The Enclosed Document Is Provided For Your Convenience.

Please Email ALL Questions:

MailTo:ContractAdministration@TampaGov.net

Please Let Us Know If You Plan To Bid

City of Tampa
Contract Administration Department
306 E. Jackson St. #280A4N
Tampa, FL 33602
(813)274-8456

CITY OF
TAMPA, FLORIDA

NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS
PROPOSAL, BID BOND, FORM OF NOTICE OF AWARD,
AGREEMENT, PERFORMANCE BOND AND
SPECIFICATIONS

FOR

Contract 16-C-00009

SCOTT STREET IMPROVEMENTS

City of Tampa
CONTRACT ADMINISTRATION DEPARTMENT
TAMPA MUNICIPAL OFFICE BUILDING
306 E. JACKSON STREET - 4TH FLOOR NORTH
TAMPA, FLORIDA 33602

JANUARY 2016

CITY OF TAMPA
CONTRACT ADMINISTRATION DEPARTMENT
306 E. Jackson Street 280A4N
Tampa, FL 33602

****

BID NOTICE MEMO

****

Bids will be received no later than 1:30 p.m. on the indicated Date(s) for the following Project(s):

****

CONTRACT NO.: 16-C-00009; Scott Street Improvements

BID DATE: February 23, 2016 ESTIMATE: $650,000 SCOPE: The work includes construction of storm water infiltration planters, sediment basins and curbing along with landscaping, concrete walkways with brick inlay and site furnishings, with all associated work required for a complete project in accordance with the Contract Documents. PRE-BID CONFERENCE: Tuesday, February 9, 2016 2:00 p.m. Attendance is not mandatory, but recommended.

****

Bids will be opened in the 4th Floor Conference Room, Tampa Municipal Office Building, 306 E. Jackson Street, Tampa, Florida 33602. Pre-Bid Conference is held at the same location unless otherwise indicated. Plans and Specifications and Addenda for this work may be examined at, and downloaded from, www.demandstar.com. Backup files are available at http://www.tampagov.net/contract-administration/programs/construction-project-bidding. Subcontracting opportunities may exist for City certified Small Local Business Enterprises (SLBEs). A copy of the current SLBE directory may be obtained at www.Tampagov.net. Phone (813) 274-8456 for assistance. Email Technical Questions to: contractadministration@tampagov.net .

TABLE OF CONTENTS

* Series = 0700 to 0799, etc.

PLANS 42 Sheets of Drawings

NOTICE TO BIDDERS
CITY OF TAMPA, FLORIDA
Contract 16-C-00009; Scott Street Improvements

Sealed Proposals will be received by the City of Tampa no later than 1:30 P.M., February 23, 2016, in the 4th Floor Conference Room, Tampa Municipal Office Building, 306 E. Jackson Street, Tampa, Florida, there to be publicly opened and read aloud.

The proposed work is to include, but not be limited to, construction of storm water infiltration planters, sediment basins and curbing along with landscaping, concrete walkways with brick inlay and site furnishings with all associated work required for a complete project in accordance with the Contract Documents.

The Instructions to Bidders, Proposal, Form of Bid Bond, Agreement, Form of Public Construction Bond, Specifications, Plans and other Contract Documents are posted at DemandStar.com. Backup files may be downloaded from http://www.tampagov.net/contract-administration/programs/construction-project-bidding. One set may be available for reference at the office of the Contract Administration Department, Municipal Office Building, Fourth Floor North, City Hall Plaza, Tampa, Florida 33602.

Each Proposal must be submitted on the Proposal form included in the Specifications and must be accompanied by a certified check or cashier's check on a solvent bank or trust company in compliance with Section 255.051, Florida Statutes, made payable to the City of Tampa, in an amount of not less than five per cent of the total bid, or a Bid Bond, of like amount, on the form set forth in the Contract Documents, as a guarantee that, if the Proposal is accepted, the Bidder will execute the Proposed Contract and furnish a Public Construction Bond within twenty (20) days after receipt of Notice of Award of Contract.

The City of Tampa reserves the right to reject any or all Bids and to waive any informalities in the Bid and/or Bid Bond. Acceptance or rejection of Proposals will be made as soon as practicable after the Proposals are received, but the City reserves the right to hold Proposals for ninety (90) days from the date of Opening.

Bid Protest Procedures: Unless subsequently indicated otherwise, in a revised posting on the Department's web page for Construction Project Bidding, the City of Tampa intends to award the referenced project to the lowest bidder listed in the tabulation posted on or about the date of Bid Opening. A bidder aggrieved by this decision may file a protest not later than 4:30 P.M., five (5) business days from the first posting thereof, pursuant to City of Tampa Code Chapter 2, Article V, Division 3, Section 2-282, Procurement Protest Procedures. Protests not conforming therewith shall not be reviewed.

Communication with City Staff

Pursuant to City of Tampa Ordinance 2010-92, during the solicitation period, including any protest and/or appeal, NO CONTACT initiated by bidders or responders with City officers or employees, other than the individuals specified below is permitted:
Contracts Management Supervisor, Jim Greiner
Contract Officer, Jody Gray
The City's Legal Department staff
The City's Contract Administration Department staff.
Technical Questions and Requests For Information should be directed to the Department via
ContractAdministration@tampagov.net

"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, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list." Refer to Section 287.133 Florida Statues.

In accordance with the City of Tampa's Equal Business Opportunity Ordinance, a Goal may have been established for subcontracting with Women/Minority Business Enterprises, W/MBEs, certified by the City. Links to further information and a list of W/MBEs are on the Department's Construction Project Bidding Web page. A link to the current complete directory of W/MBEs is on the Minority Business Development Office Website.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.01 GENERAL:

The proposed work is the Scott Street Improvements in the City of Tampa, as required for a complete project, as shown on the plans and detailed in the specifications. The work is located on land owned or controlled by the City of Tampa.

I-1.02 FORM PREPARATION AND PRESENTATION OF PROPOSALS: Replace the second sentence with the following: Submission of the entire specification book is not required.

I-1.03 ADDENDA – Section I-2.03 is replaced with the following: No interpretation of the meaning of the Plans, Specifications, or other Contract Documents will be made to any Bidder orally.

Every request for such interpretation must be in writing, addressed to the City of Tampa, Contract Administration Department, 306 E. Jackson St., 4th Floor, Tampa, Florida 33602 and then emailed to ContractAdministration@tampagov.net. To be given consideration, such request must be received at least seven (7) days prior to the date fixed for the opening of the Proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda which, if issued, will be posted on DemandStar.Com and on the Department's web page, with notice given to all prospective bidders at the respective fax numbers or e-mail addresses furnished, for such purposes. Failure of any Bidder to receive any such addenda shall not relieve said Bidder from any obligation under his Proposal as submitted. All addenda so issued shall become part of the Contract Documents.

I-1.04 SIGNATURE OF BIDDERS: Section I-2.07 is replaced with the following:

Proposals must be signed in ink by the Bidder with signature in full. When firm is a Bidder, the Proposal shall be signed in the name of the firm by one or more partners. When a corporation is a bidder the officer signing shall set out the corporate name in full beneath which he shall sign his name and give the title of his office. The Proposal shall also bear the seal of the corporation attested by its secretary.

If the bidder referred to in Section I-2.07 is a corporation, it must submit; upon request, a copy of its filed Articles of Incorporation. In addition, if the bidder was incorporated in another state, it must establish that it is authorized to do business in the State of Florida. If the bidder is using a fictitious name, it must submit upon request, proof of registration of such name with the Clerk of the Circuit Court of the Country where its principal place of business is. Failure to submit what is required is grounds to reject the bid of that bidder.

I-1.05 TIME FOR COMPLETION:

The work shall be arranged to be completed in accordance with a progress schedule approved by the Construction Engineer.

The time for completion of this project, referred in Article 4.01 of the Agreement, shall be 180 consecutive calendar days. The period for performance shall start from the date indicated in the Notice To Proceed.

I-1.06 LIQUIDATED DAMAGES:

The amount of liquidated damages, referred to in Article 4.06 of the Agreement, for completion of this project shall be $500.00 per calendar day.

I-1.07 BASIS OF AWARD OF CONTRACT:

The basis of award referred to in Item I-2.11 of Instructions to Bidders shall be the greatest amount of work, which can be accomplished within the funds available as budgeted. The award may be made on the basis of the total bid, base bid, alternates(s) if any, unit bids if any, or any combination thereof deemed to be in the best interest of the City.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

Unless all bids are rejected, the award will be made within 90 days after opening proposals.

I-1.08 GROUND BREAKING CEREMONY:

Arrangement may be made by the City in coordination with the Contractor, for construction to commence with a Ground Breaking Ceremony. Details will be discussed at the pre-construction conference.

I-1.09 INSURANCE:

The insurance required for this project shall be as indicated on Pages beginning with INS-1. Before commencing work, the Contractor shall provide the evidence of the insurance required on a Certificate of Insurance accompanied by evidence of authority to bind the insurance company or companies such as agents license, power of attorney, or letter of authority.

I-1.10 EQUAL BUSINESS OPPORTUNITY PROGRAM / W/MBE / REQUIREMENTS

In accordance with the City of Tampa's Equal Business Opportunity Program, a goal of 20.0% has been established for subcontracting with Women/Minority Business Enterprises, (W/MBBEs), certified by the City. The goal is based upon the availability of the firms listed on the Subcontract Goal Contract List included herein.

BIDDERS MUST SOLICIT ALL W/MBEs ON THAT LIST and provide documentation of emails, faxes, phone calls, letters, or other communication with the firms as a first step to demonstrate Good Faith Efforts to achieve the goal. The list is formatted to facilitate e-mail solicitations to the listed firms by copying and pasting e-mail addresses.

Bidders may explore other opportunities for subcontracting with W/MBEs by consulting the current directory of all certified W/MBEs posted on the Minority Business Development Office web page.

GOOD FAITH EFFORT COMPLIANCE PLAN REQUIRED - When a Goal has been established, the Bidder must submit, with its bid, completed to the fullest extent possible, a Good Faith Effort Compliance Plan using the form GFECP contained herein. Additional documentation is required whenever an W/MBE subcontractor's low quote is not utilized. Supplemental information or documentation concerning the Bidder's Compliance Plan may be required prior to award as requested by the City.

DIVERSITY MANAGEMENT INITIATIVE, DMI, DATA REPORTING FORMS REQUIRED - Bidders must submit, with its bid, "DMI-Solicited" forms listing all subcontractors solicited and "DMI-Utilized" forms listing all subcontractors to be utilized. Supplemental forms, documentation, or information may be submitted at bid time or as requested by the City.

After an award, "DMI-Payments" forms are to be submitted with payment requests to report payments to subcontractors.

Bidders may visit the Minority Business Development Office's web page at TampaGov.net for other information about the W/MBE program, FAQ's, and the latest W/MBE directory of certified firms.

I-1.11 BID SECURITY:

Surety companies shall have a rating of not less than B+ Class VI as evaluated in the most recently circulated Best Key rating Guide Property-Liability.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.12 PUBLIC CONSTRUCTION BOND:

The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the form provided herein, equal to 100 percent of the Contract price, such Bond to be issued and executed by (a) surety company(ies) acceptable to the City of Tampa and licensed to underwrite contracts in the State of Florida. After execution of the Agreement and before commencing work, the Contractor must provide the City a certified copy of the officially recorded Bond.

I-1.13 AGREEMENT
Section 2 – Powers of the City's Representatives
Add the following:
Article 2.05 CITY'S TERMINATION FOR CONVENIENCE:

The City may, at any time, terminate the Contract in whole or in part for the City's convenience and without cause. Termination by the City under this Paragraph shall be by a notice of termination delivered to the Contractor, specify the extent of termination and the effective date.

Upon receipt of a notice of termination, the Contractor shall immediately, in accordance with instructions from the City, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph:

(a) cease operations as specified in the notice;
(b) place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;
(c) terminate all subcontracts and orders to the extent they relate to the Work terminated;
(d) proceed to complete the performance of Work not terminated; and
(e) take actions that may be necessary, or that the City may direct, for the protection and preservation of the terminated Work.

The amount to be paid to the Contract by the City because of the termination shall consist of:

(a) for costs related to work performed on the terminated portion of the Work prior to the effective date including termination costs relative to subcontracts that are properly chargeable to the terminated portion of the Work.
(b) the reasonable costs of settlement of the Work terminated, including accounting, legal, clerical and other expenses reasonable necessary for the preparation of termination settlement proposals and supporting data; additional costs of termination and settlement of subcontracts excluding amounts of such settlements; and storage, transportation, and other costs incurred which are reasonably necessary for the preservation, protection or disposition of the terminated Work; and
(c) a fair and reasonable profit on the completed Work unless the Contractor would have sustained a loss on the entire Contract had it been completed.

Allowance shall be made for payments previously made to the Contractor for the terminated portion of the Work, and claims which the City has against the Contractor under the Contract, and for the value of materials supplies, equipment or other items that are part of the costs of the Work to be disposed of by the Contractor.

I-1.14 Section 5 – subcontracts and Assignments, Article 5.01, Page A-7, Last Paragraph:
Change "…twenty-five (25) percent… "to fifty-one (51) percent…"

Section 10-Payments, Article .05 Partial Payments, 1st Paragraph, 1st Sentence:
Change "…fair value of the work done, and may apply for…" to "…fair value of the work done, and shall apply for…"

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.15 Contractors must utilize the U.S. Department of Homeland Security's E-Verify Systems to verify the employment eligibility of all persons employed during the term of the contract to perform employment duties within the State of Florida and all persons, including subcontractors, assigned by the contractor to perform work pursuant to the contract.

I-1.16 GENERAL PROVISIONS; G-2.02 Copies Furnished to Contractor: Replace the first paragraph with the following:

The Contractor shall acquire for its use copies of the plans and specifications as needed. The documents may be downloaded from the City's web site, at
http://www.tampagov.net/dept_contract_administration/programs_and_services/construction_project_bidding/index.asp

I-1.17 PAYMENT DISPUTE RESOLUTION

Any dispute pertaining to pay requests must be presented to the City pursuant to Executive Order 2003-1.

I-1.18 SCRUTINIZED COMPANIES.

For Contracts $1,000,000 and greater, if the City determines the Contractor submitted a false certification under Section 287.135(5) of the Florida Statutes, or if the Contractor has been placed on the Scrutinized Companies with Activities in the Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, the City shall either terminate the Contract after it has given the Contractor notice and an opportunity to demonstrate the City's determination of false certification was in error pursuant to Section 287.135(5)(a) of the Florida Statutes, or maintain the Contract if the conditions of Section 287.135(4) of the Florida Statutes are met.

I-1.19 FLORIDA'S PUBLIC RECORDS LAW

4.33.3 The City of Tampa is a public agency subject to Chapter 119, Florida Statutes. In accordance with Florida Statutes, 119.0701, if applicable, Contractor shall comply with Florida's Public Records Law. Specifically, the Contractor shall:

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

2. Provide the public with access to such public records on the same terms and conditions that the City would provide the records and at a cost that does not exceed that provided in Chapter 119, Florida Statutes, or as otherwise provided by law;

3. Ensure that public records that are exempt or that are confidential and exempt from public record requirements are not disclosed except as authorized by law;

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

4.33.4 The failure of Contractor to comply with the provisions set forth in this Article shall constitute a Default and Breach of this award and the City shall enforce the Default in accordance with the provisions set forth in the DEFAULT/RE-AWARD section of this document.

SECTION 2
GENERAL INSTRUCTIONS

I-2.01 BIDDER'S RESPONSIBILITY

Before submitting Proposals, Bidders shall carefully examine the entire site of the proposed work and adjacent premises and the various means of approach and access to the site, and make all necessary investigations to inform themselves thoroughly as to the facilities necessary for delivering, placing and operating the necessary construction equipment, and for delivering and handling materials at the site, and inform themselves thoroughly as to all difficulties involved in the completion of all the work in accordance with the Contract Documents.

Bidders must examine the Plans, Specifications, and other Contract Documents and shall exercise their own judgment as to the nature and amount of the whole of the work to be done, and for the bid prices must assume all risk of variance, by whomsoever made, in any computation or statement of amounts or quantities necessary to complete the work in strict compliance with the Contract Documents.

Elevations of the ground are shown on the Plans and are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation. Bidders shall satisfy themselves as to the correctness of all elevations.

The City may have acquired, for its own use, certain information relating to the character of materials, earth formations, probable profiles of the ground, conditions below ground, and water surfaces to be encountered at the site of the proposed work. This information, if it exists, is on file at the offices of the Department of Public Works and Bidders will be permitted to see and examine this information for whatever value they consider it worth. However, this information is not guaranteed, and Bidders should satisfy themselves by making borings or test pits, or by such other methods as they may prefer, as to the character, location, and amounts of water, peat, clay, sand, quicksand, gravel, boulders, conglomerate, rock, gas or other material to be encountered or work to be performed.

Various underground and overhead structures and utilities are shown on the plans. The location and dimensions of such structures and utilities, where given, are believed to be reasonably correct, but do not purport to be absolutely so. These structures and utilities are plotted on the Plans for the information of the Bidders, but information so given is not to be construed as a representation or assurance that such structures will be found or encountered as plotted, or that such information is complete or accurate.

