, size, genus, species, and variety of trees and shrubs indicated; comply with applicable requirements of ANSI Z60.1.
- B. Nomenclature (Names of Plants): In accordance with "Hortus Third".
- C. Quality and Size:
  - 1. Nursery-grown, habit of growth normal for species.
  - 2. Sound, healthy, vigorous, and free from insects, diseases, and injuries - Florida #1 quality or better.
  - 3. Equal to or exceeding measurements specified in plant list. Measure plants before pruning with branches in normal position.
  - 4. Root System of Container-Grown Plants: Well developed and well distributed throughout the container, such that the roots visibly extend to the inside face of the growing container.
  - 5. Perform necessary pruning at time of planting.
  - 6. Sizes: Dimensional relationship requirements of ANSI Z60.1 for kind and type of plants required.
  - 7. Balled and Burlapped Plants: Firm, intact ball of earth encompassing enough of the fibrous and feeding root system to enable full plant recovery.
    - a. Ball Size: ANSI Z60.1.
  - 8. Container-Grown Plants: Self-established root systems, sufficient to hold earth together after removal from container, without being rootbound.
    - a. Stock: Grown in delivery containers for at least 6 months, but not over 2 years.
  - 9. Label each tree and shrub of each variety with securely attached waterproof tag, bearing legible designation of botanical and common name.
  - 10. All trees must have a fully developed fibrous root system, be heavily branched, or in palms, heavily leafed, free from all insects, fungus, and other diseases.
  - 11. Palms: Wrap the roots of all plants of the palm species before transporting, except if they are container grown plants and ensure that they have an adequate root ball structure, and mass for healthy transplantation as defined in "Florida Grades and Standards for Nursery Plants."
  - 12. The Engineer will not require burlapping, if the palm is carefully dug from marl or heavy soil that adheres to the roots and retains its shape without crumbling. During transporting and after arrival, carefully protect root balls of palms from wind and exposure to the sun. Muck grown palms are not allowed. After delivery to the job site, if not planting the palm within 24

hours, cover the root ball with a moist material. Plant all palms within 48 hours of delivery to the site.

13. Move sabal and coconut palms in accordance with the "Florida Grades and Standards for Nursery Plants."

- D. Replacement Shrubs and Trees: Same species, size, and quality as specified for plant being replaced, except existing trees larger than 4-inch caliper, may be replaced with 4-inch caliper trees.

## 2.02 ANTIDESICCANT

- A. Provide transpiration retarding material to be used where any plant material is moved during the growing season.

## 2.03 GUYING, STAKING, AND WRAPPING MATERIALS

- A. Wood Stake: 2 inches by 2 inches by 8 feet.
- B. Guy Wires: Galvanized, 12-gauge, ductile steel.
- C. Flags:
  1. Wood: 1/2-inch by 3 inches by 12 inches, with 3/8-inch hole centered 1-1/2 inches from each end, painted white.
  2. Sheet Metal: 1-1/2-inch with clipped corners and both ends punched, painted white.
- D. Hose: Two-ply, reinforced rubber garden hose, not less than 1/2-inch diameter, new or used.
- E. Wrapping Material:
  1. Burlap: Of first quality, minimum 8 ounces in weight, not less than 6 inches nor more than 10 inches in width.

## 2.04 MULCH

- A. Free from noxious weed seed and foreign material harmful to plant growth.
- B. Barkdust: Medium grind, pine; maximum 3/4-inch particle size.

## 2.05 PLANTING SOIL MIX

- A. Proportion by Weight: 3/4 approved top soil with 1/4 approved organic matter.

# **PART 3 EXECUTION**

## 3.01 TRANSPLANTING

- A. Remove existing plantings identified for transplant prior to beginning Work in area in accordance with standard nursery practices and as specified herein.

- B. Nondormant Plants: Prior to digging, spray foliage with antidesiccant, as recommended by manufacturer.
- C. Cover balls and containers of plants that cannot be planted immediately, with moist soil or mulch.
- D. Water plants as often as necessary to prevent drying until planted.
- E. Do not remove container-grown stock from containers before time of planting.
- F. Bare-Root Plants:
  - 1. Dig up with least possible injury to fibrous root system.
  - 2. Immediately upon removal from ground, cover roots with thick coating of mud or wrap in wet straw, moss, or other suitable packing material for protection from drying until planted.
  - 3. Plant or heel-in immediately upon relocation to temporary storage. Open and separate bundles of bare-root plants, and eliminate air pockets among roots as they are covered.
- G. Replant each temporarily removed tree, shrub, or other plant only after construction activities are completed and applicable grading and topsoil replacement is completed in its vicinity. Replant trees, shrubs, and other plants in their original positions unless otherwise shown or approved. Plant as specified for new plants.
- H. Maintain transplanted materials in same manner as new trees and shrubs.

### 3.02 LOCATION OF PLANTS

- A. Locate new planting or stake positions as shown unless obstructions are encountered, in which case notify Engineer.
- B. Locate no planting, except ground cover, closer than 18 inches to pavements, pedestrian pathways, and structures.
- C. Request Engineer observe locations, and adjust as necessary before planting begins.

### 3.03 PREPARATION

- A. Subsoil Drainage: Furnish for plant pits and beds.
- B. Planting Soil: Delay mixing of amendments and fertilizer if planting will not follow preparation of planting soil within 2 days. For pit and trench type backfill, mix planting soil prior to backfilling and stockpile at site.
- C. Plants: Place on undisturbed existing soil or well-compacted backfill.
- D. Trees and Shrubs:

1. Pits, Beds, and Trenches: Excavate with vertical and scarified sides.
  2. B & B Trees and Shrubs: Make excavations at least twice as wide as root ball.
  3. Container-Grown Stock: Excavate as specified for B & B stock, adjust for size of container width and depth.
  4. Bare-Root Trees: Excavate pits to a width to just accommodate roots fully extended and depth to allow uppermost roots to be below original grade.
  5. Fill excavations with water and allow to percolate out prior to planting.
- E. Ground Cover Beds:
1. Mix amendments and fertilizer with top soil prior to placing or apply on surface of top soil and mix thoroughly before planting.
  2. Scarify top soil to a depth of 4 to 6 inches.
  3. Establish finish grading of soil. Rake areas to smooth and create uniform texture and fill depressions.
  4. Moisten.

### 3.04 PLANTING

- A. Plant trees before planting surrounding smaller shrubs and ground covers. Adjust plants with most desirable side facing toward the prominent view (sidewalk, building, street).
- B. B & B Plants: Place in pit by lifting and carrying by its ball (do not lift by branches or trunk). Lower into pit. Set straight and in pit center with tip of rootball 1 to 2 inches above adjacent finish grade.
- C. Bare-Root Plants: Spread roots and set stock on cushion of planting soil mixture. Set straight in the pit center so that roots, when fully extended, will not touch walls of the planting pit and the uppermost root is just below finish grade. Cover roots of bare-root plants to the crown.
- D. Container-Grown Plants: Remove containers, slash edges of rootballs from top to bottom at least 1-inch deep. Plant as for B & B plants.
- E. Ground Covers: Dig planting holes through mulch with one of the following: hand trowel, shovel, bulb planter, or hoe. Split biodegradable pots or remove nonbiodegradable pots. Root systems of all potted plants shall be split or crumbled. Plant so roots are surrounded by soil below the mulch. Set potted plants so pot top is even with existing grade.

### 3.05 BACKFILLING

- A. Backfill with planting soil, except where existing soil is suitable according to top soil analysis.
- B. B & B Plants:
  1. Partially backfill pit to support plant. Remove burlap and binding from sides and tops of B & B plants, do not pull burlap from under balls.

2. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill to eliminate air pockets even if it is raining. Finish backfilling pit sides.
3. Never cover top of rootball with soil. Form a saucer above existing grade, completely around the outer rim of the plant pit.

C. Bare-Root Plants:

1. Plumb before backfilling and maintain plumb while working backfill around roots and placing layers above roots.
2. Set original soil line of plant 1-inch to 2 inches above adjacent finish landscape grades. Spread out roots without tangling or turning up to surface. Cut injured roots cleanly; do not break.
3. Carefully work backfill around roots by hand; puddle with water until backfill layers are completely saturated.

3.06 GUYING AND STAKING

- A. Support trees immediately after planting to maintain plumb position.
- B. Guying: Support all trees over 4 inches in caliper with 3 guys equally.
- C. Special Requirements for Palm Trees: Brace palms which are to be staked with three 2-inch by 4-inch wood braces, toe-nailed to cleats which are securely banded at two points to the palm, at a point one third the height of the trunk. Pad the trunk with five layers of burlap under the cleats. Place braces approximately 120 degrees apart and secure them underground by 2- by 4- by 12-inch stake pads.

3.07 MULCHING

- A. Cover planting beds and area of saucer around each plant with 3-inch thick layer of mulch within 2 days after planting. Saturate planting area with water.

3.08 PRUNING AND REPAIR

- A. Prune only after planting and in accordance with standard horticultural practice to preserve natural character of the plant. Perform in presence of Engineer or Owner's representative. Remove all dead wood, suckers, and broken or badly bruised branches. Use only clean, sharp tools. Do not cut lead shoot.
- B. For Existing Trees Impacted by Construction Activities:
  1. Maintain a minimum 6-foot clearance from the trunk of all trees except palm trees.
  2. Where roots of trees are encountered in the excavation area, use a 24-inch deep saw cut prior to excavation. Roots shall not be torn by excavating equipment. Cut roots do not require coating.
  3. Overhead branches not trimmed prior to construction and interfering with construction activities will be pruned and cut as approved by the City Forester and not torn or broken off with excavating equipment.

3.09 WEED CONTROL

- A. Maintain a weed-free condition within planting areas. Apply pre-emergent selective herbicide to mulched beds at manufacturer's recommended rate of application.

3.10 PROTECTION OF INSTALLED WORK

- A. Protect planting areas and plants against damage for duration of maintenance period.

**END OF SECTION**

## SECTION 03300 - CAST-IN-PLACE CONCRETE

### PART 1 GENERAL

#### 1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this Section:
1. American Concrete Institute (ACI):
    - a. 117, Standard Specification for Tolerances for Concrete Construction and Materials.
    - b. 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
    - c. 301, Standard Specification for Structural Concrete.
    - d. 302.1R, Guide For Concrete Floor and Slab Construction.
    - e. 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
    - f. 304.2R, Placing Concrete by Pumping Methods.
    - g. 305R, Hot Weather Concreting.
    - h. 306.1, Standard Specification for Cold Weather Concreting.
    - i. 309R, Guide for Consolidation of Concrete.
    - j. 318/318R, Building Code Requirements for Structural Concrete.
    - k. SP-15, Standard Specification for Structural Concrete.
  2. ASTM International (ASTM):
    - a. C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
    - b. C33, Standard Specification for Concrete Aggregates.
    - c. C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
    - d. C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
    - e. C94, Standard Specification for Ready-Mixed Concrete.
    - f. C143, Standard Test Method for Slump of Hydraulic-Cement Concrete.
    - g. C150, Standard Specification for Portland Cement.
    - h. C157, Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
    - i. C192, Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
    - j. C231, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
    - k. C260, Standard Specification for Air-Entraining Admixtures for Concrete.
    - l. C311, Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete.
    - m. C452, Standard Test Method for Potential Expansion of Portland-Cement Mortars Exposed to Sulfate.
    - n. C494, Standard Specification for Chemical Admixtures for Concrete.
    - o. C595, Standard Specification for Blended Hydraulic Cements.

- p. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
  - q. C1012, Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution.
  - r. C1018, Standard Test Method for Flexural Toughness and First-Crack Strength of Fiber-Reinforced Concrete (Using Beam with Third-Point Loading).
  - s. C1116, Standard Specification for Fiber-Reinforced Concrete and Shotcrete
  - t. C1218 Standard Test Method for Water-Soluble Chloride in Mortar and Concrete
  - u. C1240, Standard Specification for Silica Fume for Use as a Mineral Admixture in Hydraulic-Cement Concrete, Mortar, and Grout.
  - v. D2000, Standard Classification System for Rubber Products in Automotive Applications.
  - w. D4580, Standard Practice for Measuring Delaminations in Concrete Bridge Decks by Sounding.
  - x. E329, Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
3. National Bureau of Standards: Handbook No.44, Specifications, Tolerances, and Other Technical Requirements for Commercial Weighing and Measuring Devices.

## 1.02 DEFINITIONS

- A. Defective Areas: Surface defects that include honeycomb, rock pockets, indentations greater than 3/16 inch, cracks 0.005 inch wide and larger as well as any crack that leaks for liquid containment basins and belowgrade habitable spaces; cracks 0.010 inch wide and larger in nonfluid holding structures spalls, chips, air bubbles greater than 3/4 inch in diameter, pinholes, bug holes, embedded debris, lift lines, sand lines, bleed lines, leakage from form joints, fins and other projections, form popouts, texture irregularities, and stains and other color variations that cannot be removed by cleaning.
- B. Exposed Concrete: Concrete surfaces that can be seen inside or outside of structures regardless whether concrete is above water, dry at all times, or can be seen when structure is drained.
- C. Hydraulic Structures: Liquid containment basins.
- D. New Concrete: Less than 60 days old.
- E. Slurry Concrete: Mixture of sand, 3/8-inch minus aggregate, cement, and water for wall construction joints.

## 1.03 SUBMITTALS

- A. Action Submittals:
  - 1. Shop Drawings:

- a. Product Data: Admixtures, bonding agent, bond breaker, and patching materials.
- b. Design Data: Concrete mix designs signed by qualified mix designer.
- c. Placement Drawings:
  - 1) Concrete, identifying location of each type of construction joint.
  - 2) Tremie concrete.
- d. Gradation for coarse and fine aggregates, and combined together. List gradings, percent passing through each sieve size.
- e. Detailed plan for hot weather placements including curing and protection for concrete placed in ambient temperatures over 80 degrees F.
- f. Concrete repair methods and materials.

B. Informational Submittals:

- 1. Statements of Qualification:
  - a. Contractor's resident superintendent for concrete installation.
  - b. Mix designer.
  - c. Batch plant.
- 2. Test Reports:
  - a. Admixtures, test reports showing chemical ingredients and percentage of chloride in each admixture and fly ash.
  - b. Source test analysis report for fly ash, including percentage of chloride content.
  - c. Statement identifying aggregates reactivity. Determine water soluble chloride in each component of aggregates in accordance with ASTM C1218.
  - d. For each trial concrete mix design and signed by a qualified mix designer.
  - e. Cylinder compressive test results for laboratory concrete mixes.
- 3. Concrete Delivery Tickets:
  - a. For each batch of concrete before unloading at Site.
  - b. Record of drum revolution counter, type, brand, test certification, Amount of fly ash if used in accordance with ASTM C94, Section 16.

1.04 QUALITY ASSURANCE

A. Qualifications:

- 1. Mix Designer: Licensed professional engineer registered in the State of Florida.
- 2. Batch Plant: Currently certified by the National Ready Mixed Concrete Association.

B. Preinstallation Conference:

- 1. Required Meeting Attendees:
  - a. Contractor, including pumping, placing and finishing, and curing subcontractors.
  - b. Ready-mix producer.
  - c. Admixture representative.

- d. Testing and sampling personnel.
- e. Engineer.
- 2. Schedule and conduct prior to incorporation of respective products into Project. Notify Engineer of location and time.
- 3. Agenda shall include:
  - a. Admixture types, dosage, performance, and redosing at Site.
  - b. Mix designs, test of mixes, and Submittals.
  - c. Placement methods, techniques, equipment, consolidation, and form pressures.
  - d. Slump and placement time to maintain slump.
  - e. Finish, curing, and water retention.
  - f. Protection procedures for weather conditions.
  - g. Other specified requirements requiring coordination.
- 4. Conference minutes as specified in Section 01200, Project Meetings.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Cement: Furnish from one source.
  - 1. Portland Cement Type I or Type II:
    - a. Meet ASTM C150.
    - b. Alkalies: Maximum 0.60 percent.
    - c. Tricalcium Aluminate Content of Type I Cement: Maximum 12 percent.
    - d. Nonhydraulic Abovegrade Structures: Type I or Type II cement.
    - e. Hydraulic and Belowgrade Structures and Sewers: Type II cement or combination of Type I mixed with fly ash.
    - f. Combine fly ash with cement at batch plant or during production of cement in accordance with ASTM C595, Type IP cement.
- B. Aggregates: Furnish from one source.
  - 1. Natural Aggregates:
    - a. Free from deleterious coatings and substances in accordance with ASTM C33, except as modified herein.
    - b. Free of materials and aggregate types causing popouts, discoloration, staining, or other defects on surface of concrete.
  - 2. Nonpotentially Reactive: In accordance with ASTM C33, Appendix XI, Paragraph X1.1.
  - 3. Aggregate Soundness: Test for fine and coarse aggregates in accordance with ASTM C33 and ASTM C88 using sodium sulfate solution.
  - 4. Fine Aggregates:
    - a. Clean, sharp, natural sand.
    - b. ASTM C33.
    - c. Materials Passing 200 Sieve: 4 percent maximum.
    - d. Limit deleterious substances in accordance with ASTM C33, Table 1 with material finer than 200 sieve limited to 3 percent, coal and lignite limited to 0.5 percent.
  - 5. Coarse Aggregate:

- a. Natural gravels, combination of gravels and crushed gravels, crushed stone, or combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension).
  - b. Materials Passing 200 Sieve: 0.5 percent maximum.
  - c. Limit deleterious substances in accordance with ASTM C33, Table 3 for exposed concrete.
- C. Admixtures: Furnish from one manufacturer.
- 1. Characteristics: Compatible with each other and free of chlorides or other corrosive chemicals.
  - 2. Air-Entraining Admixture:
    - a. ASTM C260, nontoxic after 30 days and contains no chlorides.
    - b. Concrete with air-entrainment admixture added shall maintain air percentage as batched, within plus or minus 2 percent for time required for placement into structure.
  - 3. Water-Reducing Admixture: ASTM C494, Type A or Type D.
    - a. Manufacturers and Products:
      - 1) Master Builders, Inc., Cleveland, OH; Pozzolith or Polyheed.
      - 2) W. R. Grace & Co., Cambridge, MA; WRDA with HYCOL.
      - 3) Euclid Chemical Co., Cleveland, OH; Eucon WR-91.
  - 4. High Range Water Reducing Admixture (Superplasticizer):
    - a. ASTM C494.
    - b. Hold slump of 5 inches or greater for time required for placement.
    - c. Furnish type as recommended by manufacturer for allowed temperature ranges.
    - d. Type F or G.
    - e. Manufacturers and Products:
      - 1) Master Builders, Inc., Cleveland, OH; Rheobuild or Polyheed at dosage greater than 10 ounces per 100 pounds of cement.
      - 2) W. R. Grace & Co., Cambridge, MA; Daracem 100.
      - 3) Euclid Chemical Co., Cleveland, OH; Eucon 537.
  - 5. Pozzolan (Fly Ash): Class C or Class F fly ash in accordance with ASTM C618, Table 1 and 2, except as modified herein:
    - a. Shall not be produced from process that has utilized hazardous or potentially hazardous materials.
    - b. Loss on Ignition: Maximum 3 percent.
    - c. Water Requirement: Maximum 100 percent of control.
    - d.  $\frac{CaO(\%) - 5}{FE_2O_3(\%)}$ : *Maximum 1.5*
    - e. ASTM C618, Table 3, Reactivity with Cement Alkalies, apply when aggregate or portions of aggregate is reactive as specified under Paragraph Nonpotentially Reactive.
    - f. ASTM C618, Table 3, Uniformity Requirements, apply when loss on ignition of fly ash furnished exceeds 3 percent.
  - 6. Fly Ash: Maximum 25 percent, minimum 15 percent of total weight of fly ash plus cement.

7. For fly ash not meeting requirements of chemical ratio listed above, furnish the following:
    - a. Test fly ash in accordance with ASTM C1012.
    - b. Furnish test data confirming fly ash in combination with cement used meets strength requirements, is compatible with air-entraining agents and other additives, and provides increased sulfate resistance equivalent to or better than Type II cement.
    - c. Conduct tests using proposed fly ash and cement samples together with control samples using Type II cement without fly ash.
- D. Water: Clean and potable containing less than 500 ppm of chlorides.

## 2.02 CONCRETE MIX DESIGN

- A. Design: Select and proportion ingredients using trial batches; sample, cure and test concrete mix through approved independent testing laboratory in accordance with ACI 211.1.
1. Concrete Compressive Strength, F'c:
    - a. 4,000 psi at 28 days, unless otherwise shown, except 3,000 psi at 28 days for secondary concrete elements such as curbs, sidewalks, and pipe/conduit encasements.
    - b. Design lab-cured trial mix cylinders.
    - c. Use additional cement or cement plus fly ash above minimum specified if required to meet average compressive strength, F'cr.
    - d. Use F'cr as basis for selection of concrete proportions as set forth in ACI 301.
    - e. F'cr: Equal to F'c plus 1,200 when data are not available to establish standard deviation.
  2. Concrete Fill:
    - a. Design for 2,500 psi at 28 days using 3/4-inch aggregate, 4-inch maximum slump and 0.46 maximum water-cement ratio.
    - b. Use water-reducing admixture.
- B. Proportions:
1. Design mix to meet aesthetic and structural concrete requirements.
  2. In accordance with ACI 211.1, unless specified otherwise.
  3. Unless specifically stated otherwise, water-cement ratio (or water-cement plus fly ash ratio) shall control amount of total water added to concrete as follows:

<b>Water-Cement Ratio</b>		
<b>Coarse Aggregate Size</b>	<b>Maximum W/C Ratio w/ Superplasticizer</b>	<b>Maximum W/C Ratio w/o Superplasticizer</b>
1-1/2"	0.40	0.44
1"	0.40	0.44

<b>Water-Cement Ratio</b>		
<b>Coarse Aggregate Size</b>	<b>Maximum W/C Ratio w/ Superplasticizer</b>	<b>Maximum W/C Ratio w/o Superplasticizer</b>
1-1/2"	0.40	0.44
3/4"	0.40	0.44

4. Minimum Cement Content (or Combined Cement Plus Fly Ash Content When Fly Ash is Used):
  - a. 517 pounds per cubic yard for concrete with 1-1/2-inch maximum size aggregate.
  - b. 540 pounds per cubic yard for 1-inch maximum size aggregate.
  - c. 564 pounds per cubic yard for 3/4-inch maximum size aggregate.
  - d. Increase cement content or combined cement plus fly ash content, as required to meet strength requirements and water-cement ratio.