I-2.02 FORM, PREPARATION AND PRESENTATION OF PROPOSALS

Each Proposal shall be submitted upon the Proposal Form and in accordance with the instructions included herein. The Proposal Form must not be detached herefrom. All blank spaces for bid prices must be filled in, in both words and figures, with the unit or lump sum prices, or both, for which the Proposal is made. The computed total price for each unit price Contract Item shall be determined by multiplying the estimated quantity of the item, as set forth in the Proposal Form, by the corresponding unit price bid for such item. The resulting product shall be entered in the appropriate blank space under the column headed "Computed Total Price for Item". The lump sum price bid for each lump sum price Contract Item shall also be entered in the column headed "Computed Total Price for Item". If a Proposal contains any omissions, erasures, alterations, additions, or items not called for in the itemized Proposal, or contains irregularities of any kind, such may constitute sufficient cause for rejection of the Proposal. In case of any discrepancy in the unit price or amount bid for any item in the Proposal, the price as expressed in written words will govern. In no case is the Agreement Form to be filled out or signed by the Bidder.

In the case of certain jobs bid Lump Sum a "Schedule of Unit Prices" must be filled out as an attachment to the Lump Sum proposal. These prices may be used as a guide for the negotiation of change orders, at the City's option.

The proposal must be signed and certified and be presented on the prescribed form in a sealed envelope on/or before the time and at the place stated in the Notice of Bidders, endorsed with the name of the person, firm or corporation presenting it, the date of presentation, and the title of the work for which the Proposal is made.

Unless the apparent low bidder is now engaged in or has recently completed contract work for the City of Tampa, he, if requested, shall furnish to the City, after the opening of bids and prior to award, a summary statement of record of construction experience over the past three (3) years with proper supporting evidence, and, if required by the City, shall also furnish a list of equipment and other facilities pertinent to and available for the proper execution of the proposed work, and a statement of financial resources to the extent necessary to establish ability to carry on the proposed work. The City may make further investigations as considered necessary with respect to responsibility of the Bidder to whom it appears may be awarded the Contract.

If forwarded by mail, the sealed envelope containing the Proposal, endorsed as directed above, must be enclosed in another envelope addressed as specified in the Notice to Bidders and sent by registered mail.

I-2.03 ADDENDA AND INTERPRETATIONS

No interpretation of the meaning of the Plans, Specifications, or other Contract Documents will be made to any Bidder orally.

Every request for such interpretation must be in writing, addressed to the Contract Administration Department, Tampa Municipal Office Building, 4th Floor North, City Hall Plaza, Tampa, Florida 33602. To be given consideration, such request must be received at least seven (7) days prior to the date fixed for the opening of the Proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda which, if issued, will be sent by certified mail, with return receipt requested, to all prospective bidders at the respective addresses furnished, for such purposes, not later than three (3) working days prior to the date fixed for the opening of the Proposals, and if requested, a copy will be delivered to the prospective bidder's representative. Failure of any Bidder to receive any such addenda shall not relieve said Bidder from any obligation under his Proposal as submitted. All addenda so issued shall become part of the Contract Documents.

I-2.04 BID SECURITY

Each Proposal must be accompanied by a certified or cashier's check issued by a solvent bank or trust company and payable at sight to the City of Tampa, in compliance with Section 255.051 Florida Statutes, or a Bid Bond upon the form provided herein, in an amount of not less than five percent of the sum of the computed total amount of the Bidder's Proposal as a guarantee that if the Proposal is accepted, the Bidder will execute and fill in the proposed Contract and Public Construction Bond within twenty (20) days after notice of award of the Contract. Certified checks shall have all necessary documentary revenue stamps attached if required by law. Surety on Bid Bonds shall be a duly authorized surety company authorized to do business in the State of Florida, and all such Bonds shall be issued or countersigned by a local resident producing agent, and satisfactory evidence of the authority of the person or persons executing such Bond to Execute the same shall be submitted with the Bond. Bid Bonds shall be issued by a surety company acceptable to the City.

Within ten (10) days after the opening of Proposals, the bid security of all but the three lowest Bidders will be returned. The bid security of the remaining two Bidders whose Proposals are not accepted will be

returned within ten (10) days after the execution of the Contract, or, if no such Contract has been executed, within ninety (90) days after the date of opening Proposals. The bid security of the Bidder whose Proposal is accepted will be returned only after he has duly executed the Contract and furnished the required Public Construction Bond and insurance.

Should it be necessary for the City to retain the bid security and said bid security is in the form of checks, the checks of these Bidders will be returned if replaced by Bid Bonds in an amount equal to the amount of the checks of such Bidders in such form and issued by a surety company acceptable to the City.

A Bidder may withdraw his Proposal before the time fixed for the opening of Proposals, without prejudice to himself, by communicating his purpose, in writing, to the Mayor and City Council, and when his communication is received, the Proposal will be handed to him or his authorized agent unopened. No Bidder may withdraw his Proposal within ninety (90) days after the day of opening Proposals.

The Bidder whose Proposal is accepted shall enter into a written contract, upon the Agreement form included herein, for the performance of the work and furnish the required Public Construction Bond within twenty (20) days after written notice by the City of Award of Contract has been served on such Bidder personally or after receipt of the written notice by registered mail to such Bidder at the address given in his Proposal.

If the Bidder to whom a Contract is awarded refuses or neglects to execute it or fails to furnish the required Public Construction Bond within twenty (20) days after receipt by him of the Notice of Award of Contract, the amount of his bid security shall be forfeited and shall be retained by the City as liquidated damages, and not as a penalty, it being now agreed that said sum is a fair estimate of the amount of damages that the City will sustain in case said Bidder fails to enter into a Contract and furnish the required Public Construction Bond. If a Bid Bond was furnished, the full amount of the Bond shall become due and payable as liquidated damages caused by such failure. The full amount of the bid security shall be forfeited as liquidated damages without consideration of the fact that an award may be less than the full amount of the Bidder's Proposal, excepting that the award shall be within the conditions of said Proposal relating to the basis of consideration for an award. No plea of mistake in the bid or misunderstanding of the conditions of forfeiture shall be available to the Bidder for the recovery of his deposit or as a defense to any action based upon the neglect or refusal to execute a contract.

I-2.05 LAWS AND REGULATIONS
The Bidder who is awarded the Contract must comply with all laws of the State of Florida, and all applicable Ordinances of the City of Tampa respecting labor and compensation and with all other statutes, ordinances, rules and regulations applicable and having the force of law.

I-2.06 PUBLIC CONSTRUCTION BOND
The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the form provided herein, equal to 100 percent of the Contract price, such Bond to be executed by a surety company acceptable to the City of Tampa and licensed to underwrite contracts in the State of Florida. Surety companies shall have a rating of not less than: B+ Class VI as evaluated in the most recently circulated BEST'S KEY RATING GUIDE PROPERTY-LIABILITY.

I-2.07 SIGNATURE AND QUALIFICATIONS OF BIDDERS
Proposals must be signed in ink by the Bidder with signature in full. When a firm is a Bidder, the Proposal shall be signed in the name of the firm by one or more of the partners. When a corporation is a Bidder the officer signing shall set out the corporate name in full beneath which he shall sign his name and give the title of his office. The Proposal shall also bear the seal of the corporation attested by its secretary. Anyone signing the Proposal as agent must file with it legal evidence of his authority to do so.

Bidders who are nonresident corporations shall furnish to the City a duly certified copy of their permit to transact business in the State of Florida, signed by the Secretary of State, within ten days of the notice to do so. Such notice will be given to Bidders who are nonresident corporations, to whom it appears an award will be made, and the copy of the permit must be filed with the City before the award will be made. Failure to promptly submit this evidence of qualification to do business in the State of Florida may be basis for rejection of the Proposal.

I-2.08 REJECTION OF PROPOSALS
The City reserves the right to reject any Proposal if investigation of the Bidder fails to satisfy the City that such Bidder is properly qualified to carry out the obligations and to complete the work contemplated therein. Any or all Proposals will be rejected if there is reason to believe that collusion exists among Bidders. Proposals will be considered irregular and may be rejected if they show 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.

I-2.09 QUANTITIES ESTIMATED ONLY
The estimate of quantities of the various items of work and materials, if set forth in the Proposal Form, is approximate only and is given solely to be used as a uniform basis for the comparison of Proposals. The quantities actually required to complete the Contract work may be less or more than so estimated, and if awarded a Contract for the work specified, the Contractor agrees that he will not make any claim for damages or for loss of profits because of a difference between the quantities of the various classes of work assumed for comparison of Proposals and quantities of work actually performed. The City further reserves the right to vary the quantities in any amount.

I-2.10 COMPARISON OF PROPOSALS
Except jobs bid on a "One Lump Sum" basis, proposals will be compared on the basis of a total computed price arrived at by taking the sum of the estimated quantity of each time and the corresponding unit price of each item, and including any lump sum prices on individual items.

The computed total prices for individual Contract Items and the total computed price for the entire Contract, as entered by the Bidder in the Proposal Form, are for convenience only and are subject to correction in the tabulation and computation of the Proposals.

I-2.11 BASIS OF AWARD
The Contract will be awarded, if at all, to the lowest responsible Bidder or Bidders, as determined by the City and by the terms and conditions of the Contract Documents. Unless all bids are rejected, the award will be made within ninety (90) days after the opening of Proposals. The successful Bidder will be required to possess, or obtain, a valid City Occupational License.

I-2.12 INSURANCE REQUIRED
The successful Bidder and his subcontractors will be required to procure and pay for insurance covering the work in accordance with the provisions of Article 6.02 of the Agreement as indicated on special instructions pages beginning with INS-1.

I-2.13 NO ASSIGNMENT OF BID
No Bidder shall assign his bid or any rights thereunder.

I-2.14 NONDISCRIMINATION IN EMPLOYMENT
Contracts for work under this Proposal will obligate the contractors and subcontractors not to discriminate in employment practices.

Bidders must, if requested, submit with their initial bid a signed statement as to whether they have previously performed work subject to the President's Executive Order Nos. 11246 and 11375.
Bidders must, if requested, submit a compliance report concerning their employment practices and policies in order to maintain their eligibility to receive the award of the Contract.

Successful Bidders must, if requested, submit a list of all subcontractors who will perform work on the project and written,

signed statement from authorized agents of the labor pools with which they will or may deal for employees on the work together with supporting information to the effect that said labor pools practices and policies are in conformity with Executive Order No. 11246 and that said labor pools will affirmatively cooperate in or offer no hindrance to the recruitment, employment and equal treatment of employees seeking employment and performing work under the Contract, or a certification as to what efforts have been made to secure such statements when such agents or labor pools have failed or refused to furnish them prior to the award of the Contract.

I-2.15 LABOR STANDARDS
The Bidder's attention is directed to the Contract Provisions of the Labor Standards for federally assisted projects which may be attached to and made a part of the Agreement.

I-2.16 NOTICE TO LABOR UNIONS
If applicable, the successful Bidder will be required to provide Labor Unions and other organizations of workers a completed copy of the form entitled "Notice to Labor Unions or Other Organizations of Workers", and such form may be made a part of the Agreement.

I-2.17 NOTICE TO PROSPECTIVE FEDERALLY-ASSISTED CONSTRUCTION CONTRACTORS
A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted to said Secretary prior to the award of a federally-assisted construction and Contract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause. The form of certification may be bound herein following the form of Bid Bond.

Contractors receiving federally-assisted construction Contract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractor for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity Clause:

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT
FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

"A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause."

"Contractors receiving subcontract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide from the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity Clause."

The United States requires a pre-award conference if a proposed construction contract exceeds one million dollars to determine if the the prospective contractor is in compliance with the Equal Employment Opportunity requirements of Executive Order 11246 of September 24, 1965. In such instances, a meeting may be scheduled at which the prospective contractor must specify what affirmative action he has taken or proposed to take to assure equal employment opportunity which must be approved by the United States before award of the contract will be authorized.

Bidders must be prepared to submit an Equal Employment Opportunity (EEO) plan at a pre-award conference. The plan must include bidding opportunities offered by the Bidder to minority subcontractors.

On October 13, 1971, President Nixon issued Executive Order 11246 emphasizing the government's commitment to the promotion of minority business enterprise. Accordingly, the United States is firmly committed to the utilization of available resources to support this important program. U.S. agencies are most interested in realizing minority participation on the subject. Achieving equal employment opportunity compliance is required through Executive Order 11246. WE cannot emphasize too strongly that minority subcontractors be extended subcontractors bidding opportunities as but one step in your affirmative action policy.

Due to the importance of this contract, U.S. Agencies may conduct an EEO Conference prior to the award of the Contract. It is suggested that the responsive Bidder confirm the minority subcontractors he contacted for bids or quotations in his EEO plan submitted at the conference.

I-2.18 EEO AFFIRMATIVE ACTION REQUIREMENTS
By the submission of a Proposal, each Bidder acknowledges that he understands and will agree to be bound by the equal opportunity requirements of Federal regulations which shall be applicable throughout the performance of work under any contract awarded pursuant to solicitation. Each Bidder agrees that if awarded a contract, he will similarly bind contractually each subcontractor. In policies, each Bidder further understands and agrees that if awarded a contract, he must engage in Affirmative Action directed to promoting and ensuring equal employment opportunity in the work force used under the contract (and he must require contractually the same effort of all subcontractors whose subcontracts exceed $100,000). The Bidder understands and agrees that "Affirmative Action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site work force used on the project. * * * * * * * END of SECTION * * * * * * *

CITY OF TAMPA INSURANCE REQUIREMENTS

During the life of the award/contract the Awardee/Contractor shall provide, pay for, and maintain insurance with companies authorized to do business in Florida, with an A.M. Best rating of B+ (or better) Class VII (or higher), or otherwise be acceptable to the City if not rated by A.M. Best. All insurance shall be from responsible companies duly authorized to do business in the State of Florida.

All commercial general liability insurance policies (and Excess or Umbrella Liability Insurance policies, if applicable) shall provide that the City is an additional insured as to the operations of the Awardee/Contractor under the award/contract including the additional insured endorsement, the subrogation wavier endorsement, and the Severability of Interest Provision. In lieu of the additional named insured requirement, if the Awardee/Contractor's company has a declared existing policy which precludes it from including additional insureds, the City may permit the Contractor to purchase an Owners and Contractors Protective Liability policy. Such policy shall be written in the name of the City at the same limit as is required for General Liability coverage. The policy shall be evidenced on an insurance binder which must be effective from the date of issue until such time as a policy is in existence and shall be submitted to the City in the manner described below as applicable to certificates of insurance.

The insurance coverages and limits required must be evidenced by a properly executed Acord 25 Certificate of Insurance form or its equivalent. Each Certificate must be personally manually signed by the Authorized Representative of the insurance company shown in the Certificate with proof that he/she is an authorized representative thereof. Thirty days' written notice must be given to the City of any cancellation, intent not to renew, or reduction in the policy coverages, except in the application of the aggregate liability limits provisions. Should any aggregate limit of liability coverage be reduced, it shall be immediately increased back to the limit required by the contract. The insurance coverages required herein are to be primary to any insurance carried by the City or any self-insurance program thereof.

The following coverages are required:

A. Commercial General Liability Insurance shall be provided on the most current Insurance Services Office (ISO) form or its equivalent. This coverage must be provided to cover liability arising from premises and operations, independent contractors, products and completed operations, personal and advertising injury, contractual liability, and XCU exposures (if applicable). Completed operations liability coverage shall be maintained for a minimum of one-year following completion of work. The amount of Commercial General Liability insurance shall not be less than the amount specified.

(a) $1,000,000 per occurrence and a $2,000,000 general aggregate for projects valued at $2,000,000 or less. General aggregate limit for projects over that price shall equal or exceed the price of the project. An Excess or Umbrella Liability insurance policy can be provided to meet the required limit. Risk Management may be contacted for additional information regarding projects of this nature.

B. Automobile Liability Insurance shall be maintained in accordance with the laws of the State of Florida, as to the ownership, maintenance, and use of all owned, non-owned, leased, or hired vehicles. The amount of Automobile Liability Insurance shall not be less than the amount specified.

(a) $500,000 combined single limit each occurrence bodily injury & property damage- for projects valued at $100,000 and under

(b) $1,000,000 combined single limit each occurrence bodily injury & property damage – for projects valued over $100,000

C. Worker's Compensation and Employer's Liability Insurance shall be provided for all employees engaged in the work under the contract, in accordance with the Florida Statutory Requirements. The amount of the Employer's Liability Insurance shall not be less than:

(a) $500,000 bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each employee – for projects valued at $100,00 and under
(b) $1,000,000 bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each –for projects valued over $100,000

D. Excess Liability Insurance or Umbrella Liability Insurance may compensate for a deficiency in general liability, automobile, or worker's compensation insurance coverage limits. If the Excess or Umbrella policy is being provided as proof of coverage, it must name the City of Tampa as an additional insured **(IF APPLICABLE).**

E. Builder's Risk Insurance, specialized policy designed to cover the property loss exposures that are associated with construction of buildings. The amount of coverage should not be less than the amount of the project. **(IF APPLICABLE).**

F. Installation Floater- a builder's risk type policy that covers specific type of property during its installation, is coverage required for highly valued equipment or materials such as compressors, generators, or other machinery that are not covered by the builder's risk policy **(IF APPLICABLE).**

G. Longshoreman's & Harbor Worker's Compensation Act/Jones Act coverage shall be maintained for work being conducted upon navigable water of the United States. The limit required shall be the same limit as the worker's compensation/employer's liability insurance limit **(IF APPLICABLE).**

H. Professional Liability shall be maintained against claims of negligence, errors, mistakes, or omissions in the performance of the services to be performed and furnished by the Awardee/Contractor or any of its subcontractors when it acts as a DESIGN PROFESSIONAL. The amount of coverage shall be no less than amount specified **(IF APPLICABLE).**

(a) $1,000,000 per incident and general aggregate. Note all claims made policies must provide the date of retroactive coverage.

The City may waive any or all of the above referenced insurance requirements based on the specific nature of goods or services to be provided under the award/contract.

ADDITIONAL INSURED - The City must be included as an additional insured by on the general and (Excess or Umbrella liability policies) if applicable. Alternatively, the Contractor may purchase a separate owners protective liability policy in the name of the City in the specified amount as indicated in the insurance requirements.

CLAIMS MADE POLICIES - If any liability insurance is issued on a claims made form, Contractor agrees to maintain uninterrupted coverage for a minimum of one year following completion and acceptance of the work either through purchase of an extended reporting provision, or through purchase of successive renewals with a retroactive date not later than the beginning of performance of work for the City. The retroactive date must be provided for all claims made policies.

CANCELLATION/NON-RENEWAL - Thirty (30) days written notice must be given to the City of any cancellation, intent to non-renew or material reduction in coverages (except aggregate liability limits). However, ten (10) days notice may be given for non-payment of premium. Notice shall be sent to the City of Tampa Department of Public Works, 306 E. Jackson Street, Tampa, FL 33602.

NUMBER OF POLICIES - General and other liability insurance may be arranged under single policies for the full amounts required or by a combination of underlying policies with the balance provided by an excess or umbrella liability insurance policy.

WAIVER OF SUBROGATION - Contractor waives all rights against City, its agents, officers, directors and employees for recovery of damages to the extent such damage is covered under the automobile or excess liability policies.

SUBCONTRACTORS - It is the Contractor's responsibility to require all subcontractors to maintain adequate insurance coverage.

PRIMARY POLICIES - The Contractor's insurance is primary to the City's insurance or any self insurance program thereof.

RATING - All insurers shall be authorized to do business in Florida, and shall have an A.M. Best rating of B+ (or better), Class VII (or higher), or otherwise be acceptable to the City if not rated by A.M. Best.

DEDUCTIBLES - The Contractor is responsible for all deductibles. In the event of loss which would have been covered but for the presence of a deductible, the City may withhold from payment to Contractor an amount equal to the deductible to cover such loss should full recovery not be obtained under the insurance policy.

INSURANCE ADJUSTMENTS - These insurance requirements may be increased, reduced, or waived at the City's sole option with an appropriate adjustment to the Contract price.

Document updated on 12/22/2009 by RLD (Risk Management)

City of Tampa MBD Office

U-WMBE Goal Setting Firms Report

as of 1/21/2016

LANDSCAPING (TREES, LAWN, NEW CONSTRUCTION)

Arazoza Brothers Corp. **Federal Number** 65-0031332

P.O.Box 924890
Homestead, FL 33092

Phone (305) 246-3223
Fax (305) 246-0481

Minority Hispanic American
Contact Albert Arazoza

E-mail RAsensio@Arazozabrothers.com

Raulerson & Son, Inc. **Federal Number** 59-1516048

10611 Raulerson Ranch Road
Tampa, FL 33637

Phone (813) 988-3698
Fax (813) 985-6242

Minority Caucasian Female
Contact Carol Raulerson

E-mail raulersons@aol.com

Infante's Services, Inc. **Federal Number** 59-3648843

18620 Gunn Hwy.
Odessa, FL 33556

Phone (813) 926-2271
Fax (813) 926-1431

Minority Hispanic American
Contact Renee Infante

E-mail charlotte@infanteservices.com

Pine Lake Nursery & Landscape, Inc. **Federal Number** 59-3499734

19619 N. Dale Mabry Hwy.
Lutz, FL 33548

Phone (813) 948-6209
Fax (813) 948-8179

Minority Hispanic American
Contact Ivan Martinez

E-mail pinelake@tampabay.rr.com

Bay Light, LLC d/b/a Professional Property Services **Federal Number** 59-1341451

10105 11th Street North
Tampa, FL 33612

Phone (813) 972-4057
Fax (813) 971-0882

Minority African American
Contact Hyacinth Robinson

E-mail paulrobinson22@msn.com

Sunbelt Sod & Grading Company **Federal Number** 13-4250933

819 - 9th St. N.E.
Ruskin, FL 33570

Phone (813) 641-9855
Fax (813) 645-7263

Minority Caucasian Female
Contact Lesley Silva

E-mail sunbeltsod@verizon.net

Fresh Start Development, Inc. **Federal Number** 20-3857845

P.O. Box 310592
Tampa, FL 33680

Phone (813) 758-5345
Fax (813) 333-5949

Minority African American
Contact Katina McClinton

E-mail freshstartdevelop@yahoo.com

City of Tampa MBD Office

U-WMBE Goal Setting Firms Report

as of 1/21/2016

LANDSCAPING (TREES, LAWN, NEW CONSTRUCTION)

Sterling Silver Scape & Sod, Inc. **Federal Number** 59-3171150

P.O. Box 450459
Kissimmee, FL 34745

Phone (407) 846-3225
Fax (407) 846-3207

Minority African American
Contact Sterling Blake

E-mail dahlia2@sterlingsilverlandscaping.com

AAJ Lawn Care Services, Inc. **Federal Number** 26-0254393

3716 E. Idlewild Avenue
Tampa, FL 33610

Phone (813) 220-8533
Fax (888) 277-1860

Minority African American
Contact Archie Jerry

E-mail aajlawncare@gmail.com

Gustavo Negrete d/b/a Lawns & More **Federal Number** 76-6102049

1407 Bonnie Loop
Plant City, FL 33565

Phone (813) 650-1834
Fax (813) 754-0282

Minority Hispanic American
Contact Gustavo Negrete

E-mail nancyostewart29@gmail.com

A J Landscaping, LLC **Federal Number** 21-0159888

P.O. Box 2381
Valrico, FL 33596

Phone (813) 643-1781
Fax (813) 643-1781

Minority Hispanic American
Contact Alberto Pereiro

E-mail as@aslandscapingllc.com

Alpha Field Services, LLC **Federal Number** 90-1007218

27251 Wesley Chapel Blvd # 513
Wesley Chapel, FL

Phone (813) 900-2687
Fax (813) 907-2810

Minority African American
Contact Lorraine Harris

E-mail support@alphafieldservices.com

JTCM Inc **Federal Number** 56-2418914

817 S MacDill Ave
Tampa, FL 33609

Phone (813) 935-7724
Fax (813) 935-7724

Minority Caucasian Female
Contact Helen Suders

E-mail noelsuders@gmail.com

DEANS ENVIRONMENTAL SERVICES **Federal Number** 83-0461047

2126 Whispering Trails Blvd
Winter Haven, FL 33884

Phone (863) 595-8255
Fax (904) 791-9060

Minority African American
Contact KYLE DEAN

E-mail DEANK8859@AOL.COM

City of Tampa MBD Office

U-WMBE Goal Setting Firms Report

as of 1/21/2016

PAVEMENT MARKING SERVICES

BUN Construction Co., Inc. **Federal Number** 59-3362663

4202 E. Martin Luther King Blvd.
Tampa, FL 33610

Phone (813) 931-8270
Fax (813) 931-9185

Minority African American
Contact Bart Nwagbuo

E-mail bunconstruction@tampabay.rr.com

E/S Concrete Services, Inc. **Federal Number** 59-3119582

726 East Harbor Dr. South
St. Petersburg, FL 33705

Phone (727) 560-0957
Fax (727) 821-5029

Minority African American
Contact Enoris Sly

E-mail enorisslysr@yahoo.com

Traffic Control Products of Florida, Inc. **Federal Number** 59-2582822

5514 Carmack Road
Tampa, FL 33610-9416

Phone (813) 621-8484
Fax (813) 621-4611

Minority Caucasian Female
Contact Karen Wasielewski

E-mail kw@trafficcontrolproducts.org

Subcontract Goal Contact List: SLBEs and Underutilized WMBEs
(**The Underutilized WMBE Industry Category for Subcontracts is Construction - BBE Certified)

Project 16-C-00009 (Scott Street Improvements)

# Of Firms	Company Name	Federal Number	Address	Phone Number	SLBE/WMBE CLASS	City, State, Zip Code	Fax Number	Contact Name	Contact Email
1	A J Landscaping, LLC	21-0159888	P.O. Box 2381	(813) 643-1781	Small Business	Valrico, FL 33596	(813) 643-1781	Alberto Pereiro	as@aslandscapingllc.com
2	AAJ Lawn Care Services, Inc.	26-0254393	3716 E. Idlewild Avenue	(813) 220-8533	**SLBE/BBE**	Tampa, FL 33610	(888) 277-1860	Archie Jerry	aajlawncare@gmail.com
3	Alpha Field Services, LLC	90-1007218	27251 Wesley Chapel Blvd # 513	(813) 900-2687	**SLBE/BBE**	Wesley Chapel, FL	(813) 907-2810	Lorraine Harris	support@alphafieldservices.com
4	Bay Light, LLC d/b/a Professional Property Services	59-1341451	10105 11th Street North	(813) 972-4057	**SLBE/BBE**	Tampa, FL 33612	(813) 971-0882	Hyacinth Robinson	paulrobinson22@msn.com
5	Breit Turf Management, LLC	27-3737949	P.O. Box 13551	(813) 732-3221	Small Business	Tampa, FL 33681		Edward Breit	breitturf1@gmail.com
6	BUN Construction Co., Inc.	59-3362663	4202 E. Martin Luther King Blvd.	(813) 931-8270	**SLBE/BBE**	Tampa, FL 33610	(813) 931-9185	Bart Nwagbuo	bunconstruction@tampabay.rr.com
7	Cardinal Landscaping Services of Tampa, Inc.	59-3394554	817 E. Okaloosa Ave.	(813) 915-9696	Small Business	Tampa, FL 33604	(813) 915-9695	Mark Mantei	Mike@cardinallandscape.com
8	DEANS ENVIRONMENTAL SERVICES	83-0461047	2126 Whispering Trails Blvd	(863) 595-8255	**SLBE/BBE**	Winter Haven, FL 33884	(904) 791-9060	KYLE DEAN	DEANK8859@AOL.COM
9	E/S Concrete Services, Inc.	59-3119582	726 East Harbor Dr. South	(727) 560-0957	**SLBE/BBE**	St. Petersburg, FL 33705	(727) 821-5029	Enoris Sly	enorisslysr@yahoo.com
10	Evolve Professional Landscape Management, LLC	27-2323571	P.O. Box 2362	(863) 205-3769	Small Business	Bartow, FL 33831	(863) 223-0275	Joseph Bustos	office@evolveyourlawn.com
11	Fresh Start Development, Inc.	20-3857845	P.O. Box 310592	(813) 758-5345	**SLBE/BBE**	Tampa, FL 33680	(813) 333-5949	Katina McClinton	freshstartdevelop@yahoo.com
12	Gustavo Negrete d/b/a Lawns & More	76-6102049	1407 Bonnie Loop	(813) 650-1834	Small Business	Plant City, FL 33565	(813) 754-0282	Gustavo Negrete	nancyostewart29@gmail.com

African American/Black Business Enterprises (BBE) may count toward the subcontract goal. Refer to MBD Form 70-Procurement Guidelines

Report Date: January 13, 2016

Subcontract Goal Contact List: SLBEs and Underutilized WMBEs
(The Underutilized WMBE Industry Category for Subcontracts is Construction - BBE Certified)**

Project 16-C-00009 (Scott Street Improvements)

# Of Firms	Company Name	Federal Number	Address	Phone Number	SLBE/WMBE CLASS	City, State, Zip Code	Fax Number	Contact Name	Contact Email
13	Infante's Services, Inc.	59-3648843	18620 Gunn Hwy.	(813) 926-2271	Small Business	Odessa, FL 33556	(813) 926-1431	Renee Infante	charlotte@infanteservices.com
14	JTCM Inc	56-2418914	817 S MacDill Ave	(813) 935-7724	Small Business	Tampa, FL 33609	(813) 935-7724	Helen Suders	noelsuders@gmail.com
15	Nelson's Tree Farm and Nursery, Inc.	59-3404710	19139 Geraci Rd.	(813) 917-6608	Small Business	Lutz, FL 33549	(813) 350-9139	Kimberly Martinez	kimberly.martinez33@gmail.com
16	NPC Mowing & Landscaping	03-0555858	P.O. Box 292873 6441 Eureka Springs Road	(813) 967-4386	Small Business	Tampa, FL 33687-2873	(352) 668-3295	John Woodhouse	Jwoodho793@aol.com
17	Sterling Silver Scape & Sod, Inc.	59-3171150	P.O. Box 450459	(407) 846-3225	**African American**	Kissimmee, FL 34745	(407) 846-3207	Sterling Blake	dahlia2@sterlingsilverlandscaping.com
18	Sunbelt Sod & Grading Company	13-4250933	819 - 9th St. N.E.	(813) 641-9855	Small Business	Ruskin, FL 33570	(813) 645-7263	Lesley Silva	sunbeltsod@verizon.net
19	Superior Construction & Contracting, LLC	27-0679204	4402 Osborne Ave	(813) 712-7325	Small Business	Tampa, FL 33614	(813) 868-1163	Michael Strouse	jmartinez@superiorflorida.net
20	Universal Pavement Marking Inc.	59-3245096	P.O. Box 0021	(813) 653-0092	Small Business	Valrico, FL 33594	(813) 653-0092	Jon Martin	upmarking@aol.com
21	Williams Landscape Management Co., Inc.	54-3516370	PO Box 311444 5711 N. 50th St.	(813) 628-8048	Small Business	Tampa, FL 33610	(813) 628-8048	Tony Williams	tonywilliams@wlmslandscape.com

African American/Black Business Enterprises (BBE) may count toward the subcontract goal. Refer to MBD Form 70-Procurement Guidelines

Report Date: January 13, 2016

Instructions Regarding Use of the W/MBE Goal Contact List

Bidders must solicit a subcontracting bid from ALL of the firms listed on the W/MBEs list provided within the Specifications, and provide documentation of emails, faxes, phone calls, letters, or other communication with the firms as a first step in demonstrating Good-Faith Efforts to achieve the goal set for W/MBE participation on this contract.

The list is formatted to facilitate e-mailing of a solicitation to the listed firms by copying and pasting the email addresses.

The W/MBE participation Goal is based upon the availability of the certified firms indicated on the contact list. The Goal and Requirements of the City's Equal Business Opportunity Program are stated in the Bid/Contract Document, Specifications.

SOLICITATION FOR SUBCONTRACTOR QUOTES

From:
OUR COMPANY NAME:
TELEPHONE NUMBER:
ADDRESS:
FAX NUMBER:
E-MAIL ADDRESS:

To Subcontractor:

Our firm is in the process of preparing a bid for a **City of Tampa Contract**. Please accept this notice as our request for quotes for the scope of work identified below. Please respond to this request by filling in the information below and returning via e-mail or fax to the address or number provided. Please contact us if you need any assistance in obtaining bonding, lines of credit, insurance, assistance in obtaining necessary equipment, supplies, materials, participation in a City-sponsored mentor-protégé program, or if you have any questions.

Plans and Specs for this project are posted at:
http://www.tampagov.net/dept_contract_administration/programs_and_services/construction_project_bidding/

CONTRACT NO.:
CONTRACT NAME:
CITY'S BID OPENING DATE:
DEADLINE FOR YOUR SUBCONTRACTOR BID OR RESPONSE:
SPECIFIC SCOPE OF WORK:

Please complete and submit with your subcontract bid or response:
YOUR FIRM'S NAME:
MAILING ADDRESS:
CITY:
STATE:
ZIP:
FAX NUMBER:
E-MAIL ADDRESS:
__Yes, my company is interested in quoting this project for the following items of work:

__No, my company will not quote this project for the following reason(s):

(Sample Suggested Sub Solicitation 3-9-9 Tampa MBDO)

PROPOSAL

To the Mayor and City Council of the City of Tampa, Florida:

Name of Bidder _____

_____
Business Phone Number and Email Address

_____
Business Name and Mailing Address

_____
Phone Number and Name of Contact Regarding Permits

_____
Contractor/Qualifiers Name and Federal Identification Number

Date of Proposal _____

(If Bidder is a firm, fill in the following blanks):

Names and Residential Addresses of Partners

_____

_____

(If Bidder is a corporation, fill in the following blanks):

Organized under the laws of the State of _____

Names and Address of President

_____

_____

Name and Address of Vice President

_____

_____

Name and Address of Secretary

_____

_____

Names and Address of Treasurer

_____

_____

The above-named Bidder affirms and declares:

(1) That the Bidder is of lawful age and that no other person, firm or corporation has any interest in this Proposal or in the Contract proposed to be entered into.

(2) That this Proposal is made without any understanding, agreement or connection with any other person, firm, or corporation making Proposal for the same purposes, and is in all respects fair and without collusion or fraud.

(3) That the Bidder is not in arrears to the City of Tampa, upon debt or contract, and is not a defaulter, as surety or otherwise, upon any obligation to the City of Tampa.

(4) That no officer or employee or person whose salary is payable in whole or in part from the City Treasury is, shall be or become interested, directly or indirectly, as a contracting party, partner, stockholder, surety or otherwise, in this Proposal, or in the performance of the Contract, or in the supplies, materials, or equipment and work or labor to which it relates, or in any portion of the profits thereof.