C. Admixtures:

1. Air Content: 4 to 6 percent when tested in accordance with ASTM C231; 3 percent maximum for interior slabs where heavy-duty concrete floor finish is required.
2. Fly Ash: Maximum 25 percent, minimum 15 percent of total weight of fly ash plus cement.
3. Water Reducers: Use in all concrete.
4. High Range Water Reducers (Superplasticizers): Use at Contractor's option. Control slump and workability to at least 4-1/2-inch slump at discharge into forms by adjusting high range water reducer at batch plant.

D. Slump Range at Site:

1. 4-1/2 inches minimum, 8 inches maximum for concrete with a high range water reducing admixture.
2. 3 inches minimum and 5 inches maximum for concrete without high range water reducing admixture.

E. Combined Aggregate Gradation:

1. Structures: Select one of the gradations shown in the following table.
2. Combined Gradation Limits: Limits shown are for coarse aggregates and fine aggregates mixed together (combined).

<b>Sieve Sizes</b>	<b>Combined Gradation</b>		
	<b>Percentage Passing</b>		
	<b>1-1/2" Max.</b>	<b>1" Max.</b>	<b>3/4" Max.</b>

Sieve Sizes	Combined Gradation		
	Percentage Passing		
	1-1/2" Max.	1" Max.	3/4" Max.
2"	- 100	-	-
1-1/2"	95 - 100	- 100	-
1"	65 - 85	90 - 100	- 100
3/4"	55 - 75	70 - 90	92 - 100
1/2"	-		68 - 86
3/8"	40 - 55	45 - 65	57 - 74
No. 4	30 - 45	31 - 47	38 - 57
No. 8	23 - 38	23 - 40	28 - 46
No. 16	16 - 30	17 - 35	20 - 36
No. 30	10 - 20	10 - 23	14 - 25
No. 50	4 - 10	2 - 10	5 - 14
No. 100	0 - 3	0 - 3	0 - 5
No. 200	0 - 2	0 - 2	0 - 2

F. Tremie Concrete:

1. Minimum cement content of 658 pounds per cubic yard.
2. Use high range water reducing admixture (superplasticizers) admixture in accordance with ASTM C494, Type F or Type G.
3. Fine Aggregate Range: 40 to 50 percent of total aggregates by weight.
4. Use natural round gravel if available in Project area.
5. Proportion mix for design strength and slump range of 6 to 9 inches with maximum water-cement ratio.
6. Use anti-washout admixture in accordance with manufacturer's recommendations.

2.03 CONCRETE MIXING

A. General: In accordance with ACI 304R.

B. Concrete Mix Temperatures: As shown below for various stages of mixing and placing:

CONCRETE TEMPERATURES				
Ambient Air Temp.	Concrete Member Size, Minimum Dimension			
	<12"	12"-36"	36"-72"	>72"
Minimum concrete temperature as mixed for indicated air temperature:				

<b>CONCRETE TEMPERATURES</b>				
<b>Ambient Air Temp.</b>	<b>Concrete Member Size, Minimum Dimension</b>			
	<b>&lt;12"</b>	<b>12"-36"</b>	<b>36"-72"</b>	<b>&gt;72"</b>
Above 30 deg. F	60 deg. F	55 deg. F	50 deg. F	45 deg. F
0 to 30 deg. F	65 deg. F	60 deg. F	55 deg. F	50 deg. F
Below 0 deg. F	70 deg. F	65 deg. F	60 deg. F	55 deg. F
Maximum allowable gradual temperature drop in first 24 hours after curing period and after end of protection:				
–	50 deg. F	40 deg. F	30 deg. F	20 deg. F

C. Truck Mixers:

1. Equip with electrically actuated counters to readily verify number of revolutions of drum or blades.
2. Counter:
  - a. Resettable, recording type, mounted in driver's cab.
  - b. Actuated at time of starting mixers at mixing speeds.
3. Truck mixer operation shall furnish concrete batch as discharged that is homogeneous with respect to consistency, mix, and grading.
4. If slump tests taken at approximately 1/4 and 3/4 points of load during discharge give slumps differing by more than 2 inches when specified, slump is more than 4 inches, discontinue use of truck mixer unless causing condition is corrected and satisfactory performance is verified by additional slump tests.
5. Before attempting to reuse unit, check mechanical details of mixer, such as water measuring, and discharge apparatus, condition of blades, speed of rotation, general mechanical condition of unit, admixture dispensing equipment, and clearance of drum.
6. Do not use nonagitating or combination truck and trailer equipment for transporting ready-mixed concrete.
7. Concrete Volume in Truck:
  - a. Limit to 63 percent of total volume capacity in accordance with ASTM C94 when truck mixed.
  - b. Limit to 80 percent of total volume capacity when central mixed.
8. Mix each batch of concrete in truck mixer for minimum 70 revolutions of drum or blades at rate of rotation designated by equipment manufacturer.
9. Perform additional mixing, if required, at speed designated by equipment manufacturer as agitating speed.
10. Place materials, including mixing water, in mixer drum before actuating revolution counter for determining number of mixing revolutions.

D. Aggregates: Thoroughly and uniformly wash before use.

E. Admixtures:

1. Air-Entraining Admixture: Add at plant through manufacturer-approved dispensing equipment.
2. Water Reducers: Add prior to addition of high range water reducing admixture (superplasticizers).
3. High range water reducing admixture (superplasticizers) and Air-Entraining Admixtures:
  - a. Add at concrete plant only through equipment furnished or approved by admixture manufacturer.
  - b. Accomplish variations in slump, working time, and air content for flowable mixes by increasing or reducing high range water reducing admixture (superplasticizers) dose or air-entraining admixture dose at ready-mix plant only.
  - c. Equipment shall provide for easy and quick visual verification of admixture amount used for each dose.
  - d. Add discharge amount to each load of concrete into separate dispensing container, verify amount is correct, and add to concrete.
  - e. Additional dosage of high range water reducing admixture (superplasticizers) may be added in field using manufacturer-approved dispensing when unexpected delays cause too great of slump loss.

#### 2.04 SOURCE QUALITY CONTROL

- A. Cement: Test for total chloride content.
- B. Fly Ash: Test in accordance with ASTM C311.
- C. Batch Plant Inspection: Engineer shall have access to and have right to inspect batch plants, cement mills, and supply facilities of suppliers, manufacturers, and Subcontractors, providing products included in these Specifications.
  1. Weighing Scales: Tested and certified within tolerances set forth in the National Bureau of Standards Handbook No. 44.
  2. Batch Plant Equipment: Either semiautomatic or fully automatic in accordance with ASTM C94.

### **PART 3 EXECUTION**

#### 3.01 PLACING CONCRETE

- A. Preparation: Meet requirements and recommendations of ACI 304R and ACI 301, except as modified herein.
- B. Inspection: Notify Engineer at least 1 full working day in advance before starting to place concrete.
- C. Discharge Time:
  1. As determined by set time, do not exceed 1-1/2 hours after adding cement to water unless special approved time delay admixtures are used.

Coordinate time delay admixture information with manufacturer and Engineer prior to placing concrete.

2. Adjust slump or air content at Site by adding admixtures for particular load when approved by Engineer. Then, adjust plant dosage for remainder of placement. Additional dosage at Site shall be through approved dispenser supplied by admixture manufacturer.
3. Maintain required slump throughout time of concrete placement and consolidation. Discontinue use of high range water reducing admixture (superplasticizers) and provide new mix design if it fails to maintain slump between 4 to 8 inches and produce good consolidation for the length of time required. Redesign mix adjusting set control admixtures to maintain setting time in range required.

D. Placement into Formwork:

1. Before depositing concrete, remove debris from space to be occupied by concrete.
2. Prior to placement of concrete, dampen fill under slabs on ground, dampen sand where vapor retarder is specified, and dampen wood forms.
3. Reinforcement: Secure in position before placing concrete.
4. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 1.5 feet deep, except for slabs which shall be placed full depth. Place and consolidate successive layers prior to initial set of first layer to prevent cold joints.
5. Use placement devices, for example, chutes, pouring spouts, and pumps.
6. Vertical Free Fall Drop to Final Placement: 5 feet in forms 8 inches or less wide and 8 feet in forms wider than 8 inches, except as specified.
  - a. For placements where drops are greater than specified, use placement device such that free fall below placement device conforms to required value.
  - b. Limit free fall to prevent segregation caused by aggregates hitting reinforcing steel.
7. Do not use aluminum conveying devices.
8. Provide sufficient illumination in the interior of forms so concrete deposition is visible, permitting confirmation of consolidation quality.
9. Joints in Footings and Slabs:
  - a. Ensure space beneath plastic water stop completely fills with concrete.
  - b. During concrete placement, make visual inspection of entire water stop area.
  - c. Limit concrete placement to elevation of water stop in first pass, vibrate concrete under water stop, lift water stop to confirm full consolidation without voids, place remaining concrete to full height of slab.
  - d. Apply procedure to full length of water stops.
10. If reinforcement is in direct sunlight or is more than 20 degrees F higher in temperature than concrete temperature before placement, wet reinforcement with water fog spray before placing concrete to cool reinforcement.

11. Trowel and round off top exposed edges of walls with 1/4-inch radius steel edging tool.

E. Conveyor Belts and Chutes:

1. Design and arrange ends of chutes, hopper gates, and other points of concrete discharge throughout conveying, hoisting, and placing system for concrete to pass without becoming segregated.
2. Do not use chutes longer than 50 feet.
3. Minimum Slopes of Chutes: Angled to allow concrete to readily flow without segregation.
4. Conveyor Belts:
  - a. Approved by Engineer.
  - b. Wipe clean with device that does not allow mortar to adhere to belt.
  - c. Cover conveyor belts and chutes.

F. Retempering: Not permitted for concrete where cement has partially hydrated.

G. Pumping of Concrete:

1. Provide standby pump, conveyor system, crane and concrete bucket, or other system onsite during pumping, for adequate redundancy to assure completion of concrete placement without cold joints in case of primary placing equipment breakdown.
2. Minimum Pump Hose (Conduit) Diameter: 4 inches.
3. Replace pumping equipment and hoses (conduits) that are not functioning properly.

H. Maximum Size of Concrete Placements:

1. Limit size of each placement to allow for strength gain and volume change due to shrinkage
2. Locate expansion, control, contraction, and construction joints where shown. When expansion or control joints are not shown, provide construction joints at maximum spacing of 40 feet. When expansion or control joint spacing exceeds 60 feet, provide intermediate construction joints at maximum spacing of 40 feet. Uniformly space construction joints. Vertical construction joint shall not be greater than 20 feet from wall corners or intersections
3. Consider beams, girders, brackets, column capitals, and haunches as part of floor or roof system and place monolithically with floor or roof system.
4. Should placement sequence result in cold joint located below finished water surface, install water stop in joint.

I. Minimum Time Between Adjacent Placements:

1. Construction Joints: 14 days (7 days wet cure and 7 days dry cure).
2. Control Joints: 6 days.
3. Expansion Joints/Contraction Joints: 1 day.

4. At least 2 hours shall elapse after depositing concrete in long columns and walls thicker than 8 inches before depositing concrete in beams, girders, or slabs supported thereon.
  5. For columns and walls 10 feet in height or less, wait at least 45 minutes prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.
- J. Removal of Water: Unless tremie method for placing concrete is specified, remove water from space to be occupied by concrete.
- K. Consolidation and Visual Observation:
1. Consolidate concrete with internal vibrators with minimum frequency of 8,000 cycles per minute and amplitude as required to consolidate concrete in section being placed.
  2. Provide at least one standby vibrator in operable condition at placement Site prior to placing concrete.
  3. Consolidation Equipment and Methods: ACI 309R.
  4. Provide sufficient windows in forms or limit form height to allow for concrete placement through windows and for visual observation of concrete.
  5. Vibration consolidation shall not exceed distance of 3 feet from point of placement.
  6. Vibrate concrete in vicinity of joints to obtain impervious concrete.
- L. Hot Weather:
1. Prepare ingredients, mix, place, cure, and protect in accordance with ACI 305R.
  2. Placement frequency shall be such that lift lines will not be visible in exposed concrete finishes.
  3. Maintain concrete temperature below 90 degrees F at time of placement, or furnish test data or provide other proof that admixtures and mix ingredients do not produce flash set plastic shrinkage, or cracking due to heat of hydration. Cool ingredients before mixing to maintain fresh concrete temperatures as specified or less.
  4. Provide for windbreaks, shading, fog spraying, sprinkling, ice, wet cover, or other means as necessary to maintain concrete at or below specified temperature.
  5. Prevent differential temperature between reinforcing steel and concrete.
  6. Evaporation Retardant: As specified in Section 03370, Concrete Curing.

### 3.02 PLACING TREMIE CONCRETE SEALS

- A. Place concrete when water level inside area to be filled with concrete is equal to groundwater elevation outside.
- B. Maintain relation of water levels until concrete design strength is obtained.

### 3.03 CONCRETE BONDING

#### A. Horizontal Construction Joints in Reinforced Concrete Walls:

1. Thoroughly clean and saturate surface of joint with water.
2. Limit slurry concrete placement to 2-inch maximum thickness, 1-inch minimum thickness.
3. Use positive measuring device such as bucket or other device that will contain only enough slurry concrete for depositing in visually measurable area of wall to ensure that portion of form receives appropriate amount of slurry concrete to satisfy placement thickness requirements.
4. Do not deposit slurry concrete from pump hoses or large concrete buckets, unless specified placement thickness can be maintained and verified through inspection windows close to joint.
5. Limit concrete placed immediately on top of slurry concrete to 12 inches thick. Thoroughly vibrate to mix concrete and slurry concrete together.

#### B. To Existing Concrete:

1. Thoroughly clean and mechanically roughen existing concrete surfaces to roughness profile of 1/4 inch.
2. Saturate surface with water for 24 hours prior to placing new concrete.

### 3.04 CONSTRUCTION JOINTS

#### A. As specified in Section 03251, Concrete Joints.

### 3.05 REPAIRING CONCRETE

#### A. General:

1. Inject cracks that leak with crack repair epoxy.
2. Obtain quantities of repair material and manufacturer's detailed instructions for use to provide repair with finish to match adjacent surface or apply sufficient repair material adjacent to repair to blend finish appearance.
3. Repair of concrete shall provide structurally sound surface finish, uniform in appearance or upgrade finish by other means until acceptable to Engineer.

#### B. Tie Holes:

1. Fill with nonshrink grout as specified in Section 03600, Grout.
2. Match color of adjacent concrete and demonstrate on mockup panels first.
3. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

#### C. Alternate Form Ties; Through-Bolts:

1. Mechanically roughen entire interior surface of through hole. Epoxy coat roughened surface and drive elastic vinyl plug to half depth. Dry pack

entire hole from both sides of plug with nonshrink grout, as specified in Section 03600, Grout. Use only enough water to dry pack grout. Dry pack while epoxy is still tacky. If epoxy has dried, remove epoxy by mechanical means and reapply new epoxy.

2. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

D. Exposed Metal Objects:

1. Metal objects not intended to be exposed in as-built condition of structure including wire, nails, and bolts, shall be removed by chipping back concrete to depth of 1 inch and then cutting or removing metal object.
2. Repair area of chipped-out concrete per requirements of Section 03720, Vertical And Overhead Concrete Repair Systems.

E. Blockouts at Pipes or Other Penetrations:

1. Install per details shown on Drawings or submit proposed blockouts for review.
2. Use nonshrink, nonmetallic grout.

### 3.06 CONCRETE WALL FINISHES

A. Type W-1 (Ordinary Wall Finish):

1. Patch tie holes.
2. Knock off projections.
3. Patch defective areas.

B. Type W-2 (Smooth Wall Finish):

1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch defective areas and repair rough spots resulting from form release agent failure or other reasons to provide smooth uniform appearance.

C. Type W-4 (Finish for Cementitious Coatings):

1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch and repair defective areas as specified for Type W-2.

D. Type W-5 (Finish for Painting):

1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch and repair defective areas as specified for Type W-2.
4. Leave surface ready for painting as specified in Section 09900, Painting and Protective Coatings.

E. Type W-7 (Smooth Rubbed Wall Finish):

1. Only water curing will be permitted on walls being rubbed.
2. Perform rubbing while green concrete can be physically worked and smoothed without adding other materials, if structurally possible, the day following placement. Finish no later than 3 days after placement has been completed.
3. Remove forms at such a rate that all finishing, form tie filling, fin removal, and patching can be completed on same day forms are removed while curing wall.
4. After pointings have set sufficiently to permit working on surface, thoroughly saturate entire surface with water for period of 3 hours and rub until uniform surface is obtained.
5. Rub either by hand with carborundum stone of medium-coarse grade or abrasive of equal quality, or mechanically operated carborundum stone.
6. Mechanically operated carborundum stones shall be approved by Engineer before concrete finishing.
7. No cement grout, other than cement paste drawn from the concrete itself by the rubbing process shall be used.
8. Finish paste formed by rubbing by either brushing or floating as follows:
  - a. Brushing:
    - 1) Carefully strike with clean brush.
    - 2) Brush in long direction of surface being finished.
  - b. Floating:
    - 1) Spread uniformly over surface and allow to reset.
    - 2) Finish by floating with canvas, carpet face, or cork float, or rub down with dry burlap.
9. Continue water curing of wall during finishing operation in areas not being rubbed.
10. Move water curing onto rubbed areas as soon as water will not erode rubbed surface.

F. Type W-8 (Rubbed Wall Finish):

1. Meet requirements for Type W-7, except allow paste obtained from rubbing to set at least 24 hours.
2. After thoroughly saturating with water, coat surface with mixture of 85 percent cement and 15 percent lime with sufficient water to give creamy consistency. Demonstrate on sample panel prior to production finishing.
3. Rub this mixture into surface with coarse carborundum stone and brush with damp brush.
4. Brush in long direction of surface being finished.
5. Latex bonding admixture may be used. Consult with Euclid Chemical Co., Cleveland, OH or Master Builders Co., Cleveland, OH.

G. Type W-9 (Grout Cleaned Finish):

1. Meet requirements for Type W-7, except that finish must be accomplished within 7 days of placement.
2. Grout: Mixed with 1 part Portland cement and 1-1/2 parts fine sand and bonding agent to produce grout with consistency of thick paint. White Portland cement shall be substituted for part of gray Portland cement in

order to produce color matching color of surrounding concrete, as determined by trial patch.

3. Wet surface of concrete sufficiently to prevent absorption of water from grout and apply grout uniformly with brushes or spray gun.
4. Immediately after applying grout, scrub surface vigorously with cork float or stone to coat surface and fill air bubbles and holes.
5. While grout is still plastic, remove excess grout by working surface with rubber float, burlap, or other means. After surface whitens from drying (about 30 minutes at 70 degrees F), rub vigorously with clean burlap. Continue to water cure wall until curing period of 7 days is complete.
6. Latex bonding admixture may be used.

H. Type W-10 (Fractured Fin Finish):

1. Form exterior surface of walls with approved form liner.
2. Use stainless steel form ties and place at valleys.
3. Patch form tie holes.
4. Achieve final texture by light sandblast and then breaking off tips of ridge with light bushhammering, or other approved process.
5. Same person starting bushhammering shall complete process for any given structure and match approved mockup panel.

I. Type W-11 (Abrasive Blast - Sandblast Finish):

1. Intent of this procedure is to remove surface skin to depth no more than 1/16 inch, and expose only fine aggregate and air holes near surface, thus producing uniform texture.
2. Perform sandblasting on building or on concrete surfaces in same area of view at same time and obtain uniformity of appearance.
3. Same person shall accomplish sandblasting on one structure and on concrete in same area.
4. Perform sandblasting to match approved mockup panel.
5. Abrasive: Use clean silica sand, free of foreign materials, and supplied in sealed sacks.
6. Blast surface with 100 psi air pressure at rate of 2 to 3 square feet per minute with nozzle held approximately 2 feet from surface and perpendicular thereto.

### 3.07 CONCRETE SLAB FINISHES

A. General:

1. Finish slab concrete per the requirements of ACI 302.1R.
2. Use manual screeds, vibrating screeds, or roller compacting screeds to place concrete level and smooth.
3. Do not use "jitterbugs" or other special tools designed for purpose of forcing coarse aggregate away from surface and allowing layer of mortar, which will be weak and cause surface cracks or delamination, to accumulate.
4. Do not dust surfaces with dry materials.
5. Use evaporation retardant.

6. Round off edges of slabs with steel edging tool, except where cove finish is shown. Steel edging tool radius shall be 1/4 inch for slabs subject to wheeled traffic.
- B. Type S-1 (Steel Troweled Finish):
1. Finish by screeding and floating with straightedges to bring surfaces to required finish elevation. Use evaporation retardant.
  2. While concrete is still green, but sufficiently hardened to bear a person's weight without deep imprint, wood float to true, even plane with no coarse aggregate visible.
  3. Use sufficient pressure on wood floats to bring moisture to surface.
  4. After surface moisture has disappeared, hand trowel concrete to produce smooth, impervious surface, free from trowel marks.
  5. Burnish surface with an additional troweling. Final troweling shall produce ringing sound from trowel.
  6. Do not use dry cement or additional water during troweling, nor will excessive troweling be permitted.
  7. Power Finishing:
    - a. Approved power machine may be used in lieu of hand finishing in accordance with directions of machine manufacturer.
    - b. Do not use power machine when concrete has not attained necessary set to allow finishing without introducing high and low spots in slab.
    - c. Do first steel troweling for slab S-1 finish by hand.
- C. Type S-2 (Wood Float Finish):
1. Finish slab to receive fill and mortar setting bed by screeding with straightedges to bring surface to required finish plane.
  2. Wood float finish to compact and seal surface.
  3. Remove laitance and leave surface clean.
  4. Coordinate with other finish procedures.
- D. Type S-4 (Exposed Aggregate Finish):
1. Embed single layer of selected aggregates at surface of concrete slab immediately after it has been placed, screeded, and smoothed.
  2. Embed aggregates by tamping with wood float, darby, or rolling device.
  3. Accomplish exposure of selected aggregates by removing surface matrix by washing with water and brushing with stiff plastic bristled brush as soon as concrete has set sufficiently to support weight of a person.
  4. Exposure: No greater than 1/3 the average diameter of aggregate, nor less than 1/4.
  5. Next day acid wash until there is no noticeable cement film on aggregate exposed.
  6. Apply clear sealer per manufacturer's recommendations.

- E. Type S-5 (Broomed Finish):
1. Finish as specified for Type S-1 floor finish, except omit final troweling and finish surface by drawing fine-hair broom lightly across surface.
  2. Broom in same direction and parallel to expansion joints, or, in the case of inclined slabs, perpendicular to slope, except for round roof slab, broom surface in radial direction.
- F. Type S-6 (Sidewalk Finish):
1. Slope walks down 1/4 inch per foot away from structures, unless otherwise shown.
  2. Strike off surface by means of strike board and float with wood or cork float to true plane, then flat steel trowel before brooming.
  3. Broom surface at right angles to direction of traffic or as shown.
  4. Lay out sidewalk surfaces in blocks, as shown or as directed by Engineer, with grooving tool.
- G. Concrete Curbs:
1. Float top surface of curb smooth, and finish all discontinuous edges with steel edger.
  2. After concrete has taken its initial set, remove front form and give exposed vertical surface an ordinary wall finish, Type W-1.

### 3.08 CONCRETE SLAB TOLERANCES

- A. Slab Tolerances:
1. Exposed Slab Surfaces: Comprise of flat planes as required within tolerances specified.
  2. Slab Finish Tolerances and Slope Tolerances: Crowns on floor surface not too high as to prevent 10-foot straightedge from resting on end blocks, nor low spots that allow block of twice the tolerance in thickness to pass under supported 10-foot straightedge.
  3. Slab Type S-A: Steel gauge block 5/16 inch thick.
  4. Slab Type S-B: Steel gauge block 1/8 inch thick.
  5. Slab Type S-A and S-B: Finish Slab Elevation: Slope slabs to floor drain and gutter, and shall adequately drain regardless of tolerances.
  6. Thickness: Maximum 1/4 inch minus or 1/2 inch plus from thickness shown. Where thickness tolerance will not affect slope, drainage, or slab elevation, thickness tolerance may exceed 1/2 inch plus.
- B. Thickness: Maximum 1/4 inch minus or 1/2 inch plus from thickness shown. Where thickness tolerance will not affect slope, drainage, or slab elevation, thickness tolerance may exceed 1/2 inch plus.

### 3.09 BEAM AND COLUMN FINISHES

- A. General: Inject cracks with crack repair epoxy. Patch and repair defective areas.

- B. Match Wall Type:
  - 1. Repair rock pockets.
  - 2. Fill air voids.

### 3.10 BACKFILL AGAINST WALLS

- A. Do not backfill against walls until concrete has obtained specified 28-day compressive strength.
- B. Place backfill simultaneously on both sides of wall, where required, to prevent differential pressures.

### 3.11 FIELD QUALITY CONTROL

#### A. General:

- 1. Provide adequate facilities for safe storage and proper curing of concrete test cylinders onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
- 2. Provide concrete for testing of slump, air content, and for making cylinders from the point of discharge into forms. When concrete is pumped, Samples used shall be taken from discharge end of pump hose.
- 3. Evaluation will be in accordance with ACI 301 and Specifications.
- 4. Specimens shall be made, cured, and tested in accordance with ASTM C31 and ASTM C39.
- 5. Frequency of testing may be changed at discretion of Engineer.
- 6. Pumped Concrete: Take concrete samples for slump (ASTM C143) and test cylinders (ASTM C31 and C39) and shrinkage specimens (ASTM C157) at placement (discharge) end of line.
- 7. Reject concrete represented by cylinders failing to meet strength and air content specified.

#### B. Tolerances:

- 1. Walls: Measure and inspect walls for compliance with tolerances specified in Section 03100, Concrete Formwork.
- 2. Slab Finish Tolerances and Slope Tolerances:
  - a. Floor flatness measurements shall be made day after floor is finished and before shoring is removed to eliminate effects of shrinkage, curing, and deflection.
  - b. Support 10-foot long straightedge at each end with steel gauge blocks of thicknesses equal to specified tolerance.
  - c. Compliance with designated limits in four of five consecutive measurements is satisfactory, unless defective conditions are observed.

#### C. Water Leakage Tests:

- 1. Purpose: Determine integrity and watertightness of finished exterior and interior water holding concrete surfaces.

2. Potable Water Supply Reservoirs: Clean and sterilize prior to conducting test as specified in Section 02519, Disinfection of Water Systems.
3. Water-Holding Structures:
  - a. Perform leakage tests after concrete structure is complete and capable of resisting hydrostatic pressure of water test. Concrete shall have achieved its full design strength.
  - b. Perform leakage test before backfill, brick facing, grout topping slab, coatings, or other work that will cover concrete surfaces has begun.
  - c. Install temporary bulkheads, cofferdams, and pipe blind flanges, and close valves. Inspect each to see that it provides complete seal.
  - d. Fill with water to test level shown, or maximum liquid level if no test level is given. Maintain this level for 72 hours prior to start of test to allow water absorption, structural deflection, and temperature to stabilize.
  - e. Measure evaporation and precipitation by floating a partially filled, transparent, calibrated, open top container.
  - f. Measure water surface at two points 180 degrees apart when possible where attachments, such as ladders exist, at 24-hour intervals. Using sharp pointed hook gauge and fixed metal measure capable of reading to 1/100 of an inch. Continue test for period of time sufficient to produce at least 1/2-inch drop in water surface based on assumption that leakage would occur at maximum allowable rate specified or for 72 hours, whichever is lesser time.
4. Acceptance Criteria:
  - a. Volume loss shall not exceed 0.075 percent of contained liquid volume in 24-hour period, correcting for evaporation, precipitation, and settlement.
  - b. No damp spots or seepage visible on exposed surfaces. Damp spot is defined as sufficient moisture to be transferred to dry hand upon touching.
5. Repairs When Test Fails: Dewater structure; fill leaking cracks with crack repair epoxy as specified in Section 03740, Concrete Repair Crack Injection. Patch areas of damp spots previously recorded, and repeat water leakage test in its entirety until the structure successfully passes the test.

### 3.12 MANUFACTURER'S SERVICES

- A. Provide the following representative at Site in accordance with Section 01640, Manufacturers' Services, for installation assistance, inspection, and certification of proper installation for concrete ingredients, mix design, mixing, and placement.
  1. Batch Plant Representative:
    - a. Observe how concrete mixes are performing.
    - b. Be present during first placement of each type of concrete mix.
    - c. Assist with concrete mix design, performance, placement, weather problems, and problems as may occur with concrete mix throughout Project.
    - d. Establish control limits on concrete mix designs.
  2. Admixture Manufacturer's Representative:

- a. Demonstrate special features, product performance, product mixing, testing, and placement or installation for each type of admixture.
  - b. Observe how concrete mixes are performing.
  - c. Be present during first placement of each type of concrete mix.
  - d. Assist with concrete mix design, performance, placement, weather problems, and problems as may occur with concrete mix throughout Project, including instructions for redosing.
  - e. Provide equipment for control of concrete redosing for air entrainment or high range water reducing admixture (superplasticizers) at Site to maintain proper slump and air content if so needed.
3. Bonding Agent Manufacturer's Representative: Demonstrate product performance, product mixing, and placement.

### 3.13 PROTECTION OF INSTALLED WORK

- A. After curing as specified in Section 03370, Concrete Curing, and after applying final floor finish, cover slabs with plywood or particle board or plastic sheeting or other material to keep floor clean and protect it from material and damage due to other construction work.
- B. Repair defective areas and areas damaged by construction.

**END OF SECTION**

## SECTION 03370 - CONCRETE CURING

### PART 1 GENERAL

#### 1.01 THE REQUIREMENT

- A. Protect all freshly deposited concrete from premature drying and excessively hot or cold temperatures, and maintain with minimal moisture loss at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete in accordance with requirements specified herein.

#### 1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Concrete Framework
- B. Joints in Concrete
- C. Cast-in-Place Concrete
- D. Grout
- E. Concrete Finishes

#### 1.03 SUBMITTALS

- A. In accordance with the procedures and requirements set forth in the Section entitled "Submittals", the contractor shall submit the following:
  - 1. Request for acceptance along with procedures for protection of concrete under wet weather placement conditions.
  - 2. Request for placement along with proposed procedures for hot weather placement.
  - 3. Request for acceptance and proposed materials and procedures for moisture preservation.

#### 1.04 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of other requirements of these specifications all work hereunder shall conform to the applicable requirements of the referenced portions of the following documents, to the extent that the requirements therein are not in conflict with the provisions of this Section.
  - 1. Specifications for Structural Concrete for buildings, ACI 301.
  - 2. Guide for Measuring, Mixing, Transporting, and Placing Concrete, ACI 304.
  - 3. Hot Weather Concreting, ACI 305.
  - 4. Specifications for Sheet Materials for Curing Concrete, ASTM C171.

5. Specification for Liquid Membrane - Forming Compounds for Curing Concrete, ASTM C309.
6. Federal Specification TT-C-800.

#### 1.05 QUALITY ASSURANCE

- A. Curing compound shall not be used on any surface where concrete or other material will be bonded unless the manufacturer certifies that the curing compound will not prevent bond or indicates measures to be taken to completely remove the curing compound from areas to receive bonded applications.
- B. Care shall be taken to ensure that curing compounds are compatible with all finish concrete castings.

### **PART 2 PRODUCTS**

#### 2.01 CURING COMPOUNDS

- A. All materials shall meet the ASTM specifications C309, Type 1-D or Federal Specification TT-C-800 and shall have a minimum solids content of 30 percent.

### **PART 3 EXECUTION**

#### 3.01 PROTECTION AND CURING

- A. All concrete work shall be protected from the elements, flowing water and from defacement of any nature during construction operations.
- B. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Protect concrete during the curing period such that the concrete temperature does not fall below the requirements of Section 3.02 -Concrete Temperature. Cure concrete in accordance with paragraph E or paragraph F.
- C. When concrete is placed in cold weather as defined in ACI 306, the concrete shall be protected in accordance with requirements of ACI 306, Cold Weather Concreting.
- D. When concrete is placed in hot weather as defined in ACI 305, the concrete shall be protected in accordance with the requirements of ACI 305, Hot Weather Concreting.
- E. After placing and finishing, use one or more of the following methods to preserve moisture in concrete:
  1. Ponding or continuous fogging or sprinkling.
  2. Application of mats or fabric kept continuously wet.
  3. Continuous application of steam (under 150 degrees Fahrenheit).
  4. Application of sheet materials conforming to ASTM C171.

5. Application of a curing compound conforming to ASTM C309 or Federal Specification TT-C-800. Apply the compound in accordance with the manufacturer's recommendation on after water sheen has disappeared from the concrete surface and after finishing operations. The rate of application shall not exceed 200 square feet per gallon. For rough surfaces, apply in two directions at right angles to each other.
- F. Keep absorbent forms wet until they are removed. After form removal, cure concrete by one of the methods in paragraph E. Frames may be "cracked" within twenty-four hours and kept moist until they are required to be kept in place per Section 03100.

### 3.02 CONCRETE TEMPERATURE

- A. When the average of the highest and lowest temperature during the period from midnight to midnight is expected to drop below 40 F for more than three successive days, concrete shall be delivered to meet the following minimum temperature immediately after placement:
1. 55 degrees Fahrenheit for sections less than 12 in. in the least dimension
  2. 50 degrees Fahrenheit for sections 12 in. to 36 in. in the least dimension
  3. 45 degrees Fahrenheit for sections 36 in. to 72 in. in the least dimension
  4. 40 degrees Fahrenheit for sections greater than 72 in. in the least dimension
- B. The temperature of concrete as placed shall not exceed these values by more than 20 degrees Fahrenheit.
- C. These minimum requirements may be terminated when temperatures above 50 degrees Fahrenheit occur during more than half of any 24 hour duration.
- D. Unless otherwise specified or permitted, the temperature of concrete as delivered shall not exceed 90 degrees Fahrenheit.
- E. During and following curing, do not allow the surface of the concrete to change temperature more than the following:
1. 50 degrees Fahrenheit in any 24-hr period for sections less than 12 in. in the least dimension
  2. 40 degrees Fahrenheit for sections from 12 to 36 in. in the least dimension
  3. 30 degrees Fahrenheit for sections 36 to 72 in. in the least dimension
  4. 20 degrees Fahrenheit for sections greater than 72 in. in the least dimension

### 3.03 FINAL CURING

- A. Cure for at least the first seven days after placement for all concrete except high early strength concrete, for which the period shall be at least the first three days after placement.

1. Alternatively, moisture retention measures may be terminated when:
  - a. Tests are made on at least two additional cylinders kept adjacent to the structure and cured by the same methods as the structure and tests indicate 70 percent of the specified compressive strength,  $f'_c$ , as determined in accordance with ASTM C39.
  - b. The temperature of the concrete is maintained at 50 degrees fahrenheit or higher for the time required to achieve 85 percent of  $f'_c$  in laboratory-cured cylinders representative of the concrete in place.
  - c. The strength of concrete reaches  $f'_c$  as determined by accepted nondestructive methods or laboratory-cured cylinder test results.
- B. When one of the curing procedures in Paragraph 3.01-E is used initially, the curing procedure may be replaced by one of the other procedures when concrete is one day old, provided concrete is not permitted to become surface dry at any time.

**END OF SECTION**

## SECTION 03600 - GROUT

### PART 1 GENERAL

#### 1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install grout complete as shown on the Drawings and as specified herein.

#### 1.2 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:
  - 1. Commercially manufactured nonshrink cementitious grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.
  - 2. Commercially manufactured nonshrink epoxy grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.
  - 3. Cement grout. The submittal shall include the type and brand of the cement, the gradation of the fine aggregate, product data on any proposed admixtures and the proposed mix of the grout.
  - 4. Concrete grout. The submittal shall include data as required for concrete and fiber reinforcement as delineated in Section. This includes the mix design, constituent quantities per cubic yard and the water/cement ratio.
- B. Samples
  - 1. Samples of commercially manufactured grout products when requested by the Engineer.
  - 2. Aggregates for use in concrete grout when requested by the Engineer.
- C. Laboratory Test Reports
  - 1. Submit laboratory test data as required under Section 03300 for concrete to be used as concrete grout.
- D. Qualifications
  - 1. Grout manufacturers shall submit documentation that they have at least 10 years experience in the production and use of the proposed grouts which they will supply.

#### 1.3 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)

1. ASTM C531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
  2. ASTM C579 - Standard Test Method for Compressive Strength of Chemical Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
  3. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
  4. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
  5. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics
- B. U.S. Army Corps of Engineers Standard (CRD)
1. CRD C-621 - Corps of Engineers Specification for Nonshrink Grout
- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

#### 1.4 QUALITY ASSURANCE

- A. Qualifications
1. Grout manufacturer shall have a minimum of 10 years experience in the production and use of the type of grout proposed for the work.
- B. Services of Manufacturer's Representative
1. A qualified field technician of the nonshrink grout manufacturer, specifically trained in the installation of the products, shall attend the pre-installation conference and shall be present for the initial installation of each type of nonshrink grout. Additional services shall also be provided, as required, to correct installation problems.
- C. Field Testing
1. All field testing and inspection services required shall be provided by the Owner. The Contractor shall assist in the sampling of materials and shall provide any ladders, platforms, etc, for access to the work. The methods of testing shall comply in detail with the applicable ASTM Standards.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the jobsite in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers and printed instructions.
- B. Store materials in full compliance with the manufacturer's recommendations. Total storage time from date of manufacture to date of installation shall be limited to 6 months or the manufacturer's recommended storage time, whichever is less.

- C. Material which becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material at no additional expense to the Owner.
- D. Nonshrink cement-based grouts shall be delivered as preblended, prepackaged mixes requiring only the addition of water.
- E. Nonshrink epoxy grouts shall be delivered as premeasured, prepackaged, three component systems requiring only blending as directed by the manufacturer.

## 1.6 DEFINITIONS

- A. Nonshrink Grout: A commercially manufactured product that does not shrink in either the plastic or hardened state, is dimensionally stable in the hardened state and bonds to a clean base plate.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. The use of a manufacturer's name and product or catalog number is for the purpose of establishing the standard of quality desired.
- B. Like materials shall be the products of one manufacturer or supplier in order to provide standardization of appearance.

### 2.2 MATERIALS

#### A. Nonshrink Cementitious Grout

1. Nonshrink cementitious grouts shall meet or exceed the requirements of ASTM C1107, Grades B or C and CRD C-621. Grouts shall be portland cement based, contain a pre-proportioned blend of selected aggregates and shrinkage compensating agents and shall require only the addition of water. Nonshrink cementitious grouts shall not contain expansive cement or metallic particles. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C827.
  - a. General purpose nonshrink cementitious grout shall conform to the standards stated above and shall be SikaGrout 212 by Sika Corp.; Set Grout by Master Builders, Inc.; Gilco Construction Grout by Gifford Hill & Co.; Euco NS by The Euclid Chemical Co.; NBEC Grout by U. S. Grout Corp. or equal.
  - b. Flowable (Precision) nonshrink cementitious grout shall conform to the standards stated above and shall be Masterflow 928 by Master Builders, Inc.; Hi-Flow Grout by the Euclid Chemical Co.; SikaGrout 212 by Sika Corp.; Supreme Grout by Gifford Hill & Co.; Five Star Grout by U. S. Grout Corp. or equal.

#### B. Nonshrink Epoxy Grout

1. Nonshrink epoxy-based grout shall be a pre-proportioned, three component, 100 percent solids system consisting of epoxy resin, hardener, and blended aggregate. It shall have a compressive strength of 14,000 psi in 7 days when tested in conformity with ASTM D695 and have a maximum thermal expansion of  $30 \times 10^{-6}$  when tested in conformity with ASTM C531. The grout shall be Ceilcote 648 CP by Master Builders Inc.; Five Star Epoxy Grout by U.S. Grout Corp.; Sikadur 42 Grout-Pak by Sika Corp.; High Strength Epoxy Grout by the Euclid Chemical Co. or equal.
- C. Cement Grout
1. Cement grouts shall be a mixture of one part portland cement conforming to ASTM C150, Types I, II, or III and 1 to 2 parts sand conforming to ASTM C33 with sufficient water to place the grout. The water content shall be sufficient to impart workability to the grout but not to the degree that it will allow the grout to flow.
- D. Concrete Grout
1. Concrete grout shall conform to the requirements of Section 03300 except as specified herein. It shall be proportioned with cement, pozzolan, coarse and fine aggregates, water, water reducer and air entraining agent to produce a mix having an average strength of 2900 psi at 28 days, or 2500 psi nominal strength. Coarse aggregate size shall be  $\frac{1}{4}$  inch maximum. Slump should not exceed 5-in and should be as low as practical yet still retain sufficient workability.
- E. Water
1. Potable water, free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Grout shall be placed over cured concrete which has attained its full design strength unless otherwise approved by the Engineer.
- B. Concrete surfaces to receive grout shall be clean and sound; free of ice, frost, dirt, grease, oil, curing compounds, laitance and paints and free of all loose material or foreign matter which may effect the bond or performance of the grout.
- C. Roughen concrete surfaces by chipping, sandblasting, or other mechanical means to ensure bond of the grout to the concrete. Remove loose or broken concrete. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance and firmly embedded into the parent concrete.
  1. Air compressors used to clean surfaces in contact with grout shall be the oilless type or equipped with an oil trap in the air line to prevent oil from being blown onto the surface.

- D. Remove all loose rust, oil or other deleterious substances from metal embedments or bottom of baseplates prior to the installation of the grout.
- E. Concrete surfaces shall be washed clean and then kept moist for at least 24 hours prior to the placement of cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, use of a soaker hose, flooding the surface, or other method acceptable to the Engineer. Upon completion of the 24 hour period, visible water shall be removed from the surface prior to grouting. The use of an adhesive bonding agent in lieu of surface saturation shall only be used when approved by the Engineer for each specific location of grout installation.
- F. Epoxy-based grouts do not require the saturation of the concrete substrate. Surfaces in contact with epoxy grout shall be completely dry before grouting.
- G. Construct grout forms or other leakproof containment as required. Forms shall be lined or coated with release agents recommended by the grout manufacturer. Forms shall be of adequate strength, securely anchored in place and shored to resist the forces imposed by the grout and its placement.
  - 1. Forms for epoxy grout shall be designed to allow the formation of a hydraulic head and shall have chamfer strips built into forms.
- H. Level and align the structural or equipment bearing plates in accordance with the structural requirements and the recommendations of the equipment manufacturer.
- I. Equipment shall be supported during alignment and installation of grout by shims, wedges, blocks or other approved means. The shims, wedges and blocking devices shall be prevented from bonding to the grout by appropriate bond breaking coatings and removed after grouting unless otherwise approved by the Engineer.

### 3.2 INSTALLATION - GENERAL

- A. Mix, apply and cure products in strict compliance with the manufacturer's recommendations and this Section.
- B. Have sufficient manpower and equipment available for rapid and continuous mixing and placing. Keep all necessary tools and materials ready and close at hand.
- C. Maintain temperatures of the foundation plate, supporting concrete, and grout between 40 and 90 degrees F during grouting and for at least 24 hours thereafter or as recommended by the grout manufacturer, whichever is longer. Take precautions to minimize differential heating or cooling of baseplates and grout during the curing period.
- D. Take special precautions for hot weather or cold weather grouting as recommended by the manufacturer when ambient temperatures and/or the temperature of the materials in contact with the grout are outside of the 60 and 90 degrees F range.
- E. Install grout in a manner which will preserve the isolation between the elements on either side of the joint where grout is placed in the vicinity of an expansion or control joint.

- F. Reflect all existing underlying expansion, control and construction joints through the grout.

### 3.3 INSTALLATION - CEMENT GROUTS AND NONSHRINK CEMENTITIOUS GROUTS

- A. Mix in accordance with manufacturer's recommendations. Do not add cement, sand, pea gravel or admixtures without prior approval by the Engineer.
- B. Avoid mixing by hand. Mixing in a mortar mixer (with moving blades) is recommended. Pre-wet the mixer and empty excess water. Add premeasured amount of water for mixing, followed by the grout. Begin with the minimum amount of water recommended by the manufacturer and then add the minimum additional water required to obtain workability. Do not exceed the manufacturer's maximum recommended water content.
- C. Placements greater than 3-in in depth shall include the addition of clean, washed pea gravel to the grout mix when approved by the manufacturer. Comply with the manufacturer's recommendations for the size and amount of aggregate to be added.
- D. Place grout into the designated areas in a manner which will avoid segregation or entrapment of air. Do not vibrate grout to release air or to consolidate the material. Placement should proceed in a manner which will ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.
- E. Place grout rapidly and continuously to avoid cold joints. Do not place cement grouts in layers. Do not add additional water to the mix (retemper) after initial stiffening.
- F. Just before the grout reaches its final set, cut back the grout to the substrate at a 45 degree angle from the lower edge of bearing plate unless otherwise approved by the Engineer. Finish this surface with a wood float (brush) finish.
- G. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at least 24 hours after placement or longer if recommended by the manufacturer. Saturate the grout surface by use of wet burlap, soaker hoses, ponding or other approved means. Provide sunshades as necessary. If drying winds inhibit the ability of a given curing method to keep grout moist, erect wind breaks until wind is no longer a problem or curing is finished.