(5) That the Bidder has carefully examined the site of the work and that, from his own investigations, he has satisfied himself as to the nature and location of the work, the character, quality, and quantity of materials and the kinds and extent of equipment and other facilities needed for the performance of the work, the general and local conditions and all difficulties to be encountered, and all other items which may, in any way, affect the work or its performance.

(6) That the Bidder

_____ Has; Treasury Number _____

_____ Has not
(Check applicable box)

previously performed work under the President's Executive Order Nos. 11246 and 11375.

(7) That the undersigned, as Bidder, also declares that he has carefully examined and fully understands all the component parts of the Contract Documents and agrees that he will execute the Contract and finish the required Performance Bond and will completely perform the work in strict accordance with the terms of the Contract and the Contract Documents therein referred to for the following prices, to wit:

Contract Item No.	Estimated Quantity	Description and Price in Words	Computed Total Price for Item in Figures
BASE BID	LS	The work includes the furnishing of all labor, equipment, and material for the construction of storm water infiltration planters, sediment basins and curbing along with landscaping, concrete walkways with brick inlay and site furnishings, any allowances that may be listed in Section 01020, and with all associated work required for a complete project in accordance with the Contract Documents. _____ _____ dollars and _____ cents (BASE BID) LS	$_____

Computed Total Price In Words:

_____

_____ dollars and _____ cents.

Computed Total Price in Figures: $_____

The bidder acknowledges that the following addenda have been received and that the changes covered by the addendum(s) have been taken into account in this proposal: #1 ___ #2 ___ #3 ___ #4___ #5___.

The bidder acknowledges the requirements of the City of Tampa's Equal Business Opportunity Program.

Bidder acknowledges that included in the various items of the proposal and the Total Bid Price are costs for complying with the Florida Trench Safety Act (90096), (Laws of Fla.) effective October 1, 1990. The bidder further identifies the costs to be summarized below:

	Trench Safety Measure (Description)	Unit of Measure (LF, SY)	Unit Quantity	Unit Cost	Extended Cost
A.	_____	_____	_____	_____	_____
B.	_____	_____	_____	_____	_____
C.	_____	_____	_____	_____	_____
D.	_____	_____	_____	_____	_____

Total Cost $_____

Signed _____

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

Accompanying this Proposal is a certified check, cashier's check or Bid Bond (form included herein must be used) for at least five (5) percent of the total amount of the Proposal which check shall become the property of the City of Tampa, or which bond shall become forthwith due and payable to the City of Tampa, if this Proposal shall be accepted by the City of Tampa and the undersigned shall fail to execute a contract with and to furnish the required Public Construction Bond to the City of Tampa within twenty (20) days after the date of receipt of written Notice of Award by the City of Tampa to the undersigned so to do.

Dated _____, 20___

_____
(Name of Bidder)

_____
(Address of Bidder)

_____
(Signature)

_____
(Title)

Where Bidder is a Corporation:

Attest:

_____
Secretary

AFFIX
CORPORATE
SEAL

(ACKNOWLEDGMENT OF PRINCIPAL)

STATE OF)
) SS:
COUNTY OF)

For a Corporation:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ of _____, a _____ corporation, on behalf of the corporation. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For an Individual:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who is ___ personally known to me or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For a Firm:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who signed on behalf of the said firm. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

_____

Good Faith Effort Compliance Plan for Women Minority Business Subcontracting

City of Tampa - Equal Business Opportunity Program

Contract _____ Bid Date _____
Bidder _____
Signature _____ Date _____
Name _____ Title _____
The following Compliance Plan is a true report of Good Faith Efforts made to accomplish subcontracting goals for Women Minority Business Enterprises, W/MBE s, on the referenced contract:

□ The goal for W/MBE participation has been met or exceeded. See the DMI form reporting subcontractors to be utilized.
(Check Box, if appropriate; the remainder of the Compliance Plan need not be reported.)

□ The goal for W/MBE participation has not been met. The following is a recap of Good Faith Efforts made:
(Check applicable boxes below. Enclose additional documents, and/or add remarks below as needed.)

(1) Soliciting through reasonable and available means the interest of W/MBEs that have the capability to perform the work of the contract. The Bidder or Contractor must solicit this interest within sufficient time to allow the W/MBEs to respond. The Bidder or Contractor must take appropriate steps to follow up initial solicitations with interested W/MBEs. □ See DMI report forms for subcontractors solicited. □ See enclosed supplemental data on solicitation efforts. □ Remarks:

(2) Providing interested W/MBEs with adequate information about the plans, specifications, and requirements of the contract, including addenda, in a timely manner to assist them in responding to the solicitation. □ See enclosed sample solicitation. □ Remarks:

(3) Negotiating in good faith with interested W/MBEs that have submitted bids. Documentation of negotiation must include the names, addresses, and telephone numbers of W/MBEs that were solicited; the date of each such solicitation; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why agreements could not be reached with W/MBEs to perform the work. That there may be some additional costs involved in soliciting and using W/MBEs is not a sufficient reason for a contractor's failure to meet the goals, as long as such costs are reasonable. Bidders are not required to accept higher quotes in order to meet the goal. □ DMI subcontractor-utilized forms reflect successful negotiations □ This project is of a low-bid nature and negotiations are limited to clarifications of scope and specifications. □ See enclosed document. □ Remarks:

(4) Not rejecting W/MBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The W/MBEs standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations are not legitimate causes for rejecting or not soliciting bids to meet the goals. □ Not applicable. □ See attached explanation for rejection of a low-bidding subcontractor's bid. □ Remarks:

(5) Making a portion of the work available to W/MBE subcontractors and suppliers and to select those portions of the work or material consistent with the available W/MBE subcontractors and suppliers, so as to facilitate meeting the goal. □ Sub-Contractors were allowed to bid on their own choice of work or trade without restriction to a pre-determined portion. □ See enclosed comments. □ Remarks:

(6) Making good faith efforts, despite the ability or desire of a Bidder or Contractor to perform the work of a contract with its own organization. A Bidder or Contractor who desires to self-perform the work of a contract must demonstrate good faith efforts unless the goal has been met. □ Sub-Contractors were not prohibited from submitting bids on work not usually sub-contracted. □ Remarks:

(7) Selecting portions of the work to be performed by W/MBEs in order to increase the likelihood that the goals will be met. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate W/MBE participation, even when the Bidder or Contractor might otherwise prefer to perform these work items with its own forces. □ Sub-Contractors were allowed to bid on their own choice of work or trade without restriction to a pre-determined portion. □ Sub-Contractors were not prohibited from submitting bids on work not usually sub-contracted. □ See enclosed comments. □ Remarks:

(8) Making efforts to assist interested W/MBEs in obtaining bonding, lines of credit, or insurance as required by the city or contractor. □ See enclosed sample solicitation □ see enclosed document. □ Remarks:

(9) Making efforts to assist interested W/MBEs in obtaining necessary equipment, supplies, materials, or related assistance or services, including participation in a City-sponsored mentor-protégé program. □ See enclosed sample solicitation. □ See enclosed document. □ Remarks:

(10) Effectively using the services of the City and other organizations that provide assistance in the recruitment and placement of W/MBEs. □ See enclosed document. □ The following services were used:

Other Supporting Good Faith Efforts: □ See enclosed document. □ Remarks:

GFECP

Compliance Plan: Guidance for Meeting Good Faith Efforts

1. All firms on the W/MBE Goal Setting List must be solicited and documentation provided for email, fax, letters, phone calls, and other communication with the listed firms. The DMI Solicited and DMI-Utilized forms must be completed for all firms solicited or utilized. Other opportunities for subcontracting may be explored by consulting the City of Tampa and/or Hillsborough County certification listings of W/MBE's.

2. Solicitation of W/MBEs, via written or electronic notification, should provide specific information on the services needed, where plans can be reviewed and assistance offered in obtaining these, if required. Solicitations should be typically be sent a week or more before the bid date. Sample copies of the bidder's solicitations should be provided.

3. With any quotes received, a follow-up should be made whenever needed to confirm scope of work. For any W/MBE low quotes rejected, an explanation should be provided detailing negotiation efforts.

4. If a low bid W/MBE is rejected or deemed unqualified the contractor must provide an explanation and supporting documentation for this decision.

5. Prime should break down portions of work into economical feasible opportunities for subcontracting. The W/MBE directory can be useful in identifying additional subcontracting opportunities and firms not listed in the "W/MBE Goal Setting Firms List."

6. Contractor should not preclude W/MBEs from bidding on any part of work, even if the Contractor can self-perform the work.

7. Contractor should avoid relying solely on subcontracting out work where availability is not sufficient to attain pre-determined goal.

8. In its solicitations, the Bidder should offer assistance to W/MBEs in obtaining bonding, insurance, etc, if required of subcontractors by the City or Prime Contractor.

9. In its solicitation, the Bidder should offer assistance in obtaining equipment for a specific job to W/MBEs, if needed.

10. Contractor should use the services offered by such agencies as the Minority Business Development Office of the City of Tampa, Hillsborough County and the NAACP Empowerment Center for the recruitment and placement of W/MBEs.

City of Tampa –DMI -Schedule of All Sub-(Contractors/Consultants/Suppliers) Solicited

(FORM MBD-10)

Contract No.:_____ Contract Name:_____

Contractor Name:_____ Address:_____

Federal ID:_____Phone:_____ Fax:_____ Email:_____

[] No Firms were contacted/solicited for this contract.

[] No Firms were contacted because:_____

[] See attached documents with supplemental information.

NIGP Code General Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-77

This DMI Schedule Must Be Submitted with the Bid or Proposal (Do Not Modify This Form)

S = SLBE W=WMBE Federal ID	Company Name Address Phone & Fax	Type of Ownership (F=Female M=Male) BF BM = African Am. HF HM = Hispanic Am. AF AM = Asian Am. NF NM = Native Am. CF CM = Caucasian	Trade or Services NIGP Code (listed above)	Contact Method L=Letter F=Fax E=Email P=Phone	Quote or Resp. Rec'd Y/N

It is hereby certified that the information provided is an accurate and true account of contacts and solicitations for sub – contracting opportunitieson this contract. ***This form must be completed and submitted with the bid or proposal***.Modifying or failing to sign DMI forms may result in Non-Compliance and/or deemed non-responsive.

Signed:_____ Name/Title:_____ Date:_____

Note: Detailed Instructions for completing this form are on the next page

Instructions for completing The Sub-(Contractors/Consultants/ Suppliers) Solicited Form (Form MBD-10)

This form must be submitted with all bids or proposals. All subcontractors (regardless of ownership or size) solicited and subcontractors from whom unsolicited quotations were received must be included on this form. The instructions that follow correspond to the headings on the form required to be completed.Note: Ability or desire to self-perform all work shall not exempt the prime from Good Faith Efforts when Goal has been established.

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.**FIN. A number assigned to your business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **No Firms were contacted/solicited for this contract.** Checking the box indicates that a pre-determined Subcontract Goal was not set by the City resulting in your business not using subcontractors and will self-perform all work. If during the performance of the contract you employ subcontractors, the City must pre-approve subcontractors. Use of the "Sub-(Contractors/Consultants/Suppliers) Payments" form must be submitted with your invoices. Note: Certified SLBE or WMBE firms bidding as Primes are not exempt from outreach and solicitation of subcontractors.
- **No Firms were contacted because.** Provide brief explanation why no firms were contacted/solicited.
- **See attached documents.**Check box, if after you have completed the DMI Form in its entirety, you are providing any additional documentation relating to the form.All DMI data not submitted on the MBD Form-10 must be in the same format and have all requested data from MBD Form-10 included.

The following instructions are for information of any and all subcontractors solicited.

- **"S" = SLBE, "W" = WMBE.** Enter "**S**" for firms Certified by the City as Small Local Business Enterprises and/or "**W**" for firms Certified by the City as Women/Minority Business Enterprise.
- **Federal ID.**FIN. A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **Company Name, Address, Phone & Fax**. Provide company information for verification of payments.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials** Indicate the trade, service, or material provided by the subcontractor. NIGP codes are listed at top section of document.
- **Contact Method L=letter, F=fax, E=Email, P=Phone.** Indicate with letter the method of soliciting for bid.
- **Quote or Resp. (response) Rec'd (received) Y/N**. Indicate "Y" Yes if you received a quotation or if you received a response to your solicitation. Indicate "N" No if you received no response to your solicitation from the subcontractor.

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

City of Tampa –DMI Schedule of Sub-(Contractors/Consultants/Suppliers) to be Utilized

(FORM MBD-20)

Contract No.:_____ Contract Name:_____

Contractor Name:_____ Address:_____

Federal ID:_____Phone:_____ Fax:_____ Email:_____

[ ] See attached documents.

[ ] No Subcontracting (of any kind) will be performed on this contract.

NIGP Code General Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-77

This DMI Schedule Must Be Submitted with the Bid or Proposal (Do Not Modify This Form)

Enter "S" for firms Certified as Small Local Business Enterprises, "W" for firms Certified as Women/Minority Business Enterprise

S = SLBE W=WMBE Federal ID	Company Name Address Phone & Fax	Type of Ownership (F=Female M=Male) BF BM = African Am. HF HM = Hispanic Am. AF AM = Asian Am. NF NM = Native Am. CF CM = Caucasian	Trade, Services, or Materials NIGP Code Listed above	Amount of Quote. Letter of Intent if available.	Percent of Scope/Contract %

Total Subcontract/Supplier Utilization $_____

Total SLBE Utilization $ _____

Total WMBE Utilization $ _____

Percent SLBE Utilization of Total Bid/Proposal Amt. _____% Percent WMBE Utilization of Total Bid/Proposal Amt. _____%

It is hereby certified that the following information is a true and accurate account of utilization for sub-contracting opportunities on this contract. ***This form must be completed and submitted with the bid or proposal.*** Modifying or failing to sign DMI forms may result in Non-Complianceand/or deemed non-responsive.

Signed:_____ Name/Title:_____ Date:_____

Note: Detailed Instructions for completing this form are on the next page.

Instructions for completing The Sub-(Contractors/Consultants/ Suppliers) to be Utilized Form

(Form MBD-20)

This form must be submitted with all bids or proposals. All subcontractors projected to be utilized must be included on this form.

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.**FIN. A number assigned to your business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **No Subcontracting (of any kind) will be performed on this contract.** Checking box indicates your business will not use subcontractors when no Subcontract Goal has been set by the City, but will self-perform all work. When subcontractors are utilized during the performance of the contract, the "Sub-(Contractors/Consultants/Suppliers) Payments" form must be submitted with your invoices. Note: Certified SLBE or WMBE firms bidding as Primes are not exempt from outreach and solicitation of subcontractors.
- **See attached documents.** Check if you have provided any additional documentation relating to the utilization of subcontractors.
-

The following instructions are for information of Any and All subcontractors to be utilized.

- **Federal ID.**FIN. A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **"S" = SLBE, "W" = WMBE.** Enter "**S**" for firms Certified by the City as Small Local Business Enterprises and/or "**W**" for firms Certified by the City as Women/Minority Business Enterprise.
- **Company Name, Address, Phone & Fax**. Provide company information for verification of payments.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials (NIGP code if Known)** Indicate the trade, service, or material provided by the subcontractor. NIGP codes are available at http:/www.tampagov.net/mbd.
- **Amount of Quote, Letters of Intent** (required for both SLBEs and WMBEs)
- **Percent of Work/Contract.** Indicate the percent of the total contract price the subcontract(s) represent.
- **Total Subcontract/Supplier Utilization.** – Provide total dollar amount of all subcontractors/suppliers projected to be used for the contract. (Dollar amounts may not apply to CCNA proposals.)
- **Total SLBE Utilization.** Provide total dollar amount for all projected SLBE subcontractors/Suppliers used for this contract. (Dollar amounts may not apply to CCNA proposals.)
- **Total WMBE Utilization.** Provide total dollar amount for all projected WMBE subcontractors/Suppliers used for this contract. (Dollar amounts may not apply to CCNA proposals.)
- **Percent SLBE Utilization.** Total amount allocated to SLBEs divided by the total bid amount. (Dollar amounts may not apply to CCNA proposals.)
- **Percent WMBE Utilization.** Total amount allocated to WMBEs divided by the total bid/proposal amount. (Dollar amounts may not apply to CCNA proposals.)

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

TAMPA BID BOND
Contract 16-C-00009; Scott Street Improvements

KNOW ALL MEN BY THESE PRESENTS, that we, _____

_____

(hereinafter called the Principal) and _____

(hereinafter called the Surety) a Corporation chartered and existing under the laws of the State of _____, with its principal offices in the City of _____, and authorized to do business in the State of Florida, are held and firmly bound unto the City of Tampa, a Municipal Corporation of Hillsborough County, Florida, in the full and just sum of 5% of the amount of the (Bid) (Proposal) good and lawful money of the United States of America, to be paid upon demand of the City of Tampa, Florida, to which payment will and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally and firmly these presents.

WHEREAS, the Principal is about to submit, or has submitted to the City of Tampa, Florida, a Proposal for the construction of certain facilities for the City designated Contract 16-C-00009, Scott Street Improvements.

WHEREAS, the Principal desires to file this Bond in accordance with law, in lieu of a certified Bidder's check otherwise required to accompany this Proposal.

NOW, THEREFORE: The conditions of this obligation are such that if the Proposal be accepted, the Principal shall, within twenty (20) days after the date of receipt of written Notice of Award, execute a contract in accordance with the Proposal and upon the terms, conditions and price set forth therein, in the form and manner required by the City of Tampa, Florida and execute a sufficient and satisfactory Public Construction Bond payable to the City of Tampa, Florida in an amount of one hundred percent (100%) of the total contract price, in form and with security satisfactory to said City, then this Bid Bond obligation is to be void; otherwise to be and remain in full force and virtue in law, and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid City, upon demand, the amount thereof, in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

IN TESTIMONY THEREOF, the Principal and Surety have caused these presents to be duly signed and sealed this _____ day of _____, 20___.

Principal _____

BY _____

TITLE _____

BY _____

TITLE _____

(SEAL)

_____
Producing Agent

_____
Producing Agent's Address

_____
Name of Agency

_____
The addition of such phrases as "not to exceed" or like import shall render the (Bid) (Proposal)non-responsive.

AGREEMENT

For furnishing all labor, materials and equipment, together with all work incidental thereto, necessary and required for the performance of the work for the construction of Contract 16-C-00009 in accordance with your Proposal dated _____, amounting to a total of $_____ as completed in accordance with subsections I-2.09 and I-2.10 of the Instruction to Bidders.

THIS AGREEMENT, made and entered into in triplicate, this ____ day of _____, 20___, between the City of Tampa, Florida, hereinafter called the City, and hereinafter called the Contractor.

WITNESSETH that, in consideration of the mutual stipulations, agreements, and covenants herein contained, the parties hereto have agreed and hereby agree with each other, the Party of the First Part for itself, its successors and assigns, and the Party of the Second Part for itself, or himself, or themselves, and its successors and assigns, or his or their executors, administrators and assigns, as follows:

Contract 16-C-00009; Scott Street Improvements, shall include, but not be limited to, construction of storm water infiltration planters, sediment basins and curbing along with landscaping, concrete walkways with brick inlay and site furnishings with all associated work required for a complete project in accordance with the Contract Documents.

Contract Documents referred to in Article 1.01 of this Agreement also includes this volume, applicable standard drawings, the plans and any provisions referred to whether actually attached or not.

TAMPA AGREEMENT

SECTION 1
GENERAL

ARTICLE 1.01 THE CONTRACT

Except for titles, subtitles, headings, running headlines, and tables of contents (all of which are printed herein merely for convenience), the following, except for such portions thereof as may be specifically excluded, constitute the Contract:

The Notice to Bidders;
The Instructions to Bidders, including Special Instructions and General Instructions;
The Proposal;
The Bid Bond;
The Certification of Nonsegregated Facilities;
The Notice of Award;
The Agreement;
The Performance Bond;
The Notice To Proceed;
The Specifications, including the General Provisions, the Workmanship and Materials, the Specific Provisions or the Contract Items
The Plans;
All Supplementary Drawings Issued after award of the Contract;
All Addenda issued by the City prior to the receipt of proposals;
All provisions required by law to be inserted in this Contract, whether actually inserted or not.

ARTICLE 1.02 DEFINITIONS

The following words and terms, or pronouns used in their stead, shall, wherever they appear in this Contract, be construed as follows, unless different meaning is clear from the context:

(a)"City" shall mean the City of Tampa, Florida, represented by its Mayor and City Council, Party of the First Part, or such other City official as shall be duly empowered to act for the City on matters relating to this Contract.

(b)"Contractor" shall mean the Party of the Second Part hereto, whether corporation, firm or individual, or any combination thereof, and its, their, or his successors, personal representatives, executors, administrators, and assigns, and any person, firm or corporation who or which shall at any time be substituted in the place of the Party of the Second Part under this Contract.

(c)"Engineer" shall mean the Director of the Department or his duly authorized representative.

(d)"Consultant" shall mean the engineering or architectural firm or individual employed by the City to consult with and advise the City in the construction of the project.

(e)"Surety" shall mean any person, firm or corporation that has executed as Surety the Contractor's Performance Bond securing the performance of this Contact.

(f)"The Work" shall mean everything expressly or implied required to be furnished and done by the Contractor under the Contract, and shall include both Contract Work and Extra Work.

(g)"Contract Work" shall mean everything expressly or implied required to be furnished and done by the Contractor by any one or more of the Contract parts referred to in Article 1.01 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 Engineer shall determine which shall prevail.

(h)"Contract" or "Contract Documents" shall mean each of the various part of the Contract referred to in Article 1.01 hereof, both as a whole and severally.

(i)"Extra Work" shall mean work other than that required either expressly or implied by the contract in its present form.

(j)"Plans" shall mean only those drawings specifically referred to as such in these documents, or in any Addendum. Drawings issued after the execution of the Contract to explain further, or to illustrate, or to show changes in the work, will be known as "Supplementary Drawings" and shall be binding upon the Contractor with the same force as the Plans.

(k)"Specifications" shall mean all of the directions, requirements, and standards of performance applying to the work, as hereinafter detailed and designated as such, or which may be issued in an addendum.

(l)"Addendum or Addenda" shall mean the additional contract provisions issued in writing prior to the receipt of bids.

(m)"Notice" shall mean written notice. Notice shall be served upon the Contractor, either personally or by leaving the said notice at his residence or with any employee found on the work, or addressed to the Contractor at the residence or place of business given in his proposal and deposited in a postpaid wrapper in any post office box regularly maintained by the United States Post Office.

(n)"Project" shall mean the entire improvement package or related work. The "project" may consist of several different, but related, contracts.

(o)"Site" shall mean, and be limited to, the area upon or in which the Contractor's operations are carried on and such other appropriate areas as may be designed as such by the Engineer.

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

(q)Whenever in the Contract the words "directed", "required", "permitted", "ordered", "designated", "prescribed", and words of like import are used, they shall imply the direction, requirement, permission, order, designation, or prescription of the Engineer; and "approved", "acceptable", "satisfactory", "in the judgement of", and words of like import shall mean approved by, or acceptable to, or satisfactory to, or in the judgment of the Engineer.

(r)Whenever in the Contract the word "day" is used, it shall mean calendar day.

(s)"Final Acceptance" shall mean acceptance of the

work as evidenced by an official resolution of the City. Such acceptance shall be deemed to have taken place only if and when an approving resolution has been adopted by the City Council. The final acceptance shall be signed only after the City has assured itself by tests, inspection, or otherwise, that all of the provisions of the Contract have been carried out to its satisfaction.

(t)"Eastern Standard Time" shall be construed as the time being observed in the City on the day proposals are received or other documents issued or signed.

SECTION 2
POWERS OF THE CITY'S REPRESENTATIVES

ARTICLE 2.01 THE ENGINEER

It is covenanted and agreed that the Engineer, in addition to those matters elsewhere herein expressly made subject to his determination, direction, or approval, shall have the power, subject to such express provisions and limitations herein contained as are not in conflict herewith, and subject to review by the Mayor and City Council:

(a)To monitor the performance of the work.

(b)To determine the amount, kind, quality, sequence, and location of the work to be paid for hereunder and, when completed, to measure such work for payment.

(c)To determine all questions of an engineering character in relation to the work, to interpret the Plans, Specifications and Addenda.

(d)To determine how the work of this Contract shall be coordinated with the work of other contractors engaged simultaneously on this project.

(e)To make minor changes in the work as he deems necessary, provided such changes do not result in a net increase in the cost to the City or to the Contractor of the work to be done under the Contract.

(f)To amplify the Plans, add explanatory information and furnish additional Specifications and Drawings consistent with the intent of the Contract Documents.

The power of the Engineer shall not be limited to the foregoing enumeration, for it is the intent of this Contract that all of the work shall be subject to his determinations and approval, except where the determination or approval of someone other than the Engineer is expressly called for herein and except as subject to review by the Mayor and City Council. All orders of the Engineer requiring the Contractor to perform work as Contract work shall be promptly obeyed by the Contractor.

The Engineer shall not, however, have the power to issue an extra work order, and the performance of such work on the order of the Engineer without previously obtaining written confirmation thereof from the Mayor in accordance with Article 7.02 hereof may constitute a waiver of any right to extra compensation therefor. The Contractor is warned that the Engineer has no power to change the terms and provisions of this Contract, except minor changes where such change results in no net increase in the Contract Price.

ARTICLE 2.02 DIRECTOR

The Director of the Department in addition to those matters expressly made subject to his determination, direction or approval in his capacity as "Engineer", shall also have the power:

(a)To review any and all questions in relation to this Contract and its performance, except as herein otherwise specifically provided, and his determination upon such review shall be final and conclusive upon the Contractor.

(b)With the approval of the Mayor and City Council to authorize modifications or changes in the Contract so as to require: (1) the performance of extra work, or (2) the omission of Contract work whenever he deems it in the interest of the City to do so, or both.

(c)To suspend the whole or any part of the work whenever, in his judgment, such suspension is required: (1) in the interest of the City generally, or (2) to coordinate the work of the various Contractors engaged on this project, or (3) to expedite the completion of the entire project, even though the completion of this particular Contract may be thereby delayed, <u>without compensation to the Contractor for such suspension other than extending the time for the completion of the work, as much as it may have been, in the opinion of the City, delayed by such a suspension.</u>

(d)If, before the final acceptance of all the work contemplated herein, it shall be deemed necessary to take over, use, occupy, or operate any part of the completed or partly completed work, the Engineer shall have the right to do so and the Contractor will not, in any way, interfere with or object to the use, occupation, or operation of such work by the City after receipt of notice in writing from the Engineer that such work or part thereof will be used by the City on and after the date specified in such notice. Such taking over, use, occupancy or operation of any part of the completed or partially completed work shall not constitute final acceptance or approval of any such part of the work.

ARTICLE 2.03 NO ESTOPPEL

The City shall not, nor shall any department, officer, agent, or employee thereof, be bound, precluded, or estopped by any determination, decision, acceptance, return, certificate, or payment made or given under or in connection with this Contract by any officer, agent or employee of the City at any time either before or after final completion and acceptance of the work and payment therefor: (a) from showing the true and correct classification, amount, quality, or character of the work done, or that any determination, decision, acceptance, return certificate or payment is untrue, incorrect or improperly made in any particular, or that the work or any part thereof does not in fact conform to the requirements of the Contract Documents, and (b) from demanding and recovering from the Contractor any overpayments made to him or such damages as it may sustain by reason his failure to comply with the requirements of the Contract of Documents, or both.

ARTICLE 2.04 NO WAIVER OF RIGHTS

Neither the inspection, nor any order, measurements or certificate of the City or its employees, officers, or agents, nor by any order of the City for payment of money, nor any money, nor payments for or acceptance of the whole or any part of the work by the City, nor any extension of time, nor any changes in the Contract, Specifications or Plans, nor any possession by the City or its employees shall operate as a

waiver of any provisions of this Contract, nor any power herein provided nor shall any waiver of any breach of this Contract be held as a waiver of any other subsequent breach.

Any remedy provided in this Contract shall be taken and construed as cumulative, namely, in addition to each and every other suit, action, or legal proceeding. The City shall be entitled as of right to an injunction against any breach of the provisions of this Contract.

SECTION 3
PERFORMANCE OF WORK

ARTICLE 3.01 CONTRACTOR'S RESPONSIBILITY
The Contractor shall do all the work and furnish, at his own cost and expense, all labor, materials, equipment, and other facilities, except as herein otherwise provided, as may be necessary and proper for performing and completing the work under this Contract. The Contractor shall be responsible for the entire work until completed and finally accepted by the City.

The work shall be performed in accordance with the true intent and meaning of the Contract Documents. Unless otherwise expressly provided, the work must be performed in accordance with the best modern practice, with materials as specified and workmanship of the highest quality, all as determined by and entirely to the satisfaction of the Engineer.

Unless otherwise expressly provided, the means and methods of construction shall be such as the Contractor may choose, subject, however, to the approval of the Engineer. Only adequate and safe procedure, methods, structures and equipment shall be used. The Engineer's approval or the Engineer's failure to exercise his right thereon shall not relieve the Contractor of obligations to accomplish the result intended by the Contract, nor shall such create a cause of action for damages.

ARTICLE 3.02 COMPLIANCE WITH LAWS
The Contractor must comply with all local, State and Federal laws, rules, ordinances and regulations applicable to this Contract and to the work done hereunder, and must obtain, at his own expense, all permits, licenses or other authorization necessary for the prosecution of the work.

No work shall be performed under this Contract on Sundays, legal holidays or after regular working hours without the express permission of the Engineer. Where such permission is granted, the Engineer may require that such work be performed without additional expense to the City.

ARTICLE 3.03 INSPECTION
During the progress of the work and up to the date of final acceptance, the Contractor shall, at all times, afford the representatives of the City, the Florida Department of Environmental Regulation, and if applicable, the Federal Environmental Protection Agency and the Federal Department of Labor every reasonable, safe and proper facility for inspecting the work done or being done at the site. The inspection of any work shall not relieve the Contractor of any of his obligations to perform proper and satisfactory work as herein specified. Finished or unfinished work found not to be in strict accordance with the Contract shall be replaced as directed by the Engineer, even though such work may have been previously approved and payment made therefor.

The City shall have the right to reject materials and workmanship which are defective or require their correction. Rejected work and materials must be promptly removed from the site, which must at all times be kept in a reasonably clean and neat condition.

Failure or neglect on the part of the City to condemn or reject bad or inferior work or materials shall not be construed to imply an acceptance of such work or materials, if it becomes evident at any time prior to the final acceptance of the work by the City. Neither shall it be construed as barring the City at any subsequent time from the recovery of damages of such a sum of money as may be needed to build anew all portions of the work in which inferior work or improper materials were used, wherever found.

Should it be considered necessary or advisable by the City at any time before final acceptance of the entire work to make examinations of work already completed, by removing or tearing out all or portions of such work, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and material for that purpose. If such work is found to be defective in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray all expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the cost of examination and restoration of the work shall be considered an item of extra work to be paid for in accordance with the provisions of Article 7.02 hereof.

ARTICLE 3.04 PROTECTION
During performance and until final acceptance, the Contractor shall be under an absolute obligation to protect the finished and unfinished work against any damage, loss, or injury. The Contractor shall take proper precaution to protect the finished work from loss or damage, pending completion and the final acceptance of all the work included in the entire Contract, provided that such precaution shall not relieve the Contractor from any and all liability and responsibility for loss or damage to the work occurring before final acceptance by the City. Such loss or damage shall be at the risk of and borne by the Contractor, whether arising from acts or omissions of the Contractor or others. In the event of any such loss or damage, the Contractor shall forthwith repair, replace, and make good the work without extension of time therefor, except as may be otherwise provided herein.

The provisions of this Article shall not be deemed to create any new right of action in favor of third parties against the Contractor or the City.

ARTICLE 3.05 PRESERVATION OF PROPERTY

The Contractor shall preserve from damage all property along the line of the work, or which is in the vicinity of or is in anywise affected by the work, the removal or destruction of which is not called for by the Plans. This applies, but is not limited, to the public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, public streets (except natural wear and tear of streets resulting from legitimate use thereof by the Contractor), and wherever such property is damaged due to the activities of the Contractor, it shall be immediately restored to its original condition by the Contractor and at his own expense.

In case of failure on the part of the Contractor to restore such property, or make good such damage or injury, the City may, upon forty-eight (48) hour written notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any monies due or which may become due the Contractor under this Contract. Nothing in this clause shall prevent the Contractor from receiving proper compensation for the removal, damage, or replacement of any public or private property not shown on the Plans, when this is made necessary by alteration of grade or alignment authorized by the Engineer, provided that such property has not been damaged through fault of the Contractor, his employees or agents.

ARTICLE 3.06 BOUNDARIES
The Contractor shall confine his equipment, apparatus, the storage of materials, supplies and apparatus of his workmen to the limits indicated on the plans, by law, ordinances, permits or direction of the Engineer.

ARTICLE 3.07 SAFETY AND HEALTH REGULATIONS
The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91- 596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL91-54).

ARTICLE 3.08 TAXES
All taxes of any kind and character payable on account of the work done and materials furnished under this Contract shall be paid by the Contractor and shall be deemed to have been included in his bid. The laws of the State of Florida provide that sales and use taxes are payable by the Contractor upon the tangible personal property incorporated in the work and such taxes shall be paid by the Contractor and shall be deemed to have been included in his bid.

ARTICLE 3.09 ENVIRONMENTAL CONSIDERATIONS
The Contractor, in the performance of the work under this Contract, shall comply with all Local, State and Federal laws, statutes, ordinances, rules and regulations applicable to protection of the environment; and, in the event he violates any of the provisions of same, he shall be answerable to the Local, State and Federal agencies designated by law to protect the environment. In the event the City receives, from any of the environmental agencies, a citation which is occasioned by an act or omission of the Contractor or his subcontractor or any officers, employees or agents of either, it is understood and agreed that the Contractor shall automatically become a party-respondent under said citation; and the City immediately shall notify the Contractor and provide him with a copy of said citation.

The Contractor shall comply with the requirements of the citation and correct the offending conditions(s) within the time stated in said citation and further shall be held fully responsible for all fines and/or penalties.

SECTION 4
TIME PROVISIONS

ARTICLE 4.01 TIME OF START AND COMPLETION
The Contractor must commence work within thirty (30) days subsequent to the date of the receipt of the "Notice to Proceed" by the City unless otherwise provided in the Specific Provisions and Special Instructions. Time being of the essence of this Contract, the Contractor shall thereafter prosecute the work diligently, using such means and methods of construction as well as secure its full completion in accordance with the requirements of the Contract Documents no later than the date specified therefor, or on the date to which the time for completion may be extended.

The Contractor must complete the work covered by this Contract in the number of consecutive calendar days set forth in the Instructions to Bidders, unless the date of completion is extended pursuant to the provisions of Article 4.05 hereof. The period for performance shall start from the date of signing of this Agreement by the City.