### 3.4 INSTALLATION - NONSHRINK EPOXY GROUTS

- A. Mix in accordance with the procedures recommended by the manufacturer. Do not vary the ratio of components or add solvent to change the consistency of the grout mix. Do not overmix. Mix full batches only to maintain proper proportions of resin, hardener and aggregate.
- B. Monitor ambient weather conditions and contact the grout manufacturer for special placement procedures to be used for temperatures below 60 or above 90 degrees F.

- C. Place grout into the designated areas in a manner which will avoid trapping air. Placement methods shall ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.
- D. Minimize "shoulder" length (extension of grout horizontally beyond base plate). In no case shall the shoulder length of the grout be greater than the grout thickness.
- E. Finish grout by puddling to cover all aggregate and provide a smooth finish. Break bubbles and smooth the top surface of the grout in conformity with the manufacturer's recommendations.
- F. Epoxy grouts are self curing and do not require the application of water. Maintain the formed grout within its recommended placement temperature range for at least 24 hours after placing, or longer if recommended by the manufacturer.

### 3.5 INSTALLATION - CONCRETE GROUT

- A. Screed underlying concrete to the grade shown on the Drawings. Provide the surface with a broomed finish, aligned to drain. Protect and keep the surface clean until placement of concrete grout.
- B. Remove the debris and clean the surface by sweeping and vacuuming of all dirt and other foreign materials. Wash the tank slab using a strong jet of water. Flushing of debris into tank drain lines will not be permitted.
- C. Saturate the concrete surface for at least 24 hours prior to placement of the concrete grout. Saturation may be maintained by ponding, by the use of soaker hoses, or by other methods acceptable to the Engineer. Remove excess water just prior to placement of the concrete grout. Place a cement slurry immediately ahead of the concrete grout so that the slurry is moist when the grout is placed. Work the slurry over the surface with a broom until it is coated with approximately 1/16 to 1/8-in thick cement paste. (A bonding grout composed of 1 part portland cement, 1.5 parts fine sand, an approved bonding admixture and water, mixed to achieve the consistency of thick paint, may be substituted for the cement slurry.)
- D. Place concrete grout to final grade using the scraper mechanism as a guide for surface elevation and to ensure high and low spots are eliminated. Unless specifically approved by the equipment manufacturer, mechanical scraper mechanisms shall not be used as a finishing machine or screed.
- E. Provide grout control joints as indicated on the Drawings.
- F. Finish and cure the concrete grout as specified for cast-in-place concrete.

### 3.6 SCHEDULE

- A. The following list indicates where the particular types of grout are to be used:
  - 1. General purpose nonshrink cementitious grout: Use at all locations where non shrink grout is called for on the plans except for base plates greater in area than 3-ft wide by 3-ft long and except for the setting of anchor rods, anchor bolts or reinforcing steel in concrete.

2. Flowable nonshrink cementitious grout: Use under all base plates greater in area than 3-ft by 3-ft. Use at all locations indicated to receive flowable nonshrink grout by the Drawings. The Contractor, at his/her option and convenience, may also substitute flowable nonshrink grout for general purpose nonshrink cementitious grout.
3. Nonshrink epoxy grout: Use for the setting of anchor rods, anchor bolts and reinforcing steel in concrete and for all locations specifically indicated to receive epoxy grout.
4. Cement grout: Cement grout may be used for grouting of incidental base plates for structural and miscellaneous steel such as post base plates for platforms, base plates for beams, etc. It shall not be used when nonshrink grout is specifically called for on the Drawings or for grouting of primary structural steel members such as columns and girders.
5. Concrete grout: Use for overlaying the base concrete to allow more control in placing the surface grade and elsewhere as shown on the Drawings.

**END OF SECTION**

## SECTION 03740 - MODIFICATIONS AND REPAIR TO EXISTING CONCRETE

### PART 1 GENERAL

#### 1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and cut, chip, repair, demolish, excavate, or otherwise modify parts of existing structures or appurtenances as shown on the sketches and as specified herein.
- B. Work under this Section shall include repairs to existing deteriorated concrete. Repairs are separated into three basic categories as follows:
  - 1. Surface deterioration, greater than 1/2" and less than 2" depth, no exposed rebar.
  - 2. Surface deterioration, greater than 2" and less than 3", with exposed rebar, no rebar deterioration.
  - 3. Surface deterioration, greater than 3" to maximum 16" with exposed, deteriorated and/or missing rebar.

#### 1.2 RELATED WORK

- A. Cast-In-Place Concrete is included in Section 03301.
- B. Grout is included in Section 03600.

#### 1.3 GENERAL

- A. No existing structure or concrete shall be shifted, cut, removed, or otherwise altered until written authorization is given by the Engineer.
- B. When removing materials or portions of existing structures and when making openings in existing structures, take all precautions and use all necessary barriers and other protective devices so as not to damage the structures beyond the limits necessary for the new work, nor to damage the structures or contents by falling or flying debris. Unless otherwise permitted, line drilling will be required in cutting existing concrete.
- C. Manufacturer qualifications: The manufacturer of the specified products shall have a minimum of 10 years experience in the manufacture of such products and shall have an ongoing program of training, certifying and technically supporting the Contractor's personnel.
- D. Contractor qualifications: Contractors shall complete a program of instruction in the application of the approved manufacturer's material and provide certification from the manufacturer attesting to their training and status as an approved applicator.
- E. Furnish a notarized certificate stating that the materials specified meet the project requirements and submit the manufacturer's current printed literature on the specified product.

## 1.4 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
1. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
  2. ASTM D1653, Method B - Standard Test Method for Water Vapor Permeability of Organic Coating Films.
  3. ASTM D 790 - Standard Test Method for flexural properties of unreinforced and reinforced plastics and electrical insulating materials.
  4. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
  5. ASTM D732 - Standard Test Method for Shear Strength of Plastics by Punch Tool
  6. ASTM D695 - Standard Test Method for Compressive Properties Rigid Plastics.
  7. ASTM C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear
  8. ASTM D1525 - Standard Test Method for Vicat Softening Temperature of Plastics.
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Epoxy Bonding Compound:
1. The epoxy bonding compound shall be furnished in two components for combining immediately prior to use in accordance with the manufacturer's written instructions and as specified herein.
  2. The components of the epoxy resin system shall conform to the following requirements:
    - a. Component A - Component A shall be a modified epoxy resin of the epichlorohydrin bisphenol A condensation type, containing suitable viscosity control agents and having an epoxide equivalent of 180 to 200.
    - b. Component B - Component B shall be primarily a reaction product of an alkyl glycidyl ether and a polyfunctional aliphatic amine containing suitable viscosity agents modified with 2, 4, 6 tri (dimethylamino-methyl) phenol.
    - c. The component ratio of B:A shall be 1:1 by volume.
    - d. The resultant compound shall be polysulfide free.
  3. Properties of Mixed Components:
    - a. Solids Content: 100 percent by weight
    - b. Pot Life: 20 to 30 minutes at 73 Degrees F
    - c. Tack-Free Time (thin film): 3 to 5 hrs at 73 Degrees F
    - d. Final Cure ASTM D695: 3 days at 73 Degrees F
  4. (ASTM D695 percent ultimate strength)
    - a. Initial Viscosity (A+B): 2400 to 3200 cps minimum at 73 Degrees F
    - b. Color mixed: Straw
  5. Properties of Cured Material:

- a. Neat Material
- b. Tensile Strength: 5300 psi minimum at
- c. (ASTM D638) 14 days 73 Degrees F cure
- d. Tensile Elongation: 4.8 percent at 14 days,
- 6. (ASTM D638 modified) 73 Degrees F cure
- a. Compressive Strength: 7000 psi minimum at
- 7. (ASTM D695) 28 days 73 Degrees F cure
- a. Compressive Modulus: 250,000 psi minimum at
- b. (ASTM D695) 1.0 percent maximum
- 8. (ASTM D570)
- a. Bond Strength: 1500 psi minimum at
- 9. (Plastic to Hardened) 14 days, 73 Degrees F cure
- a. Deflection Temperature: 180 Degrees F minimum
- 10. (ASTM D1525)
- 11. Epoxy bonding compound shall be Sikadur Hi-Mod as manufactured by Sika Chemical Corp., Lyndhurst, N.J.; W.R. Grace Co., Cambridge, MA; Adhesive Engineering Co., Lawrence, MA or equal.

B. Epoxy Paste

- 1. General
  - a. Epoxy Paste shall be a two-component, solvent-free, asbestos free, moisture insensitive epoxy resin material used to bond dissimilar materials to concrete such as setting railing posts, dowels, anchor bolts and all-threads into hardened concrete and shall comply with the requirements of ASTM C881, Type I, Grade 3 and the additional requirements specified herein. It may also be used to patch existing surfaces where the glue line is 1/8-in or less.
- 2. Material
  - a. Properties of the cured material:
    - 1) Compressive Properties (ASTM D695): 10,000 psi minimum at 28 days.  
Tensile Strength (ASTM D638): 3,000 psi minimum at 14 days.  
Elongation at Break - 0.3 percent minimum.
    - 2) Flexural Strength (ASTM D790 - Modulus of Rupture): 3,700 psi minimum at 4 days.
    - 3) Shear Strength (ASTM D732): 2,800 psi minimum at 14 days.
    - 4) Water Absorption (ASTM D570): 1.0 percent maximum at 7 days.
    - 5) Bond Strength (ASTM C882): 2,000 psi at 14 days moist cure.
    - 6) Color: Concrete grey.
- 3. Approved manufacturer's include:
  - a. Overhead applications: Sika Corporation, Lyndhurst, NJ - Sikadur Hi-mod LV 31; Master Builders, Inc., Cleveland, OH - Concreative 1438 or equal.
  - b. Sika Corporation, Lyndhurst, N.J. - Sikadur Hi-mod LV 32; Master Builders, Inc., Cleveland, OH - Concreative 1438 or equal.

C. Non-Shrink Precision Cement Grout, Non-Shrink Cement Grout, Non-Shrink Epoxy Grout and Polymer Modified mortar are included in Section 03600 GROUT.

D. Adhesive Capsule type anchor system shall be equal to Molly parabond two part stud and capsule system by Emhart, Temple, PA or the HVA adhesive Anchoring System by Hilti Fastening Systems, Tulsa, OK. The capsule shall consist of a sealed

glass capsule containing premeasured amounts of a polyester or vinyl ester resin, quartz sand aggregate and a hardener contained in a separate vial within the capsule.

E. Crack Repair Epoxy Adhesive

1. General

- a. Crack Repair Epoxy Adhesive shall be a two-component, solvent-free, moisture insensitive epoxy resin material suitable for crack grouting by injection or gravity feed. It shall be formulated for the specific size of opening or crack being injected.

2. Material

a. Properties of the cured material

- 1) Compressive Properties (ASTM D695): 10,000 psi minimum at 28 days.
- 2) Tensile Strength (ASTM D638): 5,300 psi minimum at 14 days. Elongation at Break - 2 to 5 percent.
- 3) Flexural Strength (ASTM D790 - Modulus of Rupture): 12,000 psi minimum at 14 days (gravity); 4,600 psi minimum at 14 days (injection)
- 4) Shear Strength (ASTM D732): 3,700 psi minimum at 14 days.
- 5) Water Absorption (ASTM D570 - 2 hour boil): 1.5 percent maximum at 7 days.
- 6) Bond Strength (ASTM C882): 2,400 psi at 2 days dry; 2,000 psi at 14 days dry plus 12 days moist.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Cut, chip, repair, reuse, demolish, excavate or otherwise modify parts of the existing structures or appurtenances, as indicated on the sketches, specified herein, or necessary to permit completion of the Work. All work shall comply with other requirements of this of Section and as shown on the sketches.
- B. All commercial products specified in this Section shall be stored, mixed and applied in strict compliance with the manufacturer's recommendations.
- C. In all cases where concrete is repaired in the vicinity of an expansion joint or control joint the repairs shall be made to preserve the isolation between components on either side of the joint.
- D. When drilling holes for dowels/bolts at new or existing concrete, drilling shall stop if rebar is encountered. As approved by the Engineer, the hole location shall be relocated to avoid rebar. Rebar shall not be cut without prior approval by the Engineer. Where possible, rebar locations shall be identified prior to drilling using "rebar locators" so that drilled hole locations may be adjusted to avoid rebar interference.

### 3.2 REPAIRING EXISTING CONCRETE

- A. Remove all deteriorated materials, dirt, oil, grease, and all other bond inhibiting materials from the surface by mechanical means, i.e. - waterblasting, sandblasting, grinding, etc, as approved by the Engineer. Be sure the areas are not less than 1/2-in in depth. Irregular voids or surface stones need not be removed if they are sound, free of laitance, and firmly embedded into parent concrete, subject to the Engineer's final inspection.
- B. If reinforcing steel is exposed, it must be mechanically cleaned to remove all contaminants, rust, etc, as approved by the Engineer. If half of the diameter of the reinforcing steel is exposed, chip out behind the steel. The distance chipped behind the steel shall be a minimum of 1/2-in. Reinforcing to be saved shall not be damaged during the demolition operation.
- C. After cleaning the exposed reinforcement it is determined that more than ¼ of the effective cross sectional area has been lost, chip the concrete back along the bar a minimum of 18 bar diameters in each direction from the damaged section and replace the bar with new reinforcement of similar size. Lap the new bar 18 diameters to the exposed non-corroded section. Alternatively, contractor may drill and epoxy grout new rebar in to sound concrete adjacent to deteriorated bar. Embed new bar per grout manufacturer's requirements.
- D. Thoroughly wash the roughened concrete surfaces and keep the surfaces saturated for at least 6 hours before placing new concrete. All free water shall be removed prior to placing the concrete. An epoxy bonding compound as specified may be used in lieu of saturating surface for 6 hours in accordance with repair material manufacturer's requirements.
- E. Repair mortar, shall be placed/pumped to a thickness to match the existing surface.
  - 1. Repair mortar shall be Nonshrink cementitious grout as specified in Section 03600.
- F. When the finish surface is not specified to be lined the color of new concrete in the exposed surfaces shall match the color of the existing adjoining concrete as closely as possible.

### 3.3 CRACK REPAIR

- A. Cracks on horizontal surfaces shall be repaired by gravity feeding crack sealant into cracks per manufacturer's recommendations. If cracks are less than 1/16-in in thickness they shall be pressure injected.
- B. Cracks on vertical surfaces shall be repaired by pressure injecting crack sealant through valves sealed to surface with crack repair epoxy adhesive per manufacturer's recommendations.

**END OF SECTION**

**SECTION 16010  
ELECTRICAL GENERAL REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 SCOPE OF WORK**

- A. The general provisions of the Contract, including General Conditions, apply to all the work specified in the Electrical 1600 Sections.
- B. It is the intent of the Specifications to construct a complete and working installation. Items of equipment or materials which may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically stated herein.

**1.2 LAWS, PERMIT, FEES, AND NOTICES**

- A. Secure and pay all permits, fees and licenses necessary for the proper execution and completion of the work. Submit all notices and comply with all laws, ordinances, rules and regulations of any public agency bearing on the work, this shall include but not be limited to the authority having jurisdiction over the work.

**1.3 DEPARTURES**

- A. If any departures from the Contract Drawings or Specifications are deemed necessary, details of such departments and the reasons therefore shall be submitted as soon as practicable to the Engineer for advance written approval.

**1.4 BASIS FOR WIRING DESIGNS**

- A. The Contract Drawings and Specifications describe specific size of switches, breakers, fuses, conduits, conductors, motor starters, and other items of wiring equipment. These sizes are based on specific items of power consuming equipment (heaters, lights, motors for fans, compressors, pumps, etc.). Wherever another trade provides power consuming equipment which differs from Drawings and Specifications, the wiring for such equipment shall be changed to proper sizes to match at no additional expense to the City.

**1.5 GUARANTEES**

- A. Final Acceptance – Furnish written guarantee covering all materials, workmanship, and equipment for a period of one (1) year from the date of acceptance as described in the Contract General Conditions.
- B. The City reserves the right to operate and use all materials and equipment failing to meet the requirement of the Contract Documents until such unacceptable materials and equipment are replaced or repaired to the satisfaction of the Engineer.
- C. Provide certificate of proper installation from the manufacture or vendors of major equipment.

**1.6 AS BUILT INFORMATION**

- A. A set of “red-lined” electrical drawings shall be carefully maintained at the job site. Actual conditions are to be put on the drawings in red on a daily basis so the drawings will continuously show locations and routings of cable trays, conduits, pull boxes, circuit numbers, and other information required by the Engineer. After completion of the project, a set of “red-lined” electrical drawings shall be submitted to the Engineer.

#### **1.7 JOB SITE VISIT**

- A. Visit the project site before submitting a bid. Verify all dimensions shown on the contract drawings and determine the characteristics of existing facilities which will affect performance of the work, which are not shown on drawings or described within these specifications.
- B. The electrical drawings were developed from past record drawings and information furnished by the owner. Verify all scaled dimensions prior to submitting bids.
- C. Before submitting a bid, visit the site and determine conditions at the site and at all existing structures in order to become familiar with all existing conditions and electrical systems which will, in any way or manner, affect the work required under this Contract. No subsequent increase in Contract cost will be allowed for additional work required because of the Contractor’s failure to fulfill this requirement.
- D. After award of Contract, confer with the Engineer to verify at each area of construction activity the location of existing underground utilities. Protect all existing underground utilities during construction. Pay for all required repairs without increase in Contract cost should damage to underground utilities occur during construction.

#### **1.8 CLEANUP**

- A. Maintain a continuous cleanup during the progress of the work and use appointed storage areas for supplies. The premises shall be kept free from accumulations of waste materials and rubbish.

#### **1.9 CUTTING AND PATCHING**

- A. Cut and prepare all openings, chases and trenches required for the installation of equipment and materials. Repair, remodel and finish in strict conformance with the quality of workmanship and materials in the surrounding. Obtain written permission from the Engineer for any alterations to structural members before proceeding. All penetrations through fire walls shall be sealed to maintain the fire integrity of the wall.
- B. Installations including but not limited to, raceway systems and supports shall be completed in a fashion to avoid creating tripping hazards. Reroute any installation at the discretion of the Engineer should it be necessary. The cost of the alternate such as core drilling shall be in this contract.

#### **1.10 MAINTENANCE**

- A. Render all necessary measures to ensure complete protection and maintenance of all systems, materials, and equipment prior to final acceptance. Any materials or equipment not properly maintained or protected to assure a factory new condition at the time of final

acceptance shall be replaced immediately with new equipment, at no additional cost to the City.

#### **1.11 WATERPROOFING**

- A. Whenever any work penetrates any waterproofing, seal and render the work waterproof. All work shall be accomplished so as not to void or diminish any waterproofing bond or guarantee.

#### **1.12 TESTS**

- A. The equipment shall be demonstrated to operate in accordance with the requirements of these specifications. The test shall be performed in the presence of the Engineer or an authorized representative. The electrical contractor shall furnish all instruments, electricity and personnel required for the test specified elsewhere in these specifications. The electrical contractor shall schedule manufacturer's representatives to be present as required.

#### **1.13 POWER OUTAGES**

- A. The work shall be coordinated to require a minimum amount of time for power outages. The electrical contractor shall furnish all equipment, temporary power, portable generators and personnel required during the power outages. Requests shall be made in writing to the City at least 48 hours prior to the outage.
- B. Carry out any work involving the shutdown of the existing services to any piece of equipment now functioning in existing areas at such time as to provide the least amount of inconvenience to the City. Do such work when directed by the Engineer.

#### **1.14 SUMMARY OF ELECTRICAL WORK**

- A. Provide all labor, materials, tools, supplies, equipment and temporary utilities to complete the work shown on the drawings and specified herein. All systems are to be completely installed and fully operational. The work comprises of at least:
  - 1. Power/control wiring installation and connection
  - 2. Raceway systems including duct banks
  - 3. Temporary power as required
  - 4. Grounding and bonding
  - 5. Testing of all systems
  - 6. Miscellaneous
  - 7. Electrical testing

#### **1.15 ELECTRICAL COORDINATION**

- A. The electrical contractor is responsible for coordination with the City, Engineers, other trades, the power company and the telephone company on all matters which have a bearing on the electrical work.
- B. The contract drawings indicate the extent, the general location and arrangement of equipment, conduit and wiring. Study the contract drawings, including details, so that equipment shall be properly located and readily accessible. Locate all electrical equipment to avoid interference with mechanical and/or structural features. Make necessary changes in spacing and location

of lighting fixtures, panelboards, cabinets, receptacles, and other items of equipment provided that the overall patterns of layouts are not disrupted and remain uniform.

- C. Coordinate with instrumentation contractor. Electrical contractor shall provide all conduit systems, wiring and terminations for instrumentation. Instrumentation contractor will supervise installation and termination. The electrical contractor shall further coordinate with all other divisions to assure proper interfacing of all equipment being furnished.

## **1.16 CODES AND STANDARDS**

- A. General – Applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical work (in addition to specific applications specified by individual work sections of these specifications):
  1. U.L.: Electrical materials shall be approved by the Underwriter's Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
  2. National Electric Code.
  3. OSHA: Standards of the Occupational Safety and Health Administration are to be complied with.
  4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency, and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers, and fuses.
  5. ANSI: American National Standards Institute
  6. NESC: National Electrical Safety Code
  7. NECA: National Electrical Contractors Association
  8. IEEE: Institute of Electrical and Electronic Engineers

## **1.17 ELECTRICAL TEMPORARY FACILITIES**

- A. The electrical contractor shall include in his bid the cost of furnishing, installing, maintaining, and removing all materials and equipment required to provide temporary light and power to perform the work of all trades during construction and until work is completed, including the supply, operation and maintenance of portable generators if required. Adequate lighting and receptacle outlets for operation of hand tools shall be provided throughout the project, including shanties, trailers, field offices, temporary toilet enclosures, and shall be extended as construction progresses.
- B. Electrical Safety:
  1. All responsibility for electrical safety to protect workers and the public from electrical shock and any hazard shall be by the electrical contractors.
  2. All reasonable safety requirements shall be observed to protect workers and the public from shock and fire hazards.