The actual date of completion will be established after a final inspection as provided in Article 4.07 hereof.

ARTICLE 4.02 PROGRESS SCHEDULE
To enable the work to be laid out and prosecuted in an orderly and expeditious manner, the Contractor shall submit to the Engineer a proposed progress schedule within fifteen (15) days after the award of this Contract.

The schedule shall state the Contract starting date, time for completion and date of completion and shall show the anticipated time of starting and completion of each of the various operations to be performed under this Contract, together with all necessary and appropriate information regarding sequence and correlation of work and an estimated time required for the delivery of all materials and equipment required for the work. The proposed schedule shall be revised as directed by the Engineer until finally approved by him, and, after such approval, shall be strictly adhered to by the Contractor. The approved progress schedule may be changed only with the written permission of the Engineer.

If the Contractor shall fail to adhere to the approved progress schedule or the schedule as revised, he shall promptly adopt such other or additional means and methods of construction as will make up for the time lost, and will assure completion in accordance with the contract time.

ARTICLE 4.03 APPROVAL REQUESTS
From time to time, as the work progresses and in the sequence indicated by the approved schedule, the Contractor must submit to the Engineer a specific request, in writing, for each item of information or approval required of him by the Contract. These requests must be submitted sufficiently in advance of the date upon which the information or approval is actually required by the Contractor to allow for the time the Engineer may take to act upon such submissions or resubmissions. The Contractor shall not have any right to an extension of time on account of delays due to his failure to submit his requests for the required information or the required approval in accordance with these requirements.

ARTICLE 4.04 COORDINATION WITH OTHER CONTRACTORS
During progress of the work, other Contractors may be engaged in performing other work on this project or on other projects on the site. In that event, the Contractor shall coordinate the work to be done hereunder with the work of such other Contractors in such manner as the Engineer may direct.

ARTICLE 4.05 EXTENSION OF TIME
If such an application is made, the Contractor shall be entitled to an extension of time for delay in completion of the work should the Contractor be obstructed or delayed in the commencement, prosecution or completion of any part of said work by any act or delay of the City, or by acts or omissions of other Contractors on this project, or by a riot, insurrection, war, pestilence, acts of public authorities, fire, lightning, hurricanes, earthquakes, tornadoes, floods, extremely abnormal and excessive inclement weather as indicated by the records of the local weather bureau for a five-year period preceding the date of the Contract, or by strikes, or other causes, which causes of delay mentioned in this Article, in the opinion of the City, are entirely beyond the expectation and control of the Contractor.

The Contractor shall, however, be entitled to an extension of time for such causes only for the number of days of delay which the City may determine to be due solely to such causes and only to the extent that such occurrences actually delay the completion of the project and then only if the Contractor shall have strictly complied with all of the requirements of Articles 4.01, 4.02, 4.03 and 4.04 hereof. It is hereby understood that the determination by the Engineer as to the order and sequence of the work shall not in itself constitute a basis for extension of time.

The determination made by the City on an application for an extension of time shall be binding and conclusive on the Contractor.

Delays caused by failure of the Contractor's materialmen, manufacturers, and dealers to furnish approved working drawings, materials, fixtures, equipment, appliances, or other fittings on time or failure of subcontractors to perform their work shall not constitute a basis of extension of time.

The Contractor agrees to make no claim for damages for delay in the performance of this Contract occasioned by any act or omission to act of the City or any of its representatives or because of any injunction which may be brought against the City or its representatives and agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the work as provided herein.

ARTICLE 4.06 LIQUIDATED DAMAGES
It is mutually agreed between the parties that time is the essence of this Contract and that there will be on the part of the City considerable monetary damage in the event the Contractor should fail to complete the work within the time fixed for completion in the Contract or within the time to which such completion may have been extended.

The amount per day set forth in the Instructions to Bidders is hereby agreed upon as the liquidated damages for each and every calendar day that the time consumed in completing the work under this Contract exceeds the time allowed.

This amount shall, in no event, be considered as a penalty or otherwise than as the liquidated and adjusted damages to the City because of the delay and the Contractor and his Surety agree that the stated sum per day for each such day of delay shall be deducted and retained out of the monies which may become due hereunder and if not so deductible, the Contractor and his Surety shall be liable therefor.

ARTICLE 4.07 FINAL INSPECTION
When the work has been completed in accordance with the requirements of the Contract and final cleaning up performed, a date for final inspection of the work by the Engineer shall be set by the Contractor in a written request therefor, which date shall be not less than ten (10) days after the date of such request. The work will be deemed complete as of the date so set by the Contractor if, upon such inspection, the Engineer determines that no further work remains to be done at the site.

If such inspection reveals interms of work still to be performed, however, the Contractor shall promptly perform them and then request a reinspection. If, upon such inspection, the Engineer determines that the work is complete, the date of final completion shall be deemed to be the last day of such reinspection.

SECTION 5
SUBCONTRACTS AND ASSIGNMENTS

ARTICLE 5.01 LIMITATIONS AND CONSENT
The Contractor shall not assign, transfer, convey, sublet or otherwise dispose of this Contract or of his right, title, or interest therein, or his power to execute such Contract, or to assign any monies due or to become due thereunder to any other person, firm or corporation unless the previous written consent of the City shall first be obtained thereto and the giving of any such consent to a particular subcontract or assignment shall not dispense with the necessity of such consent to any further or other assignment.

Before making any subcontract, the Contractor must submit a

written statement to the Engineer, giving the name and address of the proposed contractor, the portion of the work and materials which he is to perform and furnish and any other information tending to prove that the proposed subcontractor has the necessary facilities, skill, integrity, past experience and financial resources to perform the work in accordance with the terms and conditions of this Contract.

If the City finds that the proposed subcontractor is qualified, the Contractor will be notified in writing. The City may revoke approval of any subcontractor when such subcontractor evidences an unwillingness or inability to perform his work in strict accordance with these Contract Documents. Notice of such revocation of approval will be given in writing to the Contractor.

The Contractor will promptly, upon request, file with the City a conformed copy of the subcontract. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of these Contract Documents, insofar as applicable to the work of subcontractors, and to give the Contractor the same power as regards terminating any subcontracts that the City may exercise over the Contractor under provisions of these Contract Documents.

The Contractor shall be required to perform with his own forces at least twenty-five (25) percent of the work, unless written consent to subcontract a greater percentage of the work is first obtained from the City.

ARTICLE 5.02 RESPONSIBILITY
The approval by the City of a subcontractor shall not relieve the Contractor of any of his responsibilities, duties, and liabilities hereunder. The Contractor shall be solely responsible to the City for the acts or defaults or omissions of his subcontractor and of such subcontractor's officers, agents, and employees, each of whom shall for all purposes be deemed to be the agent or employee of the Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between any subcontractor and the City.

SECTION 6
SECURITY AND GUARANTY

ARTICLE 6.01 CONTRACT SECURITY
The Contractor shall execute and deliver to the City a Performance Bond on the form as provided herein, in an amount at least equal to one hundred (100) percent of the full Contract price, such Bond to be executed by a surety company acceptable to the City. The surety on such Performance Bond shall be a surety company duly authorized to do business in the State of Florida, and the Bond shall be issued or countersigned by a local resident producing agent of such surety company who is a resident of the State of Florida, regularly commissioned and licensed in said State, and satisfactory evidence of the authority of the person or persons executing such Bond shall be submitted with the Bond. The Performance Bond shall serve as security for the faithful performance of this Contract, including maintenance and guaranty provisions, and for the payment of all persons performing labor and furnishing materials in connection with the Contract. The premiums on the Performance Bond shall be paid by the Contractor.

If, at any time, the City shall become dissatisfied with any surety or sureties then upon the Performance Bond, or if for any other reason such bond shall cease to be adequate security for the City, the Contractor shall, within five days after notice so to do, substitute an acceptable Bond in such form and sum and signed by such other sureties as may be satisfactory to the City. The premiums on such Bond shall be paid by the Contractor. No further partial payments shall be deemed due or shall be made until the new sureties have qualified.

ARTICLE 6.02 CONTRACTORS INSURANCE
Insurance required shall be as indicated on Special Instructions pages beginning with "INS-1"

ARTICLE 6.03 AGAINST CLAIMS AND LIENS
The City may withhold from the Contractor as much as any approved payments to him as may, in the opinion of the City, be necessary to secure (a) just claims of any persons supplying labor or materials to the Contractor or any of his subcontractors for the work then due and unpaid; (b) loss due to defective work not remedied, or (c) liability, damage, or loss due to injury to persons or damages to the work or property of other contractors, subcontractors, or others, caused by the act or neglect of the Contractor or of any of his subcontractors. The City shall have the right, as agent for the Contractor, to apply any such amounts so withheld in such manner as the City may deem proper to satisfy such claims or to secure such protection. Such application of such money shall be deemed payments for the account of the Contractor.

ARTICLE 6.04 MAINTENANCE AND GUARANTY
The Contractor hereby guarantees all the work furnished under this Contract against any defects in workmanship and materials for a period of one year following the date of final acceptance of the work by the City. Under this guarantee, the Contractor hereby agrees to make good, without delay, at his own expense, any failure of any part of the work due to faulty materials or manufacture, construction, or installation, or the failure of any equipment to perform satisfactorily all the work put upon it within the limits of the Contract Documents, and further, shall make good any damage to any part of the work caused by such failure. It is hereby agreed that the Performance Bond shall fully cover all guarantees contained in this Article.
It is also agreed that all warranties, expressed or implied, inure to the benefit of the City and are enforceable by the City.

SECTION 7
CHANGES

ARTICLE 7.01 MINOR CHANGES
The City reserves the right to make such additions, deductions, or changes to this Contract from time to time as

it deems necessary and in a manner not materially affecting the substance thereof or materially changing the price to be paid in order to carry out and complete more fully and perfectly the work herein agreed to be done and performed. This Contract shall in no way be invalidated by any such additions, deductions, or changes, and no claim by the Contractor shall be made for any loss of anticipated profits thereby.

Construction conditions may require that minor changes be made in the location and installation of the work and equipment to be furnished and other work to be performed hereunder, and the Contractor when ordered by the Engineer, shall make such adjustments and changes in said locations and work as may be necessary, without additional cost to the City, provided such adjustments and changes do not alter the character, quantity of cost of the work as a whole, and provided further that Plans and Specifications showing such adjustments and changes are furnished to the Contractor by the City within a reasonable time before any work involving such adjustment and changes is begun. The Engineer shall be the sole judge of what constitutes a minor change for which no additional compensation shall be allowed.

ARTICLE 7.02 EXTRA WORK

The City may at any time by a written order and without notice to the sureties require the performance of such extra work as it may find necessary or desirable. An order for extra work shall be valid only if issued in writing and signed by the Mayor and the work so ordered must be performed by the Contractor.

The amount of compensation to be paid to the Contractor for any extra work as so ordered shall be determined as follows:

(a)By such applicable unit prices, if any, as are set forth in the Proposal; or

(b)If no such unit prices are set forth then by a lump sum or other unit prices mutually agreed upon by the City and the Contractor; or

(c)If no such unit prices are set forth in the Proposal and if the parties cannot agree upon a lump sum or other unit prices then by the actual net cost in money to the Contractor of the extra work performed, which cost shall be determined as follows:

(1) For all labor and foreman in direct charge of the authorized operations, the Contractor shall receive the current local rate of wages to be agreed upon, in writing, before starting such work for each hour that said labor and foremen are actually engaged thereon, to which shall be added an amount equal to 25 percent of the sum thereof which shall be considered and accepted as full compensation for general supervision, FICA taxes, contributions under the Florida Unemployment Compensation Act, insurance, bond, subcontractor's profit and overhead, the furnishing of small tools and miscellaneous equipment used, such as picks, shovels, hand pumps, and similar items.

(2) For all materials used, the Contractor shall receive the actual cost of such materials delivered at the site or previously approved delivery point as established by original receipted bills. No percentage shall be added to this cost.

(3) For special equipment and machinery such as power-driven pumps, concrete mixers, trucks, and tractors, or other equipment, required for the economical performance of the authorized work, the Contractor shall receive payment based on the average local area rental price for each item of equipment and the actual time of its use on the work. No percentage shall be added to this sum.

(4) Records of extra work done under this procedure shall be reviewed at the end of each day by the Contractor or his representative and the Engineer. Duplicate copies of accepted records shall be made and signed by both Contractor or his representative and the Engineer, and one copy retained by each.

Request for payment for approved and duly authorized extra work shall be submitted in the same form as Contract work or in the case of work performed under paragraph (c) (1) above upon a certified statement supported by receipted bills. Such statement shall be submitted for the current Contract payment for the month in which the work was done.

ARTICLE 7.03 DISPUTED WORK

If the Contractor is of the opinion that any work required, necessitated, or ordered violates the terms and provisions of this Contract, he must promptly notify the Engineer, in writing, of his contentions with respect thereto and request a final determination thereof. If the Engineer determines that the work in question is Contract work and not extra work or that the order complained of is proper, he will direct the Contractor to proceed and the Contractor shall promptly comply. In order, however, to reserve his right to claim compensation for such work or damages resulting from such compliance, the Contractor must, within five (5) days after receiving notice of the Engineer's determination and direction, notify the City in writing that the work is being performed or that the determination and direction is being complied with under protest. Failure of the Contractor to notify shall be deemed as a waiver of claim for extra compensation or damages therefor.

Before final acceptance by the City, all matters of dispute must be adjusted to the mutual satisfaction of the parties thereto. Final determinations and decisions, in case any questions shall arise, shall constitute a condition precedent to the right of the Contractor to receive the money therefor until the matter in question has been adjusted.

ARTICLE 7.04 OMITTED WORK

The City may at any time by a written order and without notice to the sureties require the omission of such Contract work as it may find necessary or desirable.

An order for omission of work shall be valid only if signed by the Mayor and the work so ordered must be omitted by the Contractor. The amount by which the Contract price shall be reduced shall be determined as follows:

(a) By such applicable unit prices, if any, as are set forth in the Contract; or

(b) By the appropriate lump sum price set forth in the Contract; or

(c) By the fair and reasonable estimated cost to the City

of such omitted work as determined by the Engineer and approved by the City.

SECTION 8
CONTRACTOR'S EMPLOYEES

ARTICLE 8.01 CHARACTER AND COMPETENCY
The Contractor and his subcontractors shall employ upon all parts of the work herein contracted for only competent, skillful, and trustworthy workers. Should the Engineer at any time give notice, in writing, to the Contractor or his duly authorized representative on the work that any employee in his opinion is incompetent, unfaithful, disorderly, careless, unobservant of instructions, or in any way a detriment to the satisfactory progress of the work, such employee shall immediately be dismissed and not again allowed upon the site.

ARTICLE 8.02 SUPERINTENDENCE
The Contractor shall give his personal supervision to the faithful prosecution of the work and in case of his absence shall have a competent, experienced, and reliable supervisor or superintendent, acceptable to the Engineer on the site who shall follow without delay all instructions of the Engineer in the prosecution and completion of the work and every part thereof, in full authority to supply workers, material, and equipment immediately. He shall keep on hand at all times copies of the Contract Documents.

ARTICLE 8.03 EMPLOYMENT OPPORTUNITIES
The Contractor shall, in the performance of the work required to be done under this Contract, employ all workers without discrimination regarding race, creed, color, sex or national origin and must not maintain or provide facilities that are segregated on the basis of race, color, creed or national origin.

ARTICLE 8.04 RATES OF WAGES
On federally assisted projects, the rates of wages to be paid under this Contract shall not be less than the rates of wages set forth in Section 12 of this Agreement.

On other projects, no wage rate determination is included. Florida's Prevailing Wage Law (Section 215.19, Florida Statutes) was repealed effective April 25, 1979.

ARTICLE 8.05 PAYROLL REPORTS
The Contractor and each subcontractor shall, if requested to do so, furnish to the Engineer a duly certified copy of his payroll and also any other information required by the Engineer to satisfy him that the provisions of the law as to the hours of employment and rate of wages are being observed.

Payrolls shall be prepared in accordance with instructions furnished by the City and on approved forms. The Contractor shall not carry on his payroll any persons not employed by him. Subcontractor's employees shall be carried only on the payrolls of the employing subcontractor.

SECTION 9
CONTRACTOR'S DEFAULT

ARTICLE 9.01 CITY'S RIGHT AND NOTICE
It is mutually agreed that: (a) if the Contractor fails to begin work when required to do so, or (b) if at any time during the progress of the work it shall appear to the Engineer that the Contractor is not prosecuting the work with reasonable speed, or is delaying the work unreasonably and unnecessarily, or (c) if the force of workmen or quality or quantity of material furnished are not sufficient to insure completion of the work within the specified time and in accordance with the Specifications hereto attached, or (d) if the Contractor shall fail to make prompt payments for materials or labor or to subcontractors for work performed under the Contract, or (e) if legal proceedings have been instituted by others than the City in such manner as to interfere with the progress of the work and may subject the City to peril of litigation or outside claims of (f) if the Contractor shall be adjudged a bankrupt or make an assignment for the benefit of creditors, or (g) if in any proceeding instituted by or against the Contractor an order shall be made or entered granting an extension of time of payment, composition, adjustment, modification, settlement or satisfaction of his debts or liabilities, or (h) if a receiver or trustee shall be appointed for the Contractor or the Contractor's property, or (i) if the Contract or any part thereof shall be sublet without the consent of the City being first obtained in writing, or (j) if this Contract or any right, monies, or claim thereunder shall be assigned by the Contractor, otherwise than as herein specified, or (k) if the Contractor shall fail in any manner of substance to observe the provisions of this Contract, or (l) if any of the work, machinery, or equipment shall be defective, and shall not be replaced as herein provided, or (m) if the work to be done under this Contract shall be abandoned, then such fact or conditions shall be certified by the Engineer and thereupon the City without prejudice to any other rights or remedies of the City, shall have the right to declare the Contractor in default and so notify the Contractor by a written notice, setting forth the ground or grounds upon which such default is declared and the Contractor must discontinue the work, either as a portion of the work or the whole thereof, as directed.

ARTICLE 9.02 CONTRACTOR'S DUTY UPON DEFAULT
Upon receipt of notice that his Contract is in default, the Contractor shall immediately discontinue all further operations on the work or such part thereof, and shall immediately quit the site or such part thereof, leaving untouched all plant, materials, equipment, tools, and supplies.

ARTICLE 9.03 COMPLETION OF DEFAULTED WORK
The City, after declaring the Contractor in default, may then have the work completed or the defective equipment or machinery replaced or anything else done to complete the work in strict accordance with the Contract Documents by such means and in such manner, by Contract with or without public letting, or otherwise, as it may deem advisable,

utilizing for such purpose without additional cost to the City such of the Contractor's plant, materials, equipment, tools, and supplies remaining on the site, and also such subcontractors as it may deem advisable.

The City shall reimburse all parties, including itself, for the expense of such completion, including liquidated damages, if any, and the cost of reletting. The City shall deduct this expense from monies due or to become due to the Contractor under this Contract, or any part thereof, and in case such expense is more than the sum remaining unpaid of the original contract price, the Contractor and his sureties shall pay the amount of such deficiency to the City.

ARTICLE 9.04 PARTIAL DEFAULT
In case the City shall declare the Contractor in default as to a part of the work only, the Contractor shall discontinue such part, shall continue performing the remainder of the work in strict conformity with the terms of the Contract, and shall in no way hinder or interfere with any other contractor or person whom the City may engage to complete the work as to which the Contractor was declared in default.

SECTION 10
PAYMENTS

ARTICLE 10.01 PRICES
For the Contractor's complete performance of the work, the City will pay and the Contractor agrees to accept, subject to the terms and conditions hereof, the lump sum prices or unit prices in the Contractor's Proposal and the award made therein, plus the amount required to be paid for any extra work ordered under Article 7.02 hereof, less credit for any work omitted pursuant to Article 7.04 hereof. Under unit price items, the number of units actually required to complete the work under the Contract may be more than stated in the Proposal. The Contractor agrees that no claim will be made for any damages or for loss of profits because of a difference between the quantities of the various classes of work assumed and stated in the Proposal Form as a basis for comparing Proposals and the quantities of work actually performed.

The sum as awarded for any lump sum Contract or lump sum Contract Item shall represent payment in full for all of the various classes of work, including materials, equipment, and labor necessary or required to complete, in conformity with the Contract Document, the entire work shown, indicated or specified under the lump sum Contract or lump sum Contract Item.

The amount as awarded as a unit price for any unit price Contact Item shall represent payment in full for all the materials, equipment, and labor necessary to complete, in conformity with the Contract Documents, each unit of work shown, specified, or required under the said unit price Contract Item.

No payment other than the amount as awarded will be made for any class of work included in a lump sum Contract Item or a unit price Contract Item, unless specific provision is made therefor in the Contract Documents.

ARTICLE 10.02 SUBMISSION OF BID BREAKDOWN
Within fifteen (15) days after the execution of this Contract, the Contractor must submit to the Engineer in duplicate an acceptable breakdown of the lump sums and unit prices bid for items of the Contract, showing the various operations to be performed under the Contract, as described in the progress schedule required under Article 4.02 hereof, and the value of each of such operations, the total of such items to equal the total price bid. The Contractor shall also submit such other information relating to the bid prices as may be required and shall revise the bid breakdown as directed. Thereafter, the breakdown may be used for checking the Contractor's applications for partial payments hereunder but shall not be binding upon the City or the Engineer for any purpose whatsoever.

ARTICLE 10.03 REPORTS, RECORDS AND DATA
The Contractor shall furnish to the Engineer such schedules of quantities and costs, progress schedules, reports, invoices, delivery tickets, estimates, records, and other data as the Engineer may request concerning work performed or to be performed and the materials furnished under the Contract.

ARTICLE 10.04 PAYMENTS BY CONTRACTOR
The Contractor shall pay (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which such services are rendered, (b) for all materials, tools, and equipment delivered at the site of the project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such materials, tools, and equipment are incorporated or used, and (c) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors, to the extent of each subcontractor's interest therein; and proof of such payments or releases therefor shall be submitted to the Engineer upon request.

ARTICLE 10.05 PARTIAL PAYMENTS
On or about the first of each month, the Contractor shall make and certify an estimate, on forms prescribed by the City, of the amount and fair value of the work done, and may apply for partial payment therefor. The Contractor shall revise the estimate as the Engineer may direct. When satisfactory progress has been made, and shows that the value of the work completed since the last payment exceeds one percent (1%) of the total Contract price in amount, the Engineer will issue a certificate that such work has been completed and the value thereof. The City will then issue a voucher to the Contractor in accordance with the following schedule:

FOR CONTRACT AMOUNTS UNDER $250,000
(A)In the amount of ninety percent (90%) of the value of the work completed as certified until construction is one hundred percent (100%) complete (operational or beneficial occupancy), the withheld amount may be reduced below ten percent (10%), at the Engineer's option, to only that amount necessary to assure completion.

FOR CONTRACT AMOUNTS OVER $250,000

(A)In the amount of ninety percent (90%) of the value of the work completed as certified until construction is fifty percent (50%) complete.

(B)When the dollar value, as determined by the Engineer, of satisfactorily completed work in place is greater than fifty percent (50%) of the original contract price, vouchers for partial payment will be issued by the City to the Contractor in the amount of one hundred percent (100%) of the value of the work, above 50%, completed as certified for that payment period.

(C)If the Contractor has performed satisfactorily and the work is substantially complete (operational or beneficial occupancy) the withheld amount may be reduced, at the Engineer's option, to only that amount necessary to assure completion.

In addition to the Conditions set forth in (A), (B), and (C) above, payments will always be less any sums that may be retained or deducted by the City under the terms of any of the contract documents and less any sums that may be retained to cover monetary guarantees for equipment, materials or progress performance.

Payment on estimates made on or about the first of the month may be expected on or about the 20th of the month.

Unless specified otherwise in the Contract Items, the delivered cost of equipment and nonperishable materials suitably stored at the site of the work and tested for adequacy may be included in the Contractor's application for partial payment provided, however, that the Contractor shall furnish evidence satisfactory to the City that the Contractor is the unconditional owner and in possession of such materials or equipment. The amount to be paid will be 90 percent of the invoice cost to the Contractor which cost shall be supported by receipted bills within 30 days of the date of payment by the City to the Contractor. Such payment shall not relieve the Contractor from full responsibility for completion of the work and for protection of such materials and equipment until incorporated in the work in a permanent manner as required by the Contract Documents.

Before any payment will be made under this Contract, the Contractor and every subcontractor, if required, shall deliver to the Engineer a written, verified statement, in satisfactory form, showing in detail all amounts then due and unpaid by such Contractor or subcontractor to all laborers, workmen, and mechanics, employed by him under the Contract for the performance of the work at the site thereof, for daily or weekly wages, or to other persons for materials, equipment, or supplies delivered at the site of the work during the period covered by the payment under consideration.

ARTICLE 10.06 FINAL PAYMENT

Under determination of satisfactory completion of the work under this Contract as provided in Article 4.07 hereof, the Engineer will prepare the final estimate showing the value of the completed work. This estimate will be prepared within 30 days after the date of completion or as soon thereafter as the necessary measurements and computations can be made. All prior certificates and estimates, being approximate only, are subject to correction in the final estimate and payment.

When the final estimate has been prepared and certified by Engineer, he will submit to the Mayor and City Council the final certificate stating that the work has been completed and the amount based on the final estimate remaining due to the Contractor. The City will then accept the work as fully completed and will, not later than 30 days after the final acceptance, as defined in Article 1.02, of the work done under this Contract, pay the Contractor the entire amount so found due thereunder after deduction of all previous payments and all percentages and amounts to be kept and retained under provisions of this Contract; provided, however, and it is understood and agreed that, as a precedent to receiving final payment, the Contractor shall submit to the City a sworn affidavit that all bills for labor, service, materials, and subcontractors have been paid and that there are no suits pending in connection with this work. The City, at its option, may permit the Contractor to execute a separate surety bond in a form satisfactory to the City. The surety bond shall be in the full amount of the suit or suits.

Neither the final payment nor any part of the retained percentage shall be paid until the Contractor, if required, shall furnish the City with a complete release from any should remain unsatisfied after all payments are made, the Contractor shall refund to the City all monies which the City may be compelled to pay in discharging such claim, including incidental costs and attorney's fees.

ARTICLE 10.07 ACCEPTANCE OF FINAL PAYMENT

The acceptance by the Contractor, or by anyone claiming by or through him, of the final payment shall operate as and shall be a release to the City and every officer and agent thereof from any and all claims and liability to the Contractor for anything done or furnished in connection with the work or project and for any act or neglect of the Contractor or of any others relating to or affecting the work. No payment, however, final or otherwise, shall operate to release the Contractor or his sureties from any obligations under this Contract or the Performance Bond.

SECTION 11
MISCELLANEOUS PROVISIONS

ARTICLE 11.01 CONTRACTOR'S WARRANTIES

In consideration of, and to induce the award of this contract to him, the Contractor represents and warrants:

(a)That he is not in arrears to the City upon debt or contract, and he is not a defaulter, as surety, contractor, or otherwise.

(b)That he is financially solvent and sufficiently experienced and competent to perform the work.

(c)That the work can be performed as called for by the Contract Documents.

(d)That the facts stated in his proposal and the information given by him are true and correct in all respects.

(e)That he is fully informed regarding all the conditions affecting the work to be done and labor and materials to be

furnished for the completion of this Contract, and that his information was secured by personal investigation and research.

ARTICLE 11.02 PATENTED DEVICES, MATERIAL AND PROCESSES

It is mutually understood and agreed that Contract prices include all royalties and costs arising from patents, trademarks, and copyrights in any way involved in the work. Whenever the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall indemnify and save harmless the City, its officers, agents and employees from any and all claims for infringement by reason of the use of any such patented design, device, tool, material, equipment, or process, to be performed under the Contract, and shall indemnify the said City, its officers, agents, and employees for any costs, expenses, and damages which may be incurred by reason of such infringement at any time during the prosecution or after completion of the work.

ARTICLE 11.03 SUITS AT LAW

In case any action at law or suit in equity may or shall be brought against the City or any of its officers, agents, or employees for or on account of the failure, omission, or neglect of the Contractor or his subcontractors, employees, or agents, to do or perform any of the covenants, acts, matters, or things by this Contract undertaken to be done or performed by the Contractor of his subcontractors, employees, or agents, or from any injuries done to property or persons and caused by the negligence or alleged negligence of the Contractor of his subcontractors, employees, or agents, or in any other manner arising out of the performance of this Contract, then the Contractor shall immediately assume and take charge of the defense of such actions or suits in like manner and to all intents and purposes as if said actions or suits have been brought directly against the Contractor, and the Contractor shall also indemnity and save harmless the City, its officers, agents, and employees from any and all loss, cost or damage whatever arising out of such actions or suits, in like manner and to all intents and purposes as if said actions or suits have been brought directly against the Contractor.

The Contractor shall and does hereby assume all liability for and agrees to indemnify the City or its Engineer against any or all loss, costs, damages, and liability for any or by reason of any lien, claims or demands, either for materials purchased or for work performed by laborers, mechanics, and others and from any damages, costs, actions, or causes of action and judgement arising from injuries sustained by mechanics, laborers, or other persons by reason of accidents or otherwise, whether caused by the carelessness or inefficiency or neglect of said Contractor, his subcontractors, agents, employees, workmen or otherwise.

ARTICLE 11.04 CLAIMS FOR DAMAGES

If the Contractor shall claim compensation for any damage sustained, other than for extra or disputed work covered by Article 7.02 and 7.03 hereof, by reason of any act or omission of the City, its agents, or any persons, he shall, within five days after sustaining such damage, make and deliver to the Engineer a written statement of the nature of the damage sustained and of the basis of the claim against the City. On or before the 15th of the month succeeding that in which any damage shall have been sustained, the Contractor shall make and deliver to the Engineer an itemized statement of the details and amounts of such damage, duly verified by the Contractor. Unless such statements shall be made delivered within the times aforesaid, it is stipulated that and all claims for such compensation shall be forfeited and invalidated, and the Contractor shall not be entitled to payment on account of such claims.

ARTICLE 11.05 NO CLAIMS AGAINST INDIVIDUALS

No claim whatsoever shall be made by the Contractor against any officer, agent, employee of the City for, or on account of, anything done or omitted to be done in connection with this Contract.

ARTICLE 11.06 LIABILITY UNAFFECTED

Nothing herein contained shall in any manner create any liability against the City on behalf of any claim for labor, services, or materials, or of subcontractors, and nothing herein contained shall affect the liability of the Contractor or his sureties to the City or to any workmen or materialsmen upon bond given in connection with this Contract.

ARTICLE 11.07 INDEMNIFICATION PROVISIONS

Whenever there appears in this Agreement, or in the other Contact Documents made a part hereof, an indemnification provision within the purview of Chapter 725.06, Laws of Florida, the monetary limitation on the extent of the indemnification under each such provision shall be One Million Dollars or a sum equal to the total Contract price, whichever shall be the greater.

ARTICLE 11.08 UNLAWFUL PROVISIONS DEEMED STRICKEN

If this contract contains any unlawful provisions not an essential part of the Contract and which shall not appear to have a controlling or material inducement to the making thereof, such provisions shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the Contract without affecting the binding force of the remainder.

ARTICLE 11.09 LEGAL PROVISIONS DEEMED INCLUDED

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

ARTICLE 11.10 DEATH OR INCOMPETENCY OF CONTRACTOR

In the event of death or legal incompetency of a Contractor who shall be an individual or surviving member of a contracting firm, such death or adjudication of incompetency

shall not terminate the Contract, but shall act as default hereunder to the effect provided in Article 9.01 hereof and the estate of the Contractor and his surety shall remain liable hereunder to the same extent as though the Contractor had lived. Notice of default, as provided in Article 9.01 hereof, shall not be required to be given in the event of such death or adjudication of incompetency.

ARTICLE 11.11 NUMBER AND GENDER OF WORDS

Whenever the context so admits or requires, all references herein in one number shall be deemed extended to and including the other number, whether singular or plural, and the use of any gender shall be applicable to all genders.

ARTICLE 11.12 ACCESS TO RECORDS

Representatives of Federal Agencies, if applicable, and the State of Florida shall have access to the work whenever it is in preparation of progress. On federally assisted projects the Federal Agency, the Comptroller General of the United States, or any authorized representative shall have access to any books, documents, papers, and records of the Contractor which are pertinent to the project for the purpose of making audit, examination, excerpts, and transcription thereof.

SECTION 12
LABOR STANDARDS

ARTICLE 12.01 LABOR STANDARDS

The Contractor shall comply with all of the regulations set forth in "Labor Standards Provisions for Federally Assisted Construction Contracts", which may be attached, and any applicable Florida Statutes.

ARTICLE 12.02 NOTICE TO LABOR UNIONS

If required, the Contractor shall provide Labor Unions and other organizations of workers, and shall post, in a conspicuous place available to employees or applicants for employment, a completed copy of the form entitled "Notice to Labor Unions or Other Organizations of Workers" attached to and made a part of this Agreement.

ARTICLE 12.03 SAFETY AND HEALTH REGULATIONS

The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91- 596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). Nothing in these Acts shall be construed to supersede or in any manner affect any worker's compensation law or statutory rights, duties, or liabilities of employers and employees under any law with respect to injuries, diseases, or death of employees arising out of, or in the course of, employment.

ARTICLE 12.04 EEO AFFIRMATIVE ACTION REQUIREMENTS

The Contractor understands and agrees to be bound by the equal opportunity requirements of Federal regulations which shall be applicable throughout the performance of work under this Contract. The Contractor also agrees to similarly bind contractually each subcontractor. In policies, the Contractor agrees to engage in Affirmative Action directed at promoting and ensuring equal employment opportunity in the work force used under the Contract (and the Contractor agrees to require contractually the same effort of all subcontractors whose subcontractors exceed $100,000). The Contractor understands and agrees that "Affirmative Action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site work force used on the Contract.

ARTICLE 12.05 PREVAILING RATES OF WAGES

Florida's prevailing wage law was repealed effective April 25, 1979.

For Federally assisted projects, appropriate prevailing wage rate determinations are indicated on pages beginning with WR-1.

* * * * * * *

IN WITNESS THEREOF, the parties have hereunto set their hands and seals, and such of them as are corporation have caused these present to be signed by their duly authorized officers.