## **1.18 EXCAVATING FOR ELECTRICAL WORK**

- A. General – Excavation or drilling, backfill and repair of paving and grassing is to be in the bid of the electrical contractor. The actual work need not be performed by electrical trades. However, the electrical contractor is responsible for all excavation, drilling, dewatering, backfilling, tamping, and repair of pavements and grassing required in support of electrical work. All areas disturbed by electrical work shall be repaired to their original condition, or as indicated on the drawings.
- B. Coordination:
1. The electrical contractor must check for existing utilities before commencing any excavation or drilling.
  2. Contract drawings and other trades are to be consulted to avoid interferences with other utilities on this project.
  3. In the event of damage to existing utilities, the Engineer shall be immediately notified, and damage shall be immediately repaired by the Contractor with no expense to the City.
  4. The City is to be consulted to ascertain locations of existing interferences by referring to “As-Built” drawings and City’s experience. The excavations are to be scheduled at the City’s convenience.
  5. Exploratory excavation such as pot holing may be required to avoid damage to existing utilities and equipment. The cost of all exploration shall be included in this bid.
- C. Precautions – The electrical contractor must take every reasonable precaution to avoid interferences. In the vicinity of a suspected interference, excavations shall be dug by hand.
- D. Excavating, Drilling and Backfilling
1. All excavating and trenching shall be done after being verified by Sunshine.
  2. Do not excavate for electrical work until the work is ready to proceed without delay, so that the total time lapse from excavation to completion of backfilling will be minimum.
  3. Excavate with vertical-sided excavations to the greatest extend possible, except where otherwise indicated. Where necessary, provide sheeting and cross-bracing to sustain sides of excavations, and to avoid damage to adjacent structures such as tanks, buildings, and etc. Remove sheeting and cross-bracing during backfilling wherever such removal will not endanger the work or other property. Where not removed, cut sheeting off at a sufficient distance below finished grade to not interfere with other work.
  4. Locate and protect existing utilities and other underground work in a manner which will ensure that no damage or service interruption will result from excavating and backfilling.
  5. Protect property from damage which might result from excavating and backfilling.
  6. Dewater excavations as necessary. Protect excavations from inflow of surface water. Pump minor inflow of ground water from excavations; protect excavations and below grade property from being damaged by water, sediment or erosion from or through electrical work excavations.

7. No organic material is permitted in backfill. All vegetation, peat, sod, or other organic matter shall be removed from the premises. Except under roadways, backfill materials shall be clean sand. No debris or trash may be used as backfill.
8. Under roadways, backfill material shall be the same as comprising the road bed.
9. Backfill excavations in 8" high courses of backfill material, uniformly compacted to 95% density per ASTM Standard D 1557 using power-driven hand-operated compaction equipment. Watering backfill is not an adequate method of compaction. All work shall meet standards in Division 02200 and 02221.
10. Backfill to elevations matching adjacent grades, at the time of backfilling excavations for electrical work. Where subsidence is measurable or observable at electrical work excavations during the warranty period, remove the surface (pavement, lawn, or other finish) add backfill material, compact, and replace the surface treatment. Restore the appearance, quality, and condition of the surface or finish to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.
11. Where excavation and backfill for electrical work pass through or occur in a landscaped area, repair or replace the landscape work to match the original condition and quality of the work.
12. Where excavation and backfill for electrical work pass through or occur in an area of paving or flooring, replace and restore the construction and finish of paving or flooring to match the original condition and quality of the work.

**1.19 ELECTRICAL SUBMITTALS**

A. Submittals for Approval:

1. Refer to Contract General Conditions for additional instructions on submittals and substitutions. Where conflicts occur between the General Conditions and this Section, the more stringent requirements shall apply.
2. Shop Drawings and manufacturer's data sheets are required for all electrical materials.
3. Submittals will not be accepted for partial systems. Submit all materials for each specifications section at one time. Submittals must be arranged, correlated, indexed, and bound in orderly sets for ease of review.
4. Samples are to be supplied for any substitute as requested by the Engineer.
5. The following numbers of copies are required:

Shop Drawings	4 sets
Samples	1 each
Manufacturer's data	4 sets
Certifications	4 sets
Test reports	4 sets
Warranties/Guarantees	4 sets

6. Submit shop drawings, manufacturer's data, and certifications on all items of electrical work prior to the time such equipment and materials are to be ordered. Order no equipment or materials without approval from the Engineer. Submittals will not be accepted for partial system submittals; submit all data at one time. Submittals will be promptly returned, approved, approved as noted, or not approved. Items "approved as noted" must be changed to comply with the Engineer's comments and need not be resubmitted for "approved" status. Items "not approved" are not suitable, requiring complete new submittals.
7. Time delays caused by rejection of submittals are not cause for extra charges to City or time extensions.

**B. Maintenance Manuals**

1. Submit to the City three (3) copies and to the Engineer one (1) copy of all manufacturer's services, installation and operation manuals, instructions and bulletins. Service manuals must contain, but are not limited to, the following:
  - a. Brief description of system and basic features.
  - b. Manufacturer's name and model numbers of all components of the system.
  - c. List of local factory authorized service companies.
  - d. Operating instructions, including preparation for starting up, seasonal changes, shut down and service.
  - e. Maintenance instructions.
  - f. Possible breakdowns and repairs.
  - g. Manufacturer's literature describing each piece of equipment.
  - h. Control diagrams by the control manufacturer.
  - i. Description of sequence by the control manufacturer.
  - j. Parts list.
  - k. Wiring diagrams.

**C. Spare Parts**

Submit a list of recommended spare parts for all major items of equipment – include description of each part, part number and cost.

**PART 2 – PRODUCTS**

**2.1 ELECTRICAL PRODUCTS**

**A. Standard Products**

1. Unless otherwise indicated in writing by the Engineer, the products to be furnished under this specification shall be the manufacturer's latest design. Where two or more units of the same class of equipment are required, these units shall be products of the same manufacturer. Units of equipment and components of the same purpose and rating shall be interchangeable throughout the project.
2. All products shall be newly manufactured. Defective equipment or equipment damaged in the course of installation or test, shall be replaced or repaired in a manner meeting with the

approval of the Engineer, at no additional expense to the City. B. Delivery, Storage, and Handling – Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identification; adequately packaged or protected to prevent deterioration during shipment, storage and handling. Store in a dry, well ventilated, indoor space, except where prepared and protected by the manufacturer specifically for exterior storage. Comply with City’s instructions for storage locations. Connect all temporary space heaters (which are part of the permanent installation) at the time equipment is delivered on site.

C. Substitutions – Comply with instructions in the Contract General Conditions and Special Conditions regarding substitutions.

## 2.2 ELECTRICAL IDENTIFICATION

A. Color Coding – Conductor colors shall be in accordance with the N.E.C., local agencies and NFPA requirements. Refer also to applicable sections of these specifications. Three phase feeder and branch circuits shall be identified as follows:

<u>120 / 208</u>	<u>277 / 480</u>
A – Black	A – Brown
B – Red	B – Purple
C – Blue	C – Yellow
Neutral – White	Neutral – Grey

Green or bare for grounding conductors  
Green with yellow trace: Special Grounding

B. Nameplates

1. The following items shall be equipped with nameplates: All motors, motor starters, motor control centers, pushbutton stations, control panels, time switches, disconnect or relays in separate enclosures, receptacles, wall switches, panelboards, switchboards instrumentation cabinets, high voltage boxes and cabinets. All light switches and outlets shall carry a phenolic plate with the supply circuit number engraved. Special electrical systems shall be identified at junction and pull boxes, terminal cabinets, and equipment racks.

2. Nameplates shall adequately describe the function of the particular equipment involved. Nameplates for panelboards and switchboards shall include the panel designation, voltage and phase of the supply. For example, “Panel A, 277/480V, 3-phase, 4-wire”. The name of the machine on the motor nameplates for a particular machine shall be the same as the one used on all motor starters, disconnect and F.L. STATION NAMEPLATES FOR THAT MACHINE. Normal power nameplates shall be laminated phenolic plastic, white front and back with black core, with lettering etched through the outer covering; black engraved letters on white background. Lettering shall be 3/16 inch high at pushbutton stations, thermal overload switches, receptacles, wall switches and similar devices, where the nameplate is attached to the device plate. AT all other locations, lettering shall be ¼ inch high, unless otherwise detailed on the Drawings. Nameplates shall be securely fastened to the equipment with No. 4 Phillips, round-head, cadmium plated, steel self-tapping screws or nickel-plated brass bolts. Motor nameplates may be non-ferrous metal not less than 0.03 inch thick, die stamped. In lieu of separate plastic nameplates, engraving

directly on device plates is acceptable. Engraved lettering shall be filled with contrasting enamel. Equipment nameplate schedule for all equipment shall be submitted with shop drawing submittal for Engineer's approval.

3. All junction and splice boxes shall be labeled using permanent shipping tags attached to boxes; not covers.
- C. Wire and Cable Identification – All wire and cable shall be identified at each termination point and at each pull box, splice box, junction box, or manhole. Provide permanent, waterproof, non-metallic heat shrinkable tube cable markers in 3/16 inch letters.
- D. Signs – Warning signs shall comply with OSHA requirements and reasonable safety precautions.
- E. Underground Identification – During backfilling of each exterior underground electrical, signal, or communication cable, conduit, or ductbank, install a continuous underground-type plastic with foil backed line, marker, located directly over the buried line at six (6) inches to eight (8) inches below finished grade.
- F. Rubber Mat – Provide U.L. approved rubber mat running the full length on all switchboards, MCC's, control panels, etc.

## **PART 3 – EXECUTION**

### **3.1 TESTS**

- A. Carry out tests specified hereinafter and as indicated under individual items of materials and equipment specified in other sections and in Section 16950, Electrical Testing. Coordinate tests performed by manufacturer, suppliers, and equipment representatives of other equipment containing electrical apparatus.

### **3.2 OPERATIONS**

- A. After the electrical system installation is completed and at such time as the Engineer may indicate, conduct an operating test for approval. Demonstrate that the equipment operate in accordance with the requirements of these Specifications and Drawings. Demonstrate that protective functions are operating properly and are properly incorporated in control system, circuit breaker, and motor control center circuitry. Perform the test in the presence of the Engineer. Furnish all instruments and personnel required for the tests. The City will furnish the necessary electric power.

### **3.3 VOLTAGE**

- A. When the installation is essentially complete and the plant is in operation, check the voltage at the point of termination of the power company supply system to the project. Check voltage amplitude and balance between phases for loaded and unloaded conditions.
- B. Record the supply voltage (all three phases simultaneous on the same graph) for 24 hours during a normal working day. Submit the recording with a letter of transmittal to the City and

the Engineer within 5 days of the date the test was taken. If an unbalance (as defined by NEMA) exceeds 1 percent, or if the voltage varies throughout the day and from loaded to unloaded conditions more than plus or minus 4 percent of nominal, make a written request to the power company, with a copy to the Engineer, that the condition be corrected. If corrections are not made, obtain from a responsible power company official a written statement that the voltage variations and/or unbalance are within their normal standards. Send a copy of this statement with a transmittal letter to the Engineer.

### **3.4 EQUIPMENT LINE CURRENT**

- A. Check the line current in each phase for each piece of equipment. If the power company makes adjustments to the supply voltage magnitude or balance, make the line current check after the adjustments are made. If any phase current in any piece of equipment is above the rated nameplate current, determine the cause of the problem and submit it in writing to the Engineer.
- B. Tests Reports – Submit written test results in a format by phase to phase and phase to ground, for voltage and each phase for current. The format for these submittals test results will be provided to the Engineer.

**END OF SECTION 16010**

**SECTION 16470  
PANEL BOARDS**

**PART 1 - GENERAL**

**1.1 SCOPE OF WORK**

- A. The Contractor shall furnish materials and labor to energize the existing panel boards as specified and as shown on the contract drawings.

**1.2 REFERENCES**

- A. The panel boards and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of NEMA and UL as follows:
  - 1. UL 67 – Panel Boards
  - 2. UL 50 – Cabinets and boxes
  - 3. NEMA PB1
  - 4. Fed. Spec. W-P-115C
  - 5. Circuit Breaker – Type 1 Class 1
  - 6. Fusible switch – Type II Class 1

**1.3 SUBMITTALS FOR REVIEW/APPROVAL**

- A. The following information shall be submitted to the Engineer:
  - 1. Breaker layout drawing with dimensions indicated and nameplate designation.
  - 2. Component list
  - 3. Conduit entry / exit locations
  - 4. Assembly ratings including:
    - a. Short-circuit rating
    - b. Voltage
    - c. Continuous current
  - 5. Cable terminal sizes
  - 6. Product data sheets.
- B. Where applicable, the following additional information shall be submitted to the Engineer:
  - 1. Key interlock scheme drawing and sequence of operations.

**1.4 SUBMITTALS – FOR CONSTRUCTION**

- A. The following information shall be submitted for record purposes:
  - 1. Final as-built drawings and information for items listed in paragraph 1.04.
  - 2. Installation information.
  - 3. Seismic certification and equipment anchorage details.
- B. The Final (as-built) drawings shall include the same drawings as the construction drawings, and shall incorporate all changes made during the manufacturing process.

## **1.5 QUALIFICATIONS**

- A. The manufacturer of the panel board shall be the manufacturer of the major components within the assembly, including circuit breakers and fusible switches.
- B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.
- C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- D. The equipment and major components shall be suitable for and certified to meet all applicable seismic requirements of Uniform Building Code (UBC) for zone 4 application. Guidelines from the installation consistent with these requirements shall be provided by the switch gear manufacturer and be based upon testing of representative equipment. The test response spectrum shall be based upon a 5% minimum damping factor, UBC: a peak of 2.15 g's (3.2-11 Hz), and a ZPA of 0.86 g's applied at the base of the equipment. The test shall fully envelop this response spectrum for all equipment natural frequencies up to at least 35 Hz.
- E. The following minimum mounting and installation guidelines shall be met, unless specifically modified by the above referenced standards.
  - 1. The Contractor shall provide equipment anchorage details, coordinated with the equipment mounting provision, prepared and stamped by a licensed civil engineer in the state. Mounting recommendations shall be provided by the manufacturer based upon approved shake table tests used to verify the seismic design of the equipment.
  - 2. The equipment manufacturer shall certify that the equipment can withstand, that is, function following the seismic event, including both vertical and lateral required response spectra as specified in above codes.
  - 3. The equipment manufacturer shall document the requirements necessary for proper seismic mounting of the equipment. Seismic qualification shall be considered achieved when the capability of the equipment, meets or exceeds the specified response spectra.

## **1.6 REGULATORY REQUIREMENTS**

- A. The panel boards shall be UL labeled.

## **1.7 DELIVERY, STORAGE AND HANDLING**

- A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

## **1.8 OPERATION AND MAINTENANCE MANUALS**

- A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts' lists where applicable, for the complete assembly and each major component.

## **PART 2 – PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Alan Bradley
- B. Square D Company
- C. General Electric

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer ten (10) days prior to bid date.

### **2.2 RATINGS**

- A. Panel boards rated 240V AC or less shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 10,000 amperes RMS symmetrical.
- B. Panel boards rated 480V AC shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 14,000 amperes RMS symmetrical.
- C. Panel boards shall be labeled with a UL short-circuit rating. When series ratings are applied with integral or remote upstream devices, a label or manual shall be provided. It shall state the conditions of the UL series ratings including:
  - 1. Size and type of upstream device
  - 2. Branch devices that can be used
  - 3. UL series short-circuit rating.

### **2.3 CONSTRUCTION**

- A. Interiors shall be completely factory assembled devices. They shall be designed such that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors.
- B. Trims for branch circuit panel boards shall be supplied with a hinged door over all circuit breaker handles. Doors in panel board trims shall not uncover any line parts. Doors shall have a semi flush cylinder lock and catch assembly. Doors over 48 inches in height shall have auxiliary fasteners.
- C. Distribution panel board trims shall cover all live parts. Switching device handles shall be accessible.
- D. Surface trims shall be same height and width as box. Flush trims shall overlap the box by  $\frac{3}{4}$  of an inch on all sides.

- E. A directory card with a clear plastic cover shall be supplied and mounted on the inside of each door.
- F. All locks shall be keyed alike.

## **2.4 BUS**

- A. Main bus shall be copper sized in accordance with UL standards to limit temperature rise on any current carrying part to a maximum of 65 degrees C above an ambient of 40 degrees C maximum.
- B. A system insulated, and isolated ground bus shall be included in all panels.
- C. Full-size (100%-rated) insulated neutral bars shall be included for panel boards shown with neutral. Bus bar taps for panels with single-pole branches shall be arranged for sequence phasing of the branch circuit devices. Neutral busing shall have a suitable lug for each outgoing feeder requiring a neutral connection. 200%-rated neutrals shall be supplied for panels designated on drawings with oversized neutral conductors.

## **2.5 BRANCH CIRCUIT PANEL BOARDS**

- A. The minimum short-circuit rating for branch circuit panel boards shall be indicated on the drawings. Panel boards shall be fully rated.
- B. Bolt-on type, heavy-duty, quick-make, quick-break, single- and multi-pole circuit breakers of the types specified herein, shall be provided for each circuit with toggle handles that indicate when unit has tripped.
- C. Circuit breakers shall be thermal-magnetic type with common type handle for all multiple pole circuit breakers. Circuit breakers shall be minimum 100-ampere frame and through 100-ampere trip sizes shall take up the same pole spacing. Circuit breakers shall be UL listed as type SWD for lighting circuits.
- D. Circuit breakers shall have a minimum interrupting rating of 10,000 amperes symmetrical at 240 volts, and 14,000 amperes symmetrical at 480 volts, unless otherwise noted on the drawings.

## **2.6 DISTRIBUTION PANELBOARDS – CIRCUIT BREAKER TYPE**

- A. Distribution panel boards with bolt-on devices contained therein shall have interrupting ratings as indicated on the drawings. Panel boards shall be fully rated. Panel boards shall have molded case circuit breakers as indicated below.
- B. Distribution panel boards with plug-on devices contained therein shall have interrupting ratings as indicated on the drawings. Panel boards shall be fully rated. Panel boards shall have molded case circuit breakers permanently affixed to plug-on breaker adapter, as indicated below.
- C. Where indicated, provide circuit breaker for application at 100% of their continuous ampere rating in their intended enclosure.

- D. Provide shunt trips, bell alarms, and auxiliary switches as shown on the contract drawings.

**2.7 MAIN AND FEEDER PROTECTIVE DEVICES**

**2.8 TRIP UNITS**

**2.9 DISTRIBUTION PANEL BOARDS – FUSIBLE SWITCH TYPE**

- A. Distribution panel boards shall have fusible switches as specified below and include fuses with ratings indicated on the drawings.

**2.10 MAIN AND FEEDER PROTECTOR DEVICES**

**2.11 Not Used**

**2.12 TRANSIENT VOLTAGE SURGE SUPPRESSION**

- A. Provide transient voltage surge protection as specified in Section 16671.

**2.13 ENCLOSURE**

- A. Enclosures shall be at least 20 inches wide made from galvanized steel. Provide minimum gutter space in accordance with the National Electrical Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.

**2.14 NAMEPLATES**

- A. Provide an engraved nameplate for each panel section.

**2.15 FINISH**

- A. Surfaces of the trim assembly shall be properly cleaned, primed, and a finish coat of gray ANSI 61 paint applied.

**PART 3 – EXECUTION**

**3.1 FACTORY TESTING**

- A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

**3.2 INSTALLATION**

- A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawing.

**END OF SECTION 16470**

**SECTION 16950  
ELECTRICAL TESTING**

**PART 1 - GENERAL**

**1.1 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

**1.2 SUBMITTALS**

- A. Administrative Submittals: Submit 10 days prior to performing inspections or tests:
  - 1. Schedule for performing inspection and tests.
  - 2. List of references to be used for each test.
  - 3. Sample copy of equipment, materials specifications and forms.
  - 4. Sample copy of individual device test form.
  - 5. Sample copy of individual system test form.
- B. Quality Control Submittals: Submit within 30 days after completion of test:
  - 1. Test or inspection reports and certificates for each electrical item tested.
- C. Contract Closeout Submittals:
  - 1. Operation and maintenance data.
  - 2. After test or inspection reports and certificates have been reviewed by the ENGINEER and returned, insert a copy of each in the operation and maintenance manual.

**1.3 SEQUENCING AND SCHEDULING**

- A. Perform inspection and electrical tests after equipment has been installed.
- B. Perform tests with apparatus de-energized whenever feasible.

- C. Inspection and electrical tests on energized equipment shall be:
1. Scheduled with the ENGINEER and OWNER prior to de-energization.
  2. Notify ENGINEER and OWNER at least 24 hours prior to performing tests on electrical equipment.
  3. Schedule and coordinate all required manufacturer's representatives.

#### 1.4 SPECIFIC TESTS

- A. Conductors 600 volts or less:
1. Perform insulation resistance testing of all power circuits below 600 volts with a 1000 Volt Megger.
  2. Prepare a written test report of the results and submit to Engineer prior to final inspection.
  3. Minimum acceptable value for insulation resistance is 1 megohm.
  4. Disconnect equipment that might be damaged by this test. Perform tests with all other equipment connected to the circuit.
  5. As part of final completion, and before schedule for substantial completion, contractor shall test all panels' feeder connections, incoming main feed locks, splices, and connections with infrared temperature sensing device to ensure all materials are not defective and all joints are tight.
- B. Grounding systems
1. Fall-of-Potential Test:
    - a. In accordance with IEEE 81, Section 8.2.1.5 for the measurement of the main systems ground resistance.
    - b. Main ground electrode system resistance to ground to be no greater than 5 ohms.
  2. Two-Point Direct Method Test:
    - a. In accordance with IEEE 81, Section 8.2.1.1 for measurement of ground resistance between main ground system, equipment frames, and system neutral and derived neutral points.
    - b. Equipment ground resistance shall not exceed main grounding resistance by 0.50 ohm.
  3. Control wiring test:
    - a. Apply secondary voltage to control power and potential circuits.
    - b. Check voltage levels at each point on terminal boards and each device terminal.
    - c. Insulation resistance test at 1,000 volts dc on control wiring except that connected to solid state components. Insulation resistance to be 1 megohm minimum.

4. Operational test by initiating control devices to affect proper operation.

**END OF SECTION 16950**

**SECTION 260500  
BASIC ELECTRICAL MATERIAL AND METHODS**

**PART 1 GENERAL**

**1.1 SCOPE OF WORK**

- A. Furnish Generator Set, all materials, labor, equipment and incidentals required to install an Emergency Power Source to supply power to the building during the FPL's power interruption. The scope of the work, per drawing and specification, includes, but is not limited to the following:
1. One 350 KW/480v/ 277v/ 3 Phase Diesel-Generator set with 500 gallon, steel Double wall sub base fuel tank.
  2. Reinforced concrete slab with ½ inch Neo Prin vibrating pad.
  3. One 800 480v/ 277v/ 3 Phase/ 4 wire Amps, 25 KAIC, NIMA 1, auto-transfer switch ATS per specification.
  4. Two sets of 3x300 MCM + 1 # 250 MCM + 1 # 2 GND of THHN Conductor in 3 inch conduit, buried in 24 inch depth from generator to new ATS in existing electrical room.
  5. Intercept existing FPL main feed in electrical room, reroute it to new ATS.
  6. All necessary wiring and connection of ATS to existing main panel in order to make project completed.
  7. Modify air conditioning power circuits with Time Delay Relays and set them in sequence of 1,2,3,4, and 5 minutes.
- B. The work, apparatus and materials which shall be furnished under these Specifications and accompanying Drawings shall include all items listed hereinafter and/or shown on the Drawings. Certain equipment which will require wiring thereto and/or complete installation is indicated. All materials necessary for the complete installation shall be furnished and installed by the CONTRACTOR to provide complete power, lighting, wiring and control systems as indicated on the Drawings and/or as specified herein.
- C. The CONTRACTOR shall furnish and install the necessary cables, protective devices, conductors, supports, raceways, exterior electrical system as indicated on the Drawings and/or as specified.
- D. The work shall include complete testing of all equipment and wiring at the completion of the work and making any minor connection changes or adjustments necessary for the proper functioning of the system and equipment. All workmanship shall be of the highest quality; sub-standard work will be rejected.
- E. Each bidder or his authorized representatives shall, before preparing his proposal, visit all areas of the existing buildings and structures in which work under this Section is to be performed and inspect carefully the present installation. The submission of the proposal by this bidder shall be considered evidence that he or his representative has visited the buildings and noted the locations and conditions under which the work will be performed and that he takes full responsibility for a complete knowledge of all factors governing his work.

- F. All power interruptions to existing equipment shall be at the OWNER's convenience. Each interruption shall have prior approval.
- G.. It is the intent of these Specifications that the electrical system shall be suitable in every way for the service required. All material and all work which may be reasonably implied as being incidental to the work of this Section shall be furnished at no extra cost.
- H. Furnish and install a complete underground system of ducts, manholes and handholes as herein specified and shown on the drawings.

## **1.2 SERVICE AND METERING**

- A. Permanent electrical power will be provided by the Florida Power & Light (FPL) at voltages indicated on the drawings.

## **1.3 CODES, INSPECTION AND FEES**

- A. All material and installation shall be in accordance with the latest edition of the National Electrical Code and all applicable national, local and state codes, laws and ordinances.
- B. Pay all fees required for permits and inspections.

## **1.4 TESTS**

- A. Test all systems and repair or replace all defective work. Make all necessary adjustments to the systems and instruct the OWNER's personnel in the proper operation of the systems.
- B. The following minimum tests and checks shall be made prior to the energizing of electrical equipment. Test shall be by the CONTRACTOR and a certified test report shall be submitted providing all test results and stating that the equipment meets and operates in accordance with the Manufacturer's and job specifications, and that equipment and installation conforms to all applicable Standards and Specifications.
  - 1. Testing all 600 volt wire insulation with a megohm meter after installation. Make tests at not less than 1000 volts. Submit a written test report of the results to the engineer.
  - 2. Mechanical inspection of all circuit breakers to assure proper operation.
- C. The Engineer shall be notified forty-eight (48) hours before tests are made to enable the Owner to have designated personnel present.

## **1 5 INTERPRETATION OF DRAWING**

- A. The Drawings are not intended to show exact locations of conduit runs.

- B. All three –phase circuits shall be run in separate conduits unless otherwise shown on the Drawings.
- C. Unless otherwise approved by the Engineer, conduit shown exposed shall be installed exposed; conduit shown concealed shall be installed concealed.
- D. Where circuits are shown as “home-runs,” all necessary fittings and boxes shall be provided for a complete raceway installation.
- E. All necessary offsets shall be furnished so as to take up a minimum space and all such offsets, fittings, etc., required to accomplish this shall be furnished and installed by the CONTRACTOR without additional expense to the Owner. In case interference develops, the Owner’s authorized representative is to decide which equipment, piping, etc., must be relocated, regardless of which was installed first
- F. Verify with the Engineer the exact locations and mounting heights of equipment, prior to installation.
- G. The locations of equipment shown on the Drawings are approximate only. Exact locations shall be as approved by the Engineer during construction. Obtain in the field all information relevant to the placing of electrical work and in case of any interference with other work, proceed as directed by the Engineer and furnish all labor and materials necessary to complete the work in an approved manner.
- H. Surface mounted panel boxes, junction boxes, conduit, etc., shall be supported by spacers to provide a clearance between wall and equipment.
- I. Circuit layouts shown are not intended to show the number of fittings, or other installation details. Furnish all labor and materials necessary to install and place in satisfactory operation all electrical systems shown. Additional circuits shall be installed wherever needed to conform to the specific requirements of the equipment.
- J. All connections to equipment shall be made as shown, specified and directed and in accordance with the approved shop drawings, regardless of the number of conductors shown on the Electrical Drawings

## **1.6 SIZE OF EQUIPMENT**

- A. The equipment shall be kept upright at all times. When equipment has to be tilted for ease of passage through restricted areas during transportation, the Manufacturer shall be required to brace the equipment suitably, to insure that the tilting does not impair the functional integrity of the equipment.

## **1.7 RECORD DRAWINGS**

- A. As the work progresses, legibly record all field changes on a set of project Contract Drawings. When the project is complete, furnish a complete set of reproducible "As-built" drawings for the Project Record Documents.

## **1.8 COMPONENT INTERCONNECTIONS**

- A. Component equipment furnished under this Specification will not be furnished as integrated systems. .
- B. Analyze all systems components and their shop drawings; identify all terminals and prepare drawings or wiring tables necessary for component interconnection.

## **1.9 SHOP DRAWINGS**

- A. As specified under other Sections, shop drawings shall be submitted for approval for all materials, equipment, apparatus, and other items as required by the Engineer.
- B. Shop drawings shall be submitted for the following equipment
  - 1. 240-Volt Panelboard Disconnect switch.
  - 2. Meter Can
  - 3. Pedestrian fixtures and poles
  - 4. Wire & cable
  - 5. Conduit
  - 6. Lighting contactor
- C. The Manufacturer's name and product designation and catalog cutsheets shall be submitted for the following materials:
  - 1. Conduit
  - 2. Receptacles
  - 3. Boxes and fittings
- D. Prior to submittal by the CONTRACTOR, all shop drawings shall be checked for accuracy and contract requirements. Shop drawings shall bear the date checked and shall be accompanied by a statement that the shop drawings have been examined for conformity to Specifications and Drawings. This statement shall also list all discrepancies with the Specifications and Drawings. Shop drawings not so checked and noted shall be returned.
- E. The Engineer's check shall be only for conformance with the design concept of the project and compliance with the Specifications and Drawings. The responsibility of, or the necessity of, furnishing materials and workmanship required by the Specifications and Drawings which may not be indicated on the shop drawings is included under the work of this Section.
- F. The responsibility for all dimensions to be confirmed and correlated at the job site and for coordination of this work with the work of all other trades is also included under the work of this Section.

- G. No material shall be ordered or shop work started until the Engineer's approval of shop drawings has been given.

## **1.10 WARRANTY**

- A. Provide a warranty for all the electrical equipment in accordance with the requirements of other Sections. Under no circumstances shall the warranty be for less than one year starting from substantial completion.

## **PART 2 PRODUCTS**

### **2.1 GENERAL**

- A. The materials used in all systems shall be new, unused and as hereinafter specified. All materials where not specified shall be of the very best of their respective kinds. Samples of materials of Manufacturer's specifications shall be submitted for approval as required by the Engineer.
- B. Materials and equipment used shall be Underwriters Laboratories, Inc. listed and conform with applicable standards of NEMA and ANSI.
- C. Electrical equipment shall, at all times during construction, be adequately protected against mechanical injury or damage by water. Electrical equipment shall not be stored out-of-doors. Electrical equipment shall be stored in dry permanent shelters. If any apparatus has been damaged, such damage shall be repaired by the CONTRACTOR at his expense. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through such special tests as directed by the Engineer, at the cost and expense of the CONTRACT, or shall be replaced by the CONTRACTOR at his own expense.
- D. All electrical panels, enclosures, raceways, conduits, wireways, boxes, cabinets, etc., shall be fabricated of metal. Nonmetallic substitutes are not acceptable. This does not apply to buried work.

### **2.2 RACEWAYS AND FITTINGS**

- A. Furnish and install complete raceway systems as shown on the Drawings and as specified herein.
- B. All conduit of a given type shall be the product of one manufacturer.
- C. All conduit shall be Rigid Nonmetallic Conduit Schedule 40 PVC.
  - 1. Rigid nonmetallic conduit shall be for use under the provisions of NEC Article 347.

2. PVC conduit shall be rigid polyvinyl chloride schedule 40 as manufactured by Carlon, An Indian Head Co., Kraloy Products Co., Inc., Highland Plastics Inc., or approved equal.

## **2.3 CONDUCTORS**

- A. Conductors shall be copper. Power circuits shall have 600 volt PVC insulations (Underwriters' approval Type THNN/THWN). Conductors shall be color coded in accordance with the NEC.
- B. All wires and cables shall be of annealed, 98 percent conductivity, soft drawn stranded copper conductors.
- C. Type THNN/THWN shall be as manufactured by the Southwire Co., Collyer Insulated Wire Co., Rome Cable or approved equal.

## **2.4 UNDERGROUND SYSTEM**

- A. Materials
  1. Ducts shall be polyvinyl chloride (PVC Schedule 40) installed on clean fine sand. No rocks or debris shall be allowed as trench fill.
- A. Ducts shall be installed to drain away from panels; ducts between pullboxes shall drain towards the pullbox. Duct slopes shall not be less than 3 inches per 100 feet.
- B. Duct lines shall be laid in trenches on a clean backfill bedding.
- C. The minimum cover for duct lines shall be as specified or required by NEC.
- D. PVC duct terminations at pullboxes shall be with PVC and bells.
- E. Where bends in ducts are required, long radius elbows, sweeps and offsets shall be used.
- F. Spare ducts shall be plugged and sealed watertight at all pullboxes. Sealant shall be foam type.
- G. Ducts in use shall be sealed watertight at all pullboxes. Sealant shall be foam type.
- H. All joints shall be made so as to prevent the passage of concrete inside the conduit to form obstructions or cause cable abrasions.
- I. A 5/8-inch by 10-foot copperclad ground rod shall be driven in the bottom of each pullbox. All bond wires and pullbox cover shall be bonded to the ground rod.

## **PART 3 EXECUTION**

### **3.1 CONDUIT INSTALLATION**

- A. Where conduits enter or leave all outlets boxes, cabinets safety switches, tap boxes, motor controllers, etc., other than those having threaded hubs, a standard lock nut shall be used on the outside of the box. Busings 1-inch and larger shall be of an approved insulated type. Unless otherwise indicated, conduit 2-inches and larger shall be supported at intervals not exceeding twelve (12) feet and for smaller sizes at intervals not exceeding eight (8) feet.
- B. During construction, all installed raceways shall be temporarily plugged or otherwise protected from the entrance of moisture, dirt, trash, plaster, moisture, etc., through neglect of the CONTRACTOR to so protect them, shall be replaced by the CONTRACTOR without additional expense to the Owner. No kinked, clogged or deformed raceways will be permitted on the job. Raceways shall be cut to proper length so that ends will fit accurately in the outlets. Where raceways cross building expansion joints, a suitable raceway expansion fitting shall be used.
- C. Size of raceway shall not be less than NEC requirements, but in no case shall be less than indicated on the Drawings. Combining of circuits, other than detailed, will not be permitted. The CONTRACTOR shall install larger size raceways than detailed where there is excessive length of unbroken run or excessive number of bends.
- D. Bends in metallic raceways shall be made while "cold" and in no case shall the raceways be heated. Raceways shall not be bent through more than 90. The radius of bends shall not be less than six (6) times the internal diameter of the raceway. Not more than four (4) (equivalent 90) bends will be permitted between outlets, the bends at the outlets being counted.
- E. Raceways shall be properly aligned, grouped and supported. Exposed raceways shall be installed at the right angles to or parallel to the principal structural members. Concealed raceways, unless otherwise indicated, may take the most direct route between outlets. Raceways shall be firmly held in place. Raceways shall run to avoid trapping wherever possible. Where areas are indicated for future openings, foundations, etc., all raceways shall be run around such areas. The CONTRACTOR shall provide necessary inserts in poured concrete areas and shall furnish and install all necessary sleeves through walls, floors and roofs for passage of raceways. Sleeves through roofs and/or exterior walls shall be properly sealed by the CONTRACTOR against entrance of moisture, etc., into building. Where necessary repairs to the building structure using material in no way inferior to that originally installed and using labor skilled in the trades involved.

### **3.2 BOXES**

- A. Install all outlet boxes, tap junction or pull boxes, device boxes, etc., necessary for the complete installation as indicated on the Drawings and/or specified herein. All boxes shall be rigidly mounted and shall be equipped with suitable screw fastened covers. All raceways entering boxes shall be mechanically and electrically secure. Open knockouts or holes in boxes shall be mechanically and electrically secure. Open knockouts or holes in boxes shall be plugged with suitable blacking devices. Boxes shall be cleared of all plaster, dirt, trash, etc., before the installation of any wiring devices and/or before the installation of cover plates.

- B. All exterior pull boxes shall be precast concrete with traffic rated covers. Boxes shall be sized as per the NEC. Precast boxes shall be manufactured by Brooks Products Co., or approved equal.

### 3.3 TERMINATIONS & SPLICES

- A. Splices, taps and attachments of fittings and lugs shall be electrically and mechanically secure. There shall be plenty of slack cable in boxes, outlets and cabinets to insure that there is no binding at the bushings. All lugs shall be of the correct sizes for the conductor in order to fit the conductor into a lug.
- B. All wires shall be numbered indicating circuit number. Numbers shall be crimp type and installed on wire after wires enter pull box.
- C. Power Conductors: Terminations shall be die type or set screw type pressure connectors as specified. Splices (where allowed) shall be silicon filled wire nut splice, weatherproof and submergence proof, King or equal.
- D. Except where otherwise approved by the Engineer no splices will be allowed in manholes, handholes or other below grade located boxes.
- E. Splices shall not be made in conduit bodies.

### 3.4 GROUNDING

- A. The entire electrical system shall be completely and effectively grounded as required by the NEC and as specified hereinafter.
- A. All metallic raceways shall be mechanically and electrically secure at all joints and at all boxes, cabinets, fittings and equipment. Metallic raceway entering the motor control center control panels or other electrical boxes shall be grounded to the appropriate ground bus. All metallic raceways shall be electrically continuous throughout the entire conduit system. Bond wires shall be used in exterior concrete pull boxes.
- B. The ground plane shall consist of a minimum of 3-5/8" x 10' copper ground rods spaced at least 10' apart. Rods and system ground shall be connected with a #1/0 copper ground to the service entrance ground. The ground resistance shall be tested and additional rods or plates added to achieve a dry season resistance not exceeding 5 ohms.

### 3.5 CONDUCTOR COLOR CODING

- A. All conductors shall be color coded as specified hereinafter. Color coding shall be by means of colored insulation material, colored braid or jacket over the insulations, or by means of suitable colored permanent, non-aging insulation tape equal to Scotch #471 or "Texcel 98" applied to conductors at each outlet, cabinet or junction point.
- B. The following system of color coding shall be strictly adhered to:
  - 1. Ground leads, green.

2. Grounded neutral leads, white.
3. Ungrounded phase wire of a delta connected 120/240 volt, 3-phase, 4-wire system, black, red and blue (high leg).

Colors for 230-208 / 120v Circuits:

- a) Phase A: Black
- b) Phase B: Red
- c) Phase C: Blue

Colors for 480/ 277v Circuits:

- d) Phase A: Brown
- e) Phase B: Orange
- f) Phase C: Yellow

4. All control leads, other than line connected "hot" leads, shall be yellow, orange and brown and/or I.P.C.E.A. standard control cable coding provided method of identification is different from method used on power conductors.
- C. The color coding assigned to each phase wire shall be consistently followed throughout the Work.

### 3.6 SUPPORTS

- A. The CONTRACTOR shall furnish and install all necessary supports for properly mounting all electrical equipment and raceways. Such supports shall be fabricated and installed in a neat and workmanlike manner, and care shall be taken that at no time shall any portion of the building structure be overloaded. Should the building structure sustain damage through carelessness or through failure of the CONTRACTOR to properly support and install the electrical equipment, the CONTRACTOR shall bear all costs involved in repairing or replacing such installation.
- B. All steel shapes exposed to the weather shall be galvanized after all cutting, drilling, and/or welding is done. All shop connections shall be welded or riveted and all field connections shall be bolted on all outdoor structures. Where the field cutting or drilling of galvanized steel is necessary, the CONTRACTOR shall apply one (1) coat of priming paint and one (1) finish coat of aluminum and oil paint.

### 3.7 TESTS AND CHECKS

- A. The following minimum tests and checks shall be made, but prior to the termination of any field wiring.
  1. Megger terminals and buses after disconnecting devices sensitive to megger voltage.
  2. A 1,000V DC megger shall be used for these tests.
  3. The first test shall be made with main circuit breaker closed and all remaining breakers open. A second test shall be made with all circuit breakers closed.

4. The test results shall be recorded and forwarded to the Engineer for his review. Minimum megger readings shall be 100 megohms in both tests.

**END OF SECTION 260500**

**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. This Section includes the following:
  - 1. Building wires and cables rated 600 V and less.
  - 2. Connectors, splices, and terminations rated 600 V and less.
  - 3. Sleeves and sleeve seals for cables.
- B. Related Sections include the following:
  - 1. Division 26 Section "Medium-Voltage Cables" for single-conductor and multiconductor cables, cable splices, and terminations for electrical distribution systems with 2001 to 35,000 V.
  - 2. Division 26 Section "Undercarpet Electrical Power Cables" for flat cables for undercarpet installations.
  - 3. Division 27 Section "Communications Horizontal Cabling" for cabling used for voice and data circuits.

**1.3 DEFINITIONS**

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

**1.4 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- C. Field quality-control test reports.

## **1.5 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

## **1.6 COORDINATION**

- A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

## **PART 2 - PRODUCTS**

### **2.1 CONDUCTORS AND CABLES**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Alcan Products Corporation; Alcan Cable Division.
  - 2. American Insulated Wire Corp.; a Leviton Company.
  - 3. General Cable Corporation.
  - 4. Senator Wire & Cable Company.
  - 5. Southwire Company.
- C. Copper Conductors: Comply with NEMA WC 70.
- D. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN XHHW.

### **2.2 CONNECTORS AND SPLICES**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Hubbell Power Systems, Inc.
  - 3. O-Z/Gedney; EGS Electrical Group LLC.
  - 4. 3M; Electrical Products Division.
  - 5. Tyco Electronics Corp.
- C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

### 2.3 SLEEVES FOR CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

### 2.4 SLEEVE SEALS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
  - 1. Advance Products & Systems, Inc.
  - 2. Calpico, Inc.
  - 3. Metraflex Co.
  - 4. Pipeline Seal and Insulator, Inc.
- D. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
  - 1. Sealing Elements: EPDM NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 2. Pressure Plates: Carbon steel. Include two for each sealing element.

3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## **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. 10 AWG and smaller; stranded for No. 8 AWG and larger.

### **3.2 INSTALLATION OF CONDUCTORS AND CABLES**

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. 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.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

### **3.3 CONNECTIONS**

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
  1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: City will engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Perform tests and inspections and prepare test reports.
- C. Tests and Inspections:
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the critical equipment and services 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 cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
    - 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 Reports: Prepare a written report to record the following:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- E. Remove and replace malfunctioning units and retest as specified above.

**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. This Section includes methods and materials for grounding systems and equipment.
  - 1. Overhead-lines grounding.
  - 2. Underground distribution grounding.
  - 3. Common ground bonding with lightning protection system.

**1.3 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "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.
  - 5. Grounding for sensitive electronic equipment.
- C. Qualification Data: For testing agency and testing agency's field supervisor.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:
  - 1. Instructions for periodic testing and inspection of grounding features at grounding connections for separately derived systems based on NFPA 70B.
    - a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
    - b. Include recommended testing intervals.

## 1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

## PART 2 - PRODUCTS

### 2.1 CONDUCTORS

- A. Insulated Conductors: Copper] wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) 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 (41 mm) wide and 1/16 inch (1.6 mm) thick.
  - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
- C. Bare Grounding Conductor and Conductor Protector for Wood Poles:
  - 1. No. 4 AWG minimum, soft-drawn copper.
  - 2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir or cypress or cedar.
- D. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches (6 by 50 mm) in cross section, unless otherwise indicated; with insulators.

## **2.2 CONNECTORS**

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
  - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

## **2.3 GROUNDING ELECTRODES**

- A. Ground Rods: Copper-clad 3/4 inch by 10 feet (19 mm by 3 m) in diameter.
- B. Chemical-Enhanced Grounding Electrodes: Copper tube, straight or L-shaped, charged with nonhazardous electrolytic chemical salts.
  - 1. Termination: Factory-attached No. 4/0 AWG bare conductor at least 48 inches (1200 mm) long.
  - 2. Backfill Material: Electrode manufacturer's recommended material.

## **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 copper conductor, No. 2/0 AWG minimum.
  - 1. Bury at least 24 inches (600 mm) below grade.
  - 2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) 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 and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch (25 mm), minimum, from wall 6 inches (150 mm) 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, down to specified height above floor, and 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 (100 mm) 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 (50 mm) above to 6 inches (150 mm) 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 as recommended by manufacturer of splicing and termination kits.
- D. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches (150 mm) from the foundation.

### 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.
  8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
- C. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- D. Concrete 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.

### 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. Common Ground Bonding 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 (50 mm) 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 Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches (300 mm) 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 so vibration is not transmitted to rigidly mounted equipment.
  - 3. Use exothermic-welded connectors for outdoor locations, but 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, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, 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 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 (18 m) apart.
  
- I. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column, extending around the perimeter of building.
  - 1. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel.
  - 2. Bury ground ring not less than 24 inches (600 mm) from building foundation.
  
- J. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of 20 feet (6 m) of bare copper conductor not smaller than No. 4 AWG.
  - 1. If concrete foundation is less than 20 feet (6 m) long, coil excess conductor within base of foundation.
  - 2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
- C. Perform the following tests and inspections and prepare test reports:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
  - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal[, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
    - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    - b. Perform tests by fall-of-potential method according to IEEE 81.
  - 3. 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.
- D. Report measured ground resistances that exceed the following values:
  - 1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 5 ohms.
  - 2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
  - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
  - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
  - 5. Substations and Pad-Mounted Equipment: 5 ohms.
  - 6. Manhole Grounds: 10 ohms.
- E. 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  
RACEWAY 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. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
  - 1. exterior ductbanks, manholes, and underground utility construction.

**1.3 DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metal conduit.
- G. LFNC: Liquidtight flexible nonmetallic conduit.
- H. NBR: Acrylonitrile-butadiene rubber.
- I. RNC: Rigid nonmetallic conduit.

**1.4 SUBMITTALS**

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

1. Custom enclosures and cabinets.
  2. For handholes and boxes for underground wiring, including the following:
    - a. Duct entry provisions, including locations and duct sizes.
    - b. Frame and cover design.
    - c. Grounding details.
    - d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
    - e. Joint details.
- C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Qualification Data: For professional engineer and testing agency.
- E. Source quality-control test reports.

## **1.5 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

## **PART 2 - PRODUCTS**

### **2.1 METAL CONDUIT AND TUBING**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. AFC Cable Systems, Inc.
  2. Alfex Inc.
  3. Allied Tube & Conduit; a Tyco International Ltd. Co.
  4. Anamet Electrical, Inc.; Anaconda Metal Hose.
  5. Electri-Flex Co.
  6. Manhattan/CDT/Cole-Flex.
  7. Maverick Tube Corporation.

- 8. O-Z Gedney; a unit of General Signal.
  - 9. Wheatland Tube Company.
- C. Rigid Steel Conduit: ANSI C80.1.
  - D. Aluminum Rigid Conduit: ANSI C80.5.
  - E. IMC: ANSI C80.6.
  - F. PVC-Coated Steel Conduit: PVC-coated [**rigid steel conduit**] [**IMC**].
    - 1. Comply with NEMA RN 1.
    - 2. Coating Thickness: **0.040 inch (1 mm)**, minimum.
  - G. EMT: ANSI C80.3.
  - H. FMC: Zinc-coated steel.
  - I. LFMC: Flexible steel conduit with PVC jacket.
  - J. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
    - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
    - 2. Fittings for EMT: set-screw or compression type.
    - 3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, **0.040 inch (1 mm)**, with overlapping sleeves protecting threaded joints.
  - K. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

## 2.2 NONMETALLIC CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
  - 3. Arco Corporation.
  - 4. CANTEX Inc.
  - 5. CertainTeed Corp.; Pipe & Plastics Group.
  - 6. Condux International, Inc.
  - 7. ElecSYS, Inc.
  - 8. Electri-Flex Co.

9. Lamson & Sessions; Carlon Electrical Products.
  10. Manhattan/CDT/Cole-Flex.
  11. RACO; a Hubbell Company.
  12. Thomas & Betts Corporation.
- C. ENT: NEMA TC 13.
- D. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- E. LFNC: UL 1660.
- F. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
- G. Fittings for LFNC: UL 514B.

### **2.3 BOXES, ENCLOSURES, AND CABINETS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
  2. EGS/Appleton Electric.
  3. Erickson Electrical Equipment Company.
  4. Hoffman.
  5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
  6. O-Z/Gedney; a unit of General Signal.
  7. RACO; a Hubbell Company.
  8. Robroy Industries, Inc.; Enclosure Division.
  9. Scott Fetzer Co.; Adalet Division.
  10. Spring City Electrical Manufacturing Company.
  11. Thomas & Betts Corporation.
  12. Walker Systems, Inc.; Wiremold Company (The).
  13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- C. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- D. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

### **2.4 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING**

- A. Description: Comply with SCTE 77.

1. Color of Frame and Cover: Gray.
  2. Configuration: Units shall be designed for flush burial and have openbottom, unless otherwise indicated.
  3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
  4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
  5. Cover Legend: Molded lettering, "ELECTRIC."
  6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
  7. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.
- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel or fiberglass or a combination of the two.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings, or a comparable product by one of the following:
    - a. Armorcast Products Company.
    - b. Carson Industries LLC.
    - c. CDR Systems Corporation.
    - d. NewBasis.
- C. Fiberglass Handholes and Boxes with Polymer-Concrete Frame and Cover: Sheet-molded, fiberglass-reinforced, polyester-resin enclosure joined to polymer-concrete top ring or frame.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
    - a. Armorcast Products Company.
    - b. Carson Industries LLC.
    - c. Christy Concrete Products.
    - d. Synertech Moulded Products, Inc.; a division of Oldcastle Precast.
- D. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with covers of fiberglass.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings, or a comparable product by one of the following:
  - a. Carson Industries LLC.
  - b. Christy Concrete Products.
  - c. Nordic Fiberglass, Inc.

## 2.5 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

## 2.6 SLEEVE SEALS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings, or a comparable product by one of the following:
  1. Advance Products & Systems, Inc.
  2. Calpico, Inc.
  3. Metraflex Co.
  4. Pipeline Seal and Insulator, Inc.
- D. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
  1. Sealing Elements: EPDM, NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  2. Pressure Plates: Carbon steel. Include two for each sealing element.

3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## 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 a 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: Rigid steel conduit, IMC, RNC, Type EPC-40-PVC.
  2. Concealed Conduit, Aboveground: Rigid steel conduit, EMT.
  3. Underground Conduit: RNC, Type EPC-40 PVC, direct buried.
  4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC, LFNC.
  5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
  6. Application of Handholes and Boxes for Underground Wiring:
    - a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Fiberglass-reinforced polyester resin, SCTE 77, Tier 15 structural load rating.
    - b. Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Heavy-duty fiberglass units with polymer-concrete frame and cover, SCTE 77, Tier 8 structural load rating.
    - c. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbs (13 345-N) vertical loading.
- B. Comply with the following indoor applications, 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: Rigid steel conduit. Includes raceways in the following locations:

- a. Loading dock.
  - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
  - c. Mechanical rooms.
- 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  - 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: Rigid steel conduit.
  - 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic, in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch (21-mm) 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.
    - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.
  - 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 in contact with concrete.

### 3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches (150 mm) 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. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

- H. Raceways Embedded in Slabs:
1. Run conduit larger than **1-inch (27-mm)** trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
  2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
  3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.
- I. 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.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than **200-lb (90-kg)** tensile strength. Leave at least **12 inches (300 mm)** of slack at each end of pull wire.
- L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
1. **3/4-Inch (19-mm)** Trade Size and Smaller: Install raceways in maximum lengths of **50 feet (15 m)**.
  2. **1-Inch (25-mm)** Trade Size and Larger: Install raceways in maximum lengths of **75 feet (23 m)**.
  3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- M. Install raceway sealing fittings at suitable, approved, and accessible locations 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 at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  2. Where otherwise required by NFPA 70.

### 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 Division 31 Section "Earth Moving" for pipe less than **6 inches (150 mm)** in nominal diameter.
2. Install backfill as specified in Division 31 Section "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 (300 mm)** of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
  - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with **3 inches (75 mm)** of concrete.
  - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of **60 inches (1500 mm)** from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.
6. Warning Planks: Bury warning planks approximately **12 inches (300 mm)** above direct-buried conduits, placing them **24 inches (600 mm)** o.c. Align planks along the width and along the centerline of conduit.

### **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 (12.5-mm)** sieve to **No. 4 (4.75-mm)** 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 (25 mm)** above finished grade.
- D. 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 the enclosure.
- E. 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 INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

### **3.6 SLEEVE-SEAL INSTALLATION**

- A. Install to seal underground, exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### **3.7 FIRESTOPPING**

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

### **3.8 PROTECTION**

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC 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. This Section includes the following:
  - 1. Identification for raceway and metal-clad cable.
  - 2. Identification for conductors and communication and control cable.
  - 3. Underground-line warning tape.
  - 4. Warning labels and signs.
  - 5. Instruction signs.
  - 6. Equipment identification labels.
  - 7. Miscellaneous identification products.

**1.3 SUBMITTALS**

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

**1.4 QUALITY ASSURANCE**

- A. Comply with ANSI A13.1 and ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.145.

**1.5 COORDINATION**

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, 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 RACEWAY 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 raceway and cable size.
- B. Color for Printed Legend:
  - 1. Power Circuits: Black letters on an orange field.
  - 2. Legend: Indicate system or service and voltage, if applicable.
- C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, 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: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.

### **2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS**

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.
- B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

- C. Aluminum Wraparound Marker Labels: Cut from 0.014-inch- (0.35-mm-) thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.
- D. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking nylon tie fastener.
- E. Write-On Tags: Polyester tag, **0.015 inch (0.38 mm)** thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

### 2.3 UNDERGROUND-LINE WARNING TAPE

- A. Description: Permanent, bright-colored, continuous-printed, polyethylene tape.
  - 1. Not less than 6 inches (150 mm) wide by 4 mils (0.102 mm) thick.
  - 2. Compounded for permanent direct-burial service.
  - 3. Embedded continuous metallic strip or core.
  - 4. Printed legend shall indicate type of underground line.

### 2.4 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: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch (6.4-mm) grommets in corners for mounting. Nominal size, 7 by 10 inches (180 by 250 mm).
- D. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch (6.4-mm) grommets in corners for mounting. Nominal size, 10 by 14 inches (250 by 360 mm).
- 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 (915 MM)."

## 2.5 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. in. (129 sq. cm) and 1/8 inch (3.2 mm) 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.

## 2.6 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 (10 mm).
- 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 (10 mm). Overlay shall provide a weatherproof and ultraviolet-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 (10 mm).
- 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 (10 mm).
- E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

## 2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.
  - 1. Minimum Width: 3/16 inch (5 mm).
  - 2. Tensile Strength: 50 lb (22.6 kg), minimum.
  - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
  - 4. Color: Black, except where used for color-coding.
- B. Paint: Paint materials and application requirements are specified in Division 09 painting Sections.
  - 1. Exterior Concrete, Stucco, and Masonry (Other Than Concrete Unit Masonry):
    - a. Semigloss Acrylic-Enamel Finish: One finish coat(s) over a primer.
      - 1) Primer: Exterior concrete and masonry primer.
      - 2) Finish Coats: Exterior semigloss acrylic enamel.
  - 2. Exterior Concrete Unit Masonry:

- a. Semigloss Acrylic-Enamel Finish: One finish coat(s) over a block filler.
  - 1) Block Filler: Concrete unit masonry block filler.
  - 2) Finish Coats: Exterior semigloss acrylic enamel.
- 3. Exterior Ferrous Metal:
  - a. Semigloss Alkyd-Enamel Finish: One finish coat(s) over a primer.
    - 1) Primer: Exterior ferrous-metal primer.
    - 2) Finish Coats: Exterior semigloss alkyd enamel.
- 4. Exterior Zinc-Coated Metal (except Raceways):
  - a. Semigloss Alkyd-Enamel Finish: One finish coat(s) over a primer.
    - 1) Primer: Exterior zinc-coated metal primer.
    - 2) Finish Coats: Exterior semigloss alkyd enamel.
- 5. Interior Concrete and Masonry (Other Than Concrete Unit Masonry):
  - a. Semigloss Alkyd-Enamel Finish: One finish coat(s) over a primer.
    - 1) Primer: Interior concrete and masonry primer.
    - 2) Finish Coats: Interior semigloss alkyd enamel.
- 6. Interior Concrete Unit Masonry:
  - a. Semigloss Acrylic-Enamel Finish: Two finish coats over a block filler.
    - 1) Block Filler: Concrete unit masonry block filler.
    - 2) Finish Coats: Interior semigloss acrylic enamel.
- 7. Interior Gypsum Board:
  - a. Semigloss Acrylic-Enamel Finish: One finish coat(s) over a primer.
    - 1) Primer: Interior gypsum board primer.
    - 2) Finish Coats: Interior semigloss acrylic enamel.
- 8. Interior Ferrous Metal:
  - a. Semigloss Acrylic-Enamel Finish: One finish coat(s) over a primer.
    - 1) Primer: Interior ferrous-metal primer.
    - 2) Finish Coats: Interior semigloss acrylic enamel.
- 9. Interior Zinc-Coated Metal (except Raceways):
  - a. Semigloss Acrylic-Enamel Finish: One finish coat(s) over a primer.

- 1) Primer: Interior zinc-coated metal primer.
  - 2) Finish Coats: Interior semigloss acrylic enamel.
- C. 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 APPLICATION**

- A. Raceways and Duct Banks More Than 600 V Concealed within Buildings: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- (75-mm-) high black letters on 20-inch (500-mm) centers. Stop stripes at legends. Apply to the following finished surfaces:
1. Floor surface directly above conduits running beneath and within 12 inches (300 mm) of a floor that is in contact with earth or is framed above unexcavated space.
  2. Wall surfaces directly external to raceways concealed within wall.
  3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.
- B. Accessible Raceways and Metal-Clad Cables More Than 600 V: Identify with "DANGER-HIGH VOLTAGE" in black letters at least 2 inches (50 mm) high, with self-adhesive vinyl labels. Repeat legend at 10-foot (3-m) maximum intervals.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A: Identify with orange self-adhesive vinyl label.
- D. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands.
1. Fire Alarm System: Red.
  2. Fire-Suppression Supervisory and Control System: Red and yellow.
  3. Combined Fire Alarm and Security System: Red and blue.
  4. Security System: Blue and yellow.
  5. Mechanical and Electrical Supervisory System: Green and blue.
  6. Telecommunication System: Green and yellow.
  7. Control Wiring: Green and red.
- E. Power-Circuit Conductor Identification: For primary and secondary conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.
- F. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape. Identify each ungrounded conductor according to source and circuit number.

- G. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source and circuit number.
- H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data 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 Operation and Maintenance Manual.
- I. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable. Limit use of underground-line warning tape to direct-buried cables.
- J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
  - 1. 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.
  - 2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
- K. Instruction Signs:
  - 1. Operating Instructions: 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.
- L. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and 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: Adhesive film label with clear protective overlay. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high

letters on 1-1/2-inch- (38-mm-) high label; where 2 lines of text are required, use labels 2 inches (50 mm) high.

- b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
- c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:

- a. Panelboards, electrical cabinets, and enclosures.
- b. Contactors.
- c. Master clock and program equipment.
- d. Monitoring and control equipment.

### 3.2 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 nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- F. System Identification Color Banding for Raceways and Cables: Each color 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 (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded conductors.
  - 1. Color shall be factory applied or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.
  - 2. Colors for 208/120-V Circuits:
    - a. Phase A: Black.
    - b. Phase B: Red.
    - c. Phase C: Blue.
  - 3. Colors for 480/277-V Circuits:
    - a. Phase A: Brown.
    - b. Phase B: Orange.

- c. Phase C: Yellow.
- 4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) 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.
- 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. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall.
- J. Painted Identification: Prepare surface and apply paint according to Division 09 painting Sections.

**END OF SECTION 260553**

**SECTION 262816  
ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes the following individually mounted, enclosed switches and circuit breakers:
  - 1. Fusible switches.
  - 2. Nonfusible switches.
  - 3. Bolted-pressure contact switches.
  - 4. High-pressure, butt-type contact switches.
  - 5. Molded-case circuit breakers.
  - 6. Molded-case switches.
  - 7. Enclosures.

**1.3 DEFINITIONS**

- A. GD: General duty.
- B. GFCI: Ground-fault circuit interrupter.
- C. HD: Heavy duty.
- D. RMS: Root mean square.
- E. SPDT: Single pole, double throw.

**1.4 SUBMITTALS**

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
  - 1. Enclosure types and details for types other than NEMA 250, Type 1.
  - 2. Current and voltage ratings.
  - 3. Short-circuit current rating.
  - 4. UL listing for series rating of installed devices.

5. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Manufacturer Seismic Qualification Certification: Submit certification that enclosed switches and circuit breakers, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems" Include the following:
1. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
  2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Qualification Data: For testing agency.
- E. Field quality-control test reports including the following:
1. Test procedures used.
  2. Test results that comply with requirements.
  3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- F. Manufacturer's field service report.
- G. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
  2. Time-current curves, including selectable ranges for each type of circuit breaker.

## 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.
- D. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
  1. Ambient Temperature: Not less than **minus 22 deg F (minus 30 deg C)** and not exceeding **104 deg F (40 deg C)**.
  2. Altitude: Not exceeding **6600 feet (2010 m)**.

## 1.7 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

## 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Spares: For the following:
    - a. Potential Transformer Fuses: 4
    - b. Control-Power Fuses: 6
    - c. Fuses and Fusible Devices for Fused Circuit Breakers: 2
    - d. Fuses for Fusible Switches: 4
    - e. Fuses for Fused Power Circuit Devices: 4
  2. Spare Indicating Lights: Six (6) of each type installed.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### **2.2 FUSIBLE AND NONFUSIBLE SWITCHES**

- A. Available Manufacturers:
  - 1. General Electric Co.; Electrical Distribution & Control Division.
  - 2. Siemens Energy & Automation, Inc.
  - 3. Square D/Group Schneider.
- B. Fusible Switch, 600 A and Smaller: NEMA KS 1, Type GD, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- C. Nonfusible Switch, 600 A and Smaller: NEMA KS 1, Type GD, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- D. Accessories:
  - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
  - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded, and bonded; and labeled for copper and aluminum neutral conductors.
  - 3. Auxiliary Contact Kit: Auxiliary set of contacts arranged to open before switch blades open.

### **2.3 FUSED POWER CIRCUIT DEVICES**

- A. Bolted-Pressure Contact Switch: UL 977; operating mechanism shall use a rotary-mechanical-bolting action to produce and maintain high-clamping pressure on the switch blade after it engages the stationary contacts.
  - 1. Available Manufacturers:
    - a. Boltswitch, Inc.
    - b. Pringle Electrical Mfg. Co.
    - c. Siemens Energy & Automation, Inc.

- d. Square D/Group Schneider.
- B. High-Pressure, Butt-Type Contact Switch: UL 977; operating mechanism shall use butt-type contacts and a spring-charged mechanism to produce and maintain high-contact pressure when switch is closed.
- 1. Available ]Manufacturers:
    - a. General Electric Co.; Electrical Distribution & Control Division.
  - 2. Main Contact Interrupting Capability: Twelve times the switch current rating, minimum.
  - 3. Operating Mechanism: Manual handle operation to close switch stores energy in mechanism for closing and opening.
    - a. Electrical Trip: Operation of lever or push-button trip switch, or trip signal from ground-fault relay or remote-control device, causes switch to open.
    - b. Mechanical Trip: Operation of mechanical lever or push button or another device causes switch to open.
  - 4. Auxiliary Switches: Factory installed, SPDT, with leads connected to terminal block, and including one set more than quantity required for functional performance indicated.
  - 5. Service-Rated Switches: Labeled for use as service equipment.
  - 6. Ground-Fault Relay: Comply with UL 1053. Self-powered type with mechanical ground-fault indicator, test function, tripping relay with internal memory, and three-phase current transformer/sensor.
    - a. Configuration: Remote-mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground fault indicator.
    - b. Internal Memory: Integrates the cumulative value of intermittent arcing ground-fault currents and uses the effect to initiate tripping.
    - c. No-Trip Relay Test: Operation of "no-trip" test control permits ground-fault simulation test without tripping switch.
    - d. Test Control: Simulates ground fault to test relay and switch (or relay only if "no-trip" mode is selected).
  - 7. Open-Fuse Trip Device: Arranged to trip switch open if a phase fuse opens.

## 2.4 MOLDED-CASE CIRCUIT BREAKERS AND SWITCHES

- A. Manufacturers:
- 1. General Electric Co.; Electrical Distribution & Control Division.
  - 2. Moeller Electric Corporation.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D/Group Schneider.
- B. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic Trip-Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
  - a. Instantaneous trip.
  - b. Long- and short-time pickup levels.
  - c. Long- and short-time time adjustments.
  - d. Ground-fault pickup level, time delay, and  $I^2t$  response.
4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller and let-through ratings less than NEMA FU 1, RK-5.
5. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.
6. GFCI Circuit Breakers: Single- and two-pole configurations with 30-mA trip sensitivity.

C. Molded-Case Circuit-Breaker Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Mechanical style suitable for number, size, trip ratings, and conductor material.
3. Application Listing: Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
4. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
5. Communication Capability: Circuit-breaker-mounted communication module with functions and features compatible with power monitoring and control system specified in Division 26 Section "Electrical Power Monitoring and Control."
6. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
7. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage with field-adjustable 0.1- to 0.6-second time delay.
8. Auxiliary Switch: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
9. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
10. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.

D. Molded-Case Switches: Molded-case circuit breaker with fixed, high-set instantaneous trip only, and short-circuit withstand rating equal to equivalent breaker frame size interrupting rating.

E. Molded-Case Switch Accessories:

1. Lugs: Mechanical style suitable for number, size, trip ratings, and material of conductors.

2. Application Listing: Type HACR for heating, air-conditioning, and refrigerating equipment.
3. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage. Provide "dummy" trip unit where required for proper operation.
4. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage with field-adjustable 0.1- to 0.6-second time delay. Provide "dummy" trip unit where required for proper operation.
5. Auxiliary Switch: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
6. Key Interlock Kit: Externally mounted to prohibit operation; key shall be removable only when switch is in off position.

## **2.5 ENCLOSURES**

- A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.
  1. Outdoor Locations: NEMA 250, Type 3R.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 CONCRETE BASES**

- A. Coordinate size and location of concrete bases. Verify structural requirements with structural engineer.
- B. Concrete base is specified in Division 26 Section "Hangers and Supports for Electrical Systems," and concrete materials and installation requirements are specified in Division 03.

### **3.3 INSTALLATION**

- A. Comply with applicable portions of NECA 1, NEMA PB 1.1, and NEMA PB 2.1 for installation of enclosed switches and circuit breakers.
- B. Mount individual wall-mounting switches and circuit breakers with tops at uniform height, unless otherwise indicated. Anchor floor-mounting switches to concrete base.
- C. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

- D. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

### **3.4 IDENTIFICATION**

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Identification for Electrical Systems."
- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate as specified in Division 26 Section "Identification for Electrical Systems."

### **3.5 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Prepare for acceptance testing as follows:
  - 1. Inspect mechanical and electrical connections.
  - 2. Verify switch and relay type and labeling verification.
  - 3. Verify rating of installed fuses.
  - 4. Inspect proper installation of type, size, quantity, and arrangement of mounting or anchorage devices complying with manufacturer's certification.
- C. Tests and inspections and prepare test reports.
- D. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
- E. Perform the following field tests and inspections and prepare test reports:
  - 1. Test mounting and anchorage devices according to requirements in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
  - 2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
  - 3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
  - 4. Infrared Scanning:
    - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Open or remove doors or panels so connections are accessible to portable scanner.
    - b. Follow-Up Infrared Scanning: Perform an additional follow-up infrared scan of each unit 11 months after date of Substantial Completion.
    - c. Instruments, Equipment and Reports:

- 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- 2) Prepare a certified report that identifies enclosed switches and circuit breakers included and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### **3.6 ADJUSTING**

- A. Set field-adjustable switches and circuit-breaker trip ranges.

### **3.7 CLEANING**

- A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.
- B. Inspect exposed surfaces and repair damaged finishes.

**END OF SECTION 262816**

## SECTION 32141 - PERMEABLE INTERLOCKING CONCRETE PAVERS

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. Section Includes
  - 1. Permeable concrete pavers.
  - 2. Bedding and void opening aggregates
  - 3. Aggregate Base
  - 4. Edge restraint.
- B. Related Sections
  - 1. Section 02200 - Earthwork.
  - 2. Section 03300 - Cast-in-place concrete

#### 1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
  - 1. C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - 2. C 136, Method for Sieve Analysis for Fine and Coarse Aggregate.
  - 3. C 140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
  - 4. D 448, Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
  - 5. C 936, Standard Specification for Solid Interlocking Concrete Pavers.
  - 6. C 979, Specification for Pigments for Integrally Colored Concrete.
  - 7. D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5-lb (2.49 kg) Rammer and 12 in. (305 mm) drop.
  - 8. D 1557, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (4.54 kg) Rammer and 18 in. (457 mm) drop.
  - 9. D 2922 Standard Test Methods for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).
  - 10. D 4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- B. Interlocking Concrete Pavement Institute (ICPI)
  - 1. Permeable Interlocking Concrete Pavement manual.
  - 2. Permeable Design Pro software for hydrologic and structural design

#### 1.03 SUBMITTALS

- A. In accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Sieve analysis of aggregates for subbase, base and bedding materials per ASTM C 136.
- C. Project specific or producer/manufacturer source test results for void ratio and bulk

density of the base and subbase aggregates.

D. Permeable concrete pavers:

1. Paver manufacturer's catalog sheets with product specifications.
2. Four representative full-size samples of each paver type, thickness, color, and finish. Submit samples indicating the range of color expected in the finished installation.
3. Accepted samples become the standard of acceptance for the work of this Section.
4. Laboratory test reports certifying compliance of the concrete pavers with ASTM C 936.
5. Manufacturer's certification of concrete pavers by ICPI as having met applicable ASTM standards.
6. Manufacturers' material safety data sheets for the safe handling of the specified paving materials and other products specified herein.
7. Paver manufacturer's written quality control procedures including representative samples of production record keeping that ensure conformance of paving products to the product specifications.

#### 1.04 QUALITY ASSURANCE

A. Paver Installation Subcontractor Qualifications:

1. Installation shall be by a contractor and crew with at least one year of experience in placing interlocking concrete pavers on projects of similar nature or dollar costs.
2. Job references from projects of a similar size and complexity. Provide Owner/Client/General Contractor names, postal address, phone, fax, and email address.
3. The Contractor shall be in compliance with all local, state and federal licensing and bonding requirements

B. Regulatory Requirements and Approvals

#### 1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 1 Product Requirement Section.

B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged container packaging with identification tags intact on each paver bundle.

1. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.
2. Deliver concrete pavers to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by forklift or clamp lift.
3. Unload pavers at job site in such a manner that no damage occurs to the product or existing construction.

D. Storage and Protection: Store materials in protected area such that they are kept free from mud, dirt, and other foreign materials.

## 1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not install in rain.

## 1.07 MAINTENANCE

- A. Extra materials: Provide additional material for use by owner for maintenance and repair.
- B. Pavers shall be from the same production run as installed materials.

## PART 2 PRODUCTS

Note: Some projects may include permeable and solid interlocking concrete pavements. Specify each product as required.

### 2.01 PAVING UNITS FOR ROADWAY

- A. Manufacturer: PaveDrain or Approved Equal.
- B. Permeable Interlocking Concrete Paver Units:
  - 1. Paver Type:
    - a. Material Standard: Comply with ASTM C 936.
    - b. Color: Sunset Burst Blend
    - c. Color Pigment Material Standard: Comply with ASTM C 979.

### 2.02 PRODUCT SUBSTITUTIONS

- A. Substitutions: Permitted for gradations for crushed stone jointing material, base and subbase materials. Base and subbase materials shall have a minimum 0.32 void ratio. All substitutions shall be approved in writing by the project engineer.

### 2.03 CRUSHED STONE FILLER, BEDDING, BASE AND SUBBASE FOR ROADWAYS

- A. Crushed stone with 90% fractured faces, LA Abrasion < 40 per ASTM C 131.
- B. Do not use rounded river gravel for vehicular applications.
- C. All stone materials shall be washed with less than 2% passing the No. 200 sieve.
- D. Joint/opening filler and bedding: conforming to ASTM D 448 gradation as shown in Tables 1 and 2 below:

Table 1  
AASHTO No. 57 Bedding  
Grading Requirements

Sieve Size	Percent Passing
37.5 mm (1 1/2 in.)	100
25 mm (1 in.)	95 to 100
12.5 mm (1/2 in.)	25 to 60

4.75 mm (No. 4)	0 to 10
2.36 mm (No. 8)	0 to 5

Table 2

AASHTO No. 2 Bedding Grading Requirements	
Bedding Sieve Size	Percent Passing
75 mm (3 in.)	100
63 mm (2 1/2 in.)	90 to 100
50 mm (2 in.)	35 to 70
37.5 mm (1 1/2 in.)	0 to 15
19 mm (3/4 in.)	0 to 5

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

Note: The elevations and surface tolerance of the soil subgrade determine the final surface elevations of concrete pavers. The paver installation contractor cannot correct deficiencies excavation and grading of the soil subgrade with additional bedding materials. Therefore, the surface elevations of the soil subgrade should be checked and accepted by the General Contractor or designated party, with written certification presented to the paver installation subcontractor prior to starting work.

##### **A. Acceptance of Site Verification of Conditions:**

1. General Contractor shall inspect, accept and certify in writing to the paver installation subcontractor that site conditions meet specifications for the following items prior to installation of interlocking concrete pavers.
  - a. Verify that subgrade preparation, compacted density and elevations conform to specified requirements.
  - b. Provide written density test results for soil subgrade to the Owner, General Contractor and paver installation subcontractor.
  - c. Verify location, type, and elevations of edge restraints, concrete collars around utility structures, and drainage pipes and inlets.
2. Do not proceed with installation of bedding and interlocking concrete pavers until subgrade soil conditions are corrected by the General Contractor or designated subcontractor.

#### **3.02 PREPARATION**

- A. Verify that the soil subgrade is free from standing water.
- B. Stockpile joint/opening filler, base and subbase materials such that they are free from standing water, uniformly graded, free of any organic material or sediment, debris, and ready for placement.
- C. Edge Restraint Preparation:
  1. Install edge restraints per the drawings at the indicated elevations.

#### **3.03 INSTALLATION**

A. General

1. Any excess thickness of soil applied over the excavated soil subgrade to trap sediment from adjacent construction activities shall be removed before application of the geotextile and subbase materials.
2. Keep area where pavement is to be constructed free from sediment during entire job. Base and bedding materials contaminated with sediment shall be removed and replaced with clean materials.
3. Do not damage drainpipes, overflow pipes, observation wells, or any inlets and other drainage appurtenances during installation. Report any damage immediately to the project engineer.

B. Geotextiles

1. Place on bottom and sides of soil subgrade. Secure in place to prevent wrinkling from vehicle tires and tracks.
2. Overlap a minimum of 0.3 m (12 in.) in the direction of drainage.

C. Open-graded subbase and base

Note: Compaction of areas or sites that cannot accommodate a roller vibratory compactor may use a minimum 13,500 lbf (60 kN) vibratory plate compactor with a compaction indicator. At least two passes should be made over each lift of the subbase and base aggregates.

1. Moisten, spread and compact the subbase in 4 to 6 in. (100 to 150 mm) lifts without wrinkling or folding the geotextile. Place subbase to protect geotextile from wrinkling under equipment tires and tracks.
2. For each lift, make at least two passes in the vibratory mode then at least two in the static mode with a minimum 10 t (8 T) vibratory roller until there is no visible movement of the stone. Do not crush aggregate with the roller.
3. Moisten, spread and compact the base layer in one 4 in. (100 mm) thick lift. On this layer, make at least two passes in the vibratory mode then at least two in the static mode with a minimum 10 t (8 T) vibratory roller until there is no visible movement of the stone. Do not crush aggregate with the roller.

- D. The surface tolerance the compacted base should not deviate more than.  $\pm 1$  in. (25 mm) over a 10 ft (3 m) straightedge.

E. Permeable interlocking concrete pavers and joint/opening fill material

1. Lay the paving units in the pattern(s) and joint widths shown on the drawings. Maintain straight pattern lines.
2. Fill gaps at the edges of the paved area with cut units. Cut pavers subject to tire traffic shall be no smaller than 1/3 of a whole unit.
3. Cut pavers and place along the edges with a double-bladed splitter or masonry saw.
4. Remove excess aggregate on the surface by sweeping pavers clean.
5. Compact and seat the pavers into the bedding material using a low-amplitude, 75-90 Hz plate compactor capable of at least 5,000 lbf (22 kN). This will require at least two passes with the plate compactor.
6. Do not compact within 6 ft (2 m) of the unrestrained edges of the paving units.
7. Apply additional aggregate to the openings and joints if needed, filling them completely. Remove excess aggregate by sweeping then compact the pavers.

This will require at least two passes with the plate compactor.

8. All pavers within 6 ft (2 m) of the laying face must be left fully compacted at the completion of each day.
9. The final surface tolerance of compacted pavers shall not deviate more than  $\pm 3/8$  (10 mm) under a 10 ft (3 m) long straightedge.
10. The surface elevation of pavers shall be 1/8 to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.

### 3.05 FIELD QUALITY CONTROL

- A. After sweeping the surface clean, check final elevations for conformance to the drawings.
- B. Lippage: No greater than 1/8 in. (3 mm) difference in height between adjacent pavers.
- C. The surface elevation of pavers shall be 1/8 to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.
- D. Bond lines for paver courses:  $\pm 1/2$  in. ( $\pm 15$  mm) over a 50 ft (15 m) string line.

### 3.06 PROTECTION

- A. After work in this section is complete, the General Contractor shall be responsible for protecting work from sediment deposition and damage due to subsequent construction activity on the site.
- B. Installation contractor shall return to site after 6 months from the completion of the work and provide the following as required: fill paver joints with stones, replace broken or cracked pavers, and re-level settled pavers to initial elevations. Any additional work shall be considered part of original bid price and with no additional compensation.

**END OF SECTION**

**SECTION 323113  
CHAIN LINK FENCING AND GATES**

**PART 1- GENERAL**

**1.1 WORK INCLUDED**

- A. The work included in this Section consists of furnishing all labor, equipment and materials and in performing all operations necessary for installing chain link fencing, locks, and accessories. Extent of chain link fences and gates is indicated on Drawings and described in these Specifications. In addition all electrical conduits and motors shall be provided by the contractor.

**1.02 RELATED WORK**

1. Section 310000 - Earthwork
2. Section 312216 - Fine Grading
3. Section 033000 - Cast-in-Place Concrete
4. Electrical Sections

**1.3 QUALITY ASSURANCE**

- A. Chain link fencing shall be manufactured in accordance with the requirements of the CLFMI Manual. Fence manufacturer shall be a CLFMI member.
- B. Fence manufacturer shall have at least ten years of experience in the manufacture of vinyl-coated steel chain link fencing.
- C. The fence fabric, posts, gates, and all hardware shall be manufactured and supplied by a single manufacturer, to insure compatibility of all the fence elements and to define a single source responsibility.

**1.4 SUBMITTALS**

- A. Shop Drawings: Show fence layout, post locations, gates, details illustrating fence height, gate width, size of posts, rails, braces, fittings, and hardware.
- B. Product Data: Submit catalog cuts and manufacturer's detail specifications.
- C. Warranty: Vinyl coated chain link fence systems shall be supplied with minimum fifteen (15) year factory warranty.

**PART 2-PRODUCTS**

**2.1 GENERAL**

- A. Dimensions indicated for pipe are outside dimensions, exclusive of coatings. All posts and rails shall be Schedule 40 pipe.

## **2.2 FENCE FABRIC**

- A. Fabric shall be PVC coated thermally fused and bonded to a primer which is thermally cured onto galvanized steel core wire conforming to ASTM F 668, Class 2. Minimum coating thickness shall be 0.007 in.
- B. Fabric shall be woven into 1-3/4 in. mesh of 9 gauge and 6 gauge (o.148) galvanized wire core with a minimum breaking strength of 1,290 lbs./ft. in accordance with ASTM F 668, Class 2. Coated wire size shall be 8 gauge (0.165 in.). Other gauges may be required as noted on the plans.
- C. Zinc for galvanized coating shall conform to ASTM b 6, galvanized by hot dipped method AISI Type 1, before vinyl coating; coating shall be smooth. Minimum weight of zinc coating shall be 1.2 oz. per sq. ft. (0.30 oz./ft.).
- D. Polyvinyl chloride coating shall meet the following requirements:
  - 1. Specific gravity shall be 1.30 maximum, tested in accordance with ASTM D 792.
  - 2. Hardness shall be a minimum Durometer reading of A 95 in accordance with ASTM D 2240. Ultimate elongation shall be 275% in accordance with ASTM D 412.
  - 3. Tensile strength shall have a test minimum of 3,300 p.s.i. in accordance with ASTM D 412.
  - 4. Vinyl shall be a dense and impervious covering free of voids, having a smooth, lustrous surface without pinholes, bubbles, voids, or rough or blistered surface.
  - 5. Fabric shall be furnished with salvages knuckled on both the top and bottom edges.
  - 6. Furnish one-piece fabric widths up to 12 ft. in height.
- E. Fence fabric color shall be black.

## **2.3 FENCE POSTS, HARDWARE, AND FITTINGS-GENERAL**

- A. All posts, fittings, etc. shall be PVC coated same as all fence fabric. Fittings shall be of best quality malleable iron casting, wrought iron forgings, or pressed steel and provided with pin connections. Equipment shall be designed to carry 100% overload. All fittings and accessories shall be vinyl coated with color to match fence fabric.
  - 1. Malleable iron castings shall be hot-dipped galvanized in accordance with ASTM A 153.

2. Wrought iron forgings or pressed steel fitting and appurtenances shall be hot-dipped galvanized in accordance with ASTM A 123.
  3. Fence hardware coating shall match fence fabric coating.
- B. Piping shall be steel conforming to ASTM A 569 (SS40).
  - C. Galvanized items shall be galvanized in accordance with ASTM A 123, A 153, or A 385, as applicable.
  - D. Bolts which are installed 6 ft. or less above grade shall not protrude more than ¼ in. beyond the nut after tightening. Rough edges shall be filed smooth. All fittings and accessories shall be vinyl coated with color to match fence fabric.
  - E. Contractor shall provide all gate motors, belts, key/swipe pads on goosenecks (w/ bollard protection), underground conduit, and all electrical required for a complete system. Gates shall be motorized with both remote and key/swipe controls. See drawings.

## 2.4 POSTS

- A. End, Corner and Pull Posts: minimum sizes and weights as follows:
  1. Up to 6' fabric height, 2.5" OD steel pipe, 3.65 lbs. per LIN ft.
  2. Over 6' fabric height, 3" OD steel pipe, 5.79 lbs. per LIN ft.
- B. Line Posts: Space uniformly at approximately 10' o.c. maximum, unless otherwise indicated, of following minimum sizes and weights.
  1. Up to 6' fabric height, 2" steel pipe, 2.70 lbs. per LIN ft.
  2. 6' to 8' fabric height, 2.5" OD steel pipe, 3.654 lbs. per LIN ft.
  3. Over 8 fabric height, 3" OD steel pipe, 5.79 lbs. per LIN ft.

## 2.5 RAILS

- A. TOP RAIL; Manufacturer's longest length, with expansion type couplings, approximately 6" long, for each joint. Provide means for attaching top rail securely to each gate corner, pull and end post.

1-5/8" OD pipe, 2.70 lbs. per ft.
- B. MID RAIL: Provide means for attaching fabric securely to each gate corner, pull and end post.

1-5/8" OD pipe, 2.70 lbs. per ft.

- C. BOTTOM RAIL: Provide means for attaching bottom rail securely to each gate corner, pull and end post.

1-5/8" OD pipe, 2.70 lbs. per ft.

## 2.6 GATES

- A. Fabrication: Fabricate perimeter frames of gates from metal and finish to match fence framework. Assemble gate frames by welding or with special fittings and rivets for rigid connections, providing security against removal or breakage connections. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware and accessories. Space frame members a maximum of 8' apart unless otherwise indicated.

Provide same fabric as for fence, unless otherwise indicated. Install fabric with stretcher bars at vertical edges and at top and bottom edges. Attach stretcher bars to gate frame at not more than 15" o.c.

Install diagonal cross-bracing consisting of 3/8" diameter adjustable length truss rods on gates to ensure frame rigidity without sag or twist.

- B. SWING GATES: Fabricate perimeter frames of minimum 2" OD Schedule 40 pipe, weighing 1.9 lb./ft.
- C. SLIDING/ROLLING GATES: See drawing sheets for location and type. Contractor to provide all required power, control, and tie-ins to complete system. Contractor to provide 10 pin control per Fire Dept. requirements
- D. GATE HARDWARE: Provide hardware and accessories for each gate, galvanized per ASTM a 153, and in accordance with the following:
  1. Hinges: Provide 1 pair of hinges for each leaf. Size and material to suit gate size, non-lift-off type, offset to permit 180 degree gate opening. Provide 1 extra hinge for each leaf cover over 6" nominal height.
  2. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.
  3. Keeper: Provide keeper for vehicle gates, which automatically engages gate leaf and holds it in open position until manually released.
  4. Double Gates: Provide gate stops for double gates, consisting of mushroom type flush plate with anchors, set in concrete, and designed to engage center drop rod or plunger bar. Include locking device and padlock eyes as integral part of latch, permitting both gate leaves to be locked with single padlock.
- E. GATE POSTS: Furnish posts for supporting single gate leaf, or one leaf of double gate installation, for nominal gate widths as follows:

<u>Leaf Width</u>	<u>Gate Post</u>	<u>lbs./LIN ft.</u>
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Up to 6'	3"	5.79
Over 6' to 13'	4.000" OD pipe	9.11
Over 13' to 18'	6.625" OD pipe	18.97
Over 18'	8.625" OD pipe	28.55

## 2.7 POST CAPS

- A. POST CAPS: Provide weathertight closure cap with loop to receive tension wire or top rail; one cap for each post.

## 2.8 TENSION WIRE

- A. TENSION WIRE: 6-ga. Coated coil spring wire, metal and finish to match fabric. Locate at bottom of fabric.

## 2.9 WIRE TIES

- A. WIRE TIES: 11-ga. Galvanized steel or 11 ga. Aluminum wire, to match fabric core material.

## 2.10 TENSION BARS

- A. TENSION BARS: One-piece lengths equal to full height of fabric, with minimum cross-section of 3/16" x 3/4" Provide one tension bar for each gate and end post, and 2 for each corner and pull post, except where fabric is integrally woven into post.

## 2.11 POST BRACE ASSEMBLY

- A. POST BRACE ASSEMBLY: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375" diameter rod and adjustable tightener.

## 2.12 CONCRETE

- A. CONCRETE: Provide concrete consisting of portland cement, ASTM C 150 aggregates ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 3,500 p.s.i., 3/4" maximum size aggregate, maximum 3" slump, and 2% to 4% entrained air.

## PART 3-EXECUTION

### 3.1 INSTALLATION

Do not begin installation and erection before final grading is completed, unless otherwise permitted.

- A. EXCAVATION: Drill or hand excavate (using post hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.

If not indicated on drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4 times largest cross-section of post.

Unless otherwise indicated, excavate hole depths approximately 3" lower than post bottom, with bottom of posts set not less than 36" below finish grade surface.

- B. **SETTING POSTS:** Center and align posts in holes 4" above bottom of excavation. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations. Unless otherwise indicated, extend concrete footings ½" above grade and trowel to a crown to shed water.
- C. **TOP RAILS:** Run rail continuously through post caps bending to radius for curved runs. Provide expansion couplings as recommended by fencing manufacturer.
- D. **CENTER/MID RAILS:** Provide center rails where indicated. Install in one piece between posts and flush with post on fabric side, using special offset fittings where necessary.
- E. **BRACE ASSEMBLIES:** Install braces so posts are plumb when diagonal rod is under proper tension.
- F. **TENSION WIRE:** Install tension wires through post cap loops before stretching fabric and tie to each post cap. Fasten fabric to tension wire using 11 ga. galvanized steel hog rings spaced 24" o.c.
- G. **FABRIC:** Leave approximately 2" between finish grade and bottom salvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.
- H. **TENSION BARS:** Thread through or clamp to fabric 4" o.c., and secure to posts with metal bands spaced 15" o.c.
- I. **GATES:** Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.
- J. **TIE WIRES:** Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.
  - 1. Tie fabric to line posts, with wire ties spaces 12" o.c.
  - 2. Tie fabric to rails and braces, with wire ties spaced 24" o.c.
  - 3. Tie fabric to tension wires, with hog rings spaced 24" o.c.

K. FASTENERS: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

L. TOUCH UP:

1. Following installation, scratches and marred spots in galvanized surfaces shall be power wire brushed and painted with a cold-applied galvanized paint at a rate of 2 oz. zinc per sq. ft. of surface.
2. Following installation scratches and marred spots in vinyl coated surfaces shall be field coated with a vinyl coating supplied by the fence manufacturer.

**END OF SECTION 323113**