CITY OF TAMPA, FLORIDA

_____
Bob Buckhorn, Mayor
(SEAL)

ATTEST:

_____
City Clerk

Approved as to Form:
The execution of this document was authorized by Resolution No. _____

_____
Rachel S. Peterkin, Assistant City Attorney

Contractor

By:_____
(SEAL)

Title:

ATTEST:

_____
Witness

STATE OF)
) SS:
COUNTY OF)

For a Corporation:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ of _____, a _____ corporation, on behalf of the corporation. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For an Individual:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who is ___ personally known to me or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For a Firm:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who signed on behalf of the said firm. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

_____

PUBLIC CONSTRUCTION BOND

Bond No. (enter bond number)_____

Name of Contractor:_____

Principal Business Address of Contractor:_____

_____

Telephone Number of Contractor:_____

Name of Surety (if more than one list each):_____

_____

Principal Business Address of Surety:_____

_____

Telephone Number of Surety:_____

Owner is The City of Tampa, Florida

Principal Business Address of Owner: 306 E Jackson St, Tampa, FL 33602

Contract Administration Department (280A4N)

Telephone Number of Owner: 813/274-8456

Contract Number Assigned by City to contract which is the subject of this bond:_____

Legal Description or Address of Property Improved or Contract Number is:_____

_____

_____

_____

General Description of Work and Services:_____

_____

_____

_____

KNOW ALL MEN BY THESE PRESENTS That we, _____

_____
(Name of Contractor)

as Principal, hereinafter called CONTRACTOR, of the State of _____, and

_____(Name of Surety)
a corporation organized and existing under and by virtue of the laws of the State of _____, and regularly authorized to do business in the State of Florida, as SURETY, are held and firmly bound unto the City of Tampa, a municipal corporation organized and existing under the laws of the State of Florida, hereinafter called Owner, in the penal sum of _____Dollars and _____Cents ($_____), lawful money of the United States of America, for the payment whereof well and truly to be made, we bind ourselves, our heirs, executors, and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS BOND is that if Principal:

1. Performs the contract dated _____, _____, 20___, between Principal and Owner for construction of _____, the contract being made a part of this bond by reference, in the time and in the manner prescribed in the contract; and

2. Promptly makes payments to all claimants, as defined in Section 255.05(1) (Section 713.01), Florida Statutes, supplying Principal with labor, materials, or supplies, used directly or indirectly by Principal in the prosecution of the work provided for in the contract; and

3. Pays Owner all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that Owner sustains because of a default by Principal under the contract; and

4. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this bond is void; otherwise it remains in full force.

5. Contractor and Surety acknowledge that the Work for which this bond has been issued may be one of several such contract documents for a group of projects. This bond does not secure covenants to pay for or to perform design services survey or program management services. The Owner/Obligee is expected to reasonably account for damages that are caused to Owner with respect to Principal's (Contractor's) default in performance of the scope of the Work incorporated by reference into the bond, and notwithstanding any contractual or common law remedy permitted to Owner as against Contractor, the obligation of Surety for any damages under this bond shall be determined by the cost of completion of the Work less the contract balance unpaid upon default of Contractor for the Work plus liquidated damages at the rate of $500.00 per day for delays by the Contractor and/or Surety in reaching substantial completion.

6. The notice requirements for claimants and conditions for entitlement to payment set forth in Section 255.05, Fla. Stat. and the limitations period to actions upon Section 255.05, Fla. Stat. bonds apply to claimants seeking payment from surety under this bond. 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, Florida Statutes.

7. The Surety, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the contract documents or other Work to be performed hereunder, or the specifications referred to therein shall in any way affect its obligations under this bond, and it does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to Work or to the specifications.

8. The above SURETY states that it has read all of the Contract Documents made by the CONTRACTOR with the CITY, hereto attached, and the terms and conditions of the contract and work, and is familiar therewith and in particular those portions of the Agreement concerning the guaranty of such CONTRACTOR for a period of one year following the date of the final acceptance of the completed work under the Contract by the CITY, all of which this BOND includes.

DATED ON _____, 20___

_____
(Name of Principal)

_____
(Principal Business Address)

By _____

Title _____

_____
Telephone Number of Principal

Countersignature:

_____
(Name of Local Agency)

_____
(Address of Resident Agent)

By _____

Title _____

_____
Telephone Number of Local Agency

_____
(Name of Surety)

_____
(Surety Address)

By _____
(As Attorney in Fact)*

_____
Telephone Number of Surety

Accepted by City of Tampa:

By _____
Bob Buckhorn, Mayor

Date: _____ 20____

Approved as to legal sufficiency:

By _____
Assistant City Attorney

Date: _____, 20____

*(As Attorney in Fact) attach Power of Attorney and Current Certificate with Original Signature

SPECIFICATIONS
GENERAL PROVISIONS

SECTION 1
SCOPE AND INTENT

G-1.01 DESCRIPTION
The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract.

G-1.02 WORK INCLUDED
The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and other means of construction necessary or proper for performing and completing the work. He shall obtain and pay for all required permits. He shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Engineer, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.

The cost of incidental work described in these General Provisions, for which there are no specific Contract Items, shall be considered as part of the overhead cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made therefor.

The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his plant and equipment, prior approval of the Engineer notwithstanding.

G-1.03 PUBLIC UTILITY INSTALLATIONS AND STRUCTURES
Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes, and all other appurtenances and facilities pertaining thereto whether owned or controlled by the City, other governmental bodies or privately owned by individuals, firms, or corporations, and used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water or other public or private property which may be affected by the work.

The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy and it is the responsibility of the Contractor to make his own investigations to inform himself fully of the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations.

The Contractor shall protect all public utility installations and structures from damage during the work. Access across any buried public utility installation or structure shall be made only in such locations and by means approved by the Engineer. The Contractor shall so arrange his operations as to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor which are shown on the Plans or have been located in the field by the utility shall be repaired by the Contractor, at his expense, as directed by the Engineer. No separate payment shall be made for such protection or repairs to public utility installations or structures.

Public utility installations or structures owned or controlled by the City or other governmental body which are shown on the Plans to be removed, relocated, replaced or rebuilt by the Contractor shall be considered as a part of the general cost of doing the work and shall be included in the prices bid for the various Contract Items. No separate payment shall be made therefor.

Where public utility installations or structures owned or controlled by the City or other governmental body are encountered during the course of the work, and are not indicated on the Plans or in the Specifications, and when, in the opinion of the Engineer, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction or such work may be ordered, in writing by the Engineer, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be paid for as extra work as provided for in Article 7.02 of the Agreement.

The Contractor shall, at all times in performance of the work, employ approved methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of public utility installations and structures; and shall, at all times in the performance of the work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.

All City and other governmental utility departments and other owners of public utilities, which may be affected by the work, will be informed in writing by the Engineer within two weeks after the execution of the Contract or Contracts covering the work. Such notice will set out, in general, and direct attention to, the responsibilities of the City and other governmental

utility departments and other owners of public utilities for such installations and structures as may be affected by the work and will be accompanied by one set of Plans and Specifications covering the work under such Contract or Contracts.

In addition to the general notice given by the Engineer, the Contractor shall give written notice to all City and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight (48) hours in advance of breaking ground in any area or on any unit of the work. This can be accomplished by making the appropriate contact with the "Underground Utility Notification Center for Excavators (Call Candy)".

The maintenance, repair, removal, relocation, or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the Engineer.

SECTION 2
PLANS AND SPECIFICATIONS

G-2.01 PLANS
The Plans referred to in the Contract Documents bear the general project name and number as shown in the Notice To Bidders.

When obtaining data and information from the Plans, figures shall be used in preference to scaled dimensions, and large scale drawings in preference to small scale drawings.

G-2.02 COPIES FURNISHED TO CONTRACTOR
After the Contract has been executed, the Contractor will be furnished with five sets of paper prints, the same size as the original drawings, of each sheet of the Plans and five copies of the Specifications. Additional copies of the Plans and Specifications, when requested, may be furnished to the Contractor at cost of reproduction.

The Contractor shall furnish each of the subcontractors, manufacturers, and material suppliers such copies of the Contract Documents as may be required for his work.

G-2.03 SUPPLEMENTARY DRAWINGS
When, in the opinion of the Engineer, 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 Engineer and five paper prints thereof will be given to the Contractor.

The Supplementary Drawings shall be binding upon the Contractor with the same force as the Plans. Where such Supplementary Drawings require either less or more than the estimated quantities of work, credit to the City or compensation therefor to the Contractor shall be subject to the terms of the Agreement.

G-2.04 CONTRACTOR TO CHECK PLANS AND DATA
The Contractor shall verify all dimensions, quantities, and details shown on the Plans, Supplementary Drawings, Schedules, Specifications, or other data received from the Engineer, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. 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 therefrom nor from rectifying such conditions at his own expense. He will not be allowed to take advantage of any errors or omissions as full instructions will be furnished by the Engineer, should such errors or omissions be discovered. All schedules are given for the convenience of the Engineer and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

G-2.05 SPECIFICATIONS
The specifications consist of four parts, the General Provisions, the Technical Specifications, the Special Provisions and the Contract Items. The General Provisions and Technical Specifications contain general requirements which govern the work. The Special Provisions and the Contract Items modify and supplement these by detailed requirements for the work and shall always govern, whenever there appears to be conflict.

G-2.06 INTENT
All work called for in the Specifications applicable to this Contract, but not shown on the Plans in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Plans or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.

The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.

SECTION 3
WORKING DRAWINGS

G-3.01 SCOPE
The Contractor shall promptly prepare and submit layout, detail and shop drawings to insure proper construction, assembly, and installation of the work using those materials and methods as hereafter specified under the Technical Specifications, Special Provisions and Contract Items.

These drawings shall accurately and distinctly present the following:

a. All working and erection dimensions.
b. Arrangements and sectional views.
c. Necessary details, including complete information for making connections between work under this Contract and work under other Contracts.
d. Kinds of materials and finishes.
e. Parts listed and description thereof.

Drawings for mechanical equipment shall present, where applicable, such data as dimensions, weight and performance characteristics. These data shall show conformance with the performance characteristics and other criteria incorporated in the Plans and Specifications.

Each drawing shall be dated and shall contain the name of the project, Division number and description, the technical specifications section number, names of equipment or materials and the location at which the equipment or materials are to be installed. Location shall mean both physical location and location relative to other connected or attached material. The Engineer will return unchecked any submittal which does not contain complete data on the work and full information on related matters.

Stock or standard drawings will not be accepted for review unless full identification and supplementary information is shown thereon in ink or typewritten form.

The Contractor shall review all working drawing submittals before transmitting them to the Engineer to determine that they comply with requirements of the Specifications. Drawings which are incomplete or are not in compliance with the Contract Documents shall not be submitted for processing by the Engineer. The Contractor shall place his stamp of approval on all working drawings submitted to the Engineer to indicate compliance with the above.

G-3.02 APPROVAL
If the working drawings show departures from the Contract requirements, the Contractor shall make specific mention thereof in his letter of submittal; otherwise approval of such submittals shall not constitute approval of the departure. Approval of the drawings shall constitute approval of the subject matter thereof only and not of any structure, material, equipment, or apparatus shown or indicated.

The approval of drawings will be general and shall not relieve the Contractor of responsibility for the accuracy of such drawings, nor for the proper fitting and construction of the work, nor for the furnishing of materials or work required by the Contract and not indicated on the drawings. No work called for by working drawings shall be done until such drawings have been approved by the Engineer.

The procedure in seeking approval of the working drawings shall be as follows:

1.The Contractor shall submit four complete sets of drawings and other descriptive data together with one copy of a letter of transmittal to the Engineer for approval. The letter of transmittal shall contain the name of the project, contract number, technical specifications section number, the name of the Contractor, a list of drawings with numbers and titles, and any other pertinent information.

2.Drawings or descriptive data will be stamped "Approved", "Approved Subject to Corrections Marked", or "Examined and Returned for Correction" and one copy with a letter of transmittal will be returned to the Contractor.

3.If a drawing or other data is stamped "Approved", the Contractor shall insert the date of approval on five additional copies of the document and transmit the five copies to the Engineer together with one copy of a letter of transmittal containing substantially the same information as described in Instruction 1. above.

4.If a drawing or other data is stamped "Approved Subject to Corrections Marked", the Contractor shall make the corrections indicated and proceed as in Instruction 3., above.

5.If a drawing or data is stamped "Examined and Returned for Correction", the Contractor shall make the necessary corrections and resubmit the documents as set forth in Instruction 1., above. The letter of transmittal shall indicate that this is a resubmittal.

The Contractor shall revise and resubmit the working drawings as required by the Engineer, until approval thereof is obtained.

SECTION 4
MATERIALS AND EQUIPMENT

G-4.01 GENERAL REQUIREMENTS
All materials, appliances, and types or methods of construction shall be in accordance with the Specifications and shall, in no event, be less than that necessary to conform to the requirements of any applicable laws, ordinances, and codes.

All materials and equipment shall be new, unused, and correctly designed. They shall be of standard first grade quality, produced by expert personnel, and intended for the use for which they are offered. Materials or equipment which, in the opinion of the Engineer, are inferior or of a lower grade than indicated, specified, or required will not be accepted.

The quality of Workmanship and Materials entering into the work under this Contract shall conform to the requirements of the pertinent sections, clauses, paragraphs, and sentences, both directly and indirectly applicable thereto, of that part of the Technical Specifications, whether or not direct reference to such occurs in the Contract Items.

Equipment and appurtenances shall be designed in conformity with ANSI, ASME, IEEE, NEMA and other

generally accepted standards and shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, and all conditions of operation. All bearings and moving parts shall be adequately protected against wear by bushings or other approved means and shall be fully lubricated by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers, and the like, shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be mitered.

Equipment shall be of the approximate dimensions as indicated on the Plans or as specified, shall fit the spaces shown on the Plans with adequate clearances, and shall be capable of being handled through openings provided in the structure for this purpose. The equipment shall be of such design that piping and electrical connections, ductwork, and auxiliary equipment can be assembled and installed without causing major revisions to the location or arrangement of any of the facilities.

Machinery parts shall conform exactly to the dimensions shown on the working drawings. There shall be no more fitting or adjusting in setting up a machine than is necessary in assembling high grade apparatus of standard design. The equivalent parts of identical machines shall be made interchangeable. All grease lubricating fittings on equipment shall be of a uniform type. All machinery and equipment shall be safeguarded in accordance with the safety codes of the ANSI and applicable state and local codes.

G-4.02 MANUFACTURER

The names of proposed manufacturers, suppliers, material, and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the Engineer for approval, as early as possible, to afford proper investigation and checking. Such approval must be obtained before shop drawings will be checked. No manufacturer will be approved for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. He shall, upon the request of the Engineer, be required to submit evidence that he has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.

All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the Engineer, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.

Any two or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

G-4.03 REFERENCE TO STANDARDS

Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for proposals, even though reference has been made to an earlier standard, and such standards are made a part hereof to the extent which is indicated or intended.

Reference to a technical society, organization or body may be made in the Specifications by abbreviations, in accordance with the following list:

AASHTO for American Association of State Highway and Transportation Officials (formerly AASHO)
ACI for American Concrete Institute
AGMA for American Gear Manufacturer's Association
AFBMA for Anti-Friction Bearing Manufacturer's Association
AISC for American Institute of Steel Construction
AISI for American Iron and Steel Institute
ANSI for American National Standards Institute
ASCE for American Society of Civil Engineers
ASTM for American Society for Testing and Materials
ASME for American Society of Mechanical Engineers
AWS for American Welding Society
AWWA for American Water Works Association
AWPA for American Wood Preservers Association
CEMA for Conveyor Equipment Manufacturers Association
CIPRA for Cast Iron Pipe Research Association
IEEE for Institute of Electrical and Electronic Engineers
IPCEA for Insulated Power Cable Engineers Association
NEC for National Electrical Code
NEMA for National Electrical Manufacturers Association
SAE for Society of Automotive Engineers
SHBI for Steel Heating Boiler Institute
Fed.Spec. for Federal Specifications
Navy Spec. for Navy Department Specifications
U.L.,Inc. for Underwriters' Laboratories, Inc.

When no reference is made to a code, standard or specification, the Standard Specifications of the ANSI, the ASME, the ASTM, the IEEE, or the NEMA shall govern.

G-4.04 SAMPLES

The Contractor shall, when required, submit to the Engineer for approval typical samples of materials and equipment. The samples shall be properly identified by tags and shall be submitted sufficiently in advance of the time when they are to be incorporated into the work, so that rejections thereof will not cause delay. A letter of transmittal, in duplicate, from the Contractor requesting approval must accompany all such samples.

G-4.05 EQUIVALENT QUALITY

Whenever, in the Contract Documents, an article, material, apparatus, equipment, or process is called for by trade name or by the name of a patentee, manufacturer, or dealer or by reference to catalogs of a manufacturer or dealer, it shall be understood as intending to mean and specify the article, material, apparatus, equipment or process designated, or any

equal thereto in quality, finish, design, efficiency, and durability and equally serviceable for the purposes for which it is intended.

Whenever material or equipment is submitted for approval as being equal to that specified, the decision as to whether or not such material or equipment is equal to that specified shall be made by the Engineer.

Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Contract, the Contractor shall immediately proceed to furnish the designated material or equipment.

Neither the approval by the Engineer of alternate material or equipment as being equivalent to that specified nor the furnishing of the material or equipment specified, shall in any way relieve the Contractor of responsibility for failure of the material or equipment, due to faulty design, material, or workmanship, to perform the functions required of them by the Specifications.

G-4.06 DELIVERY
The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the work so as to complete thw work within the allotted time. The Contractor shall also coordinate deliveries in order to avoid a delay in, or impediment of, the progress of the work of any related Contractor.

G-4.07 CARE AND PROTECTION
The Contractor shall be solely responsible for properly storing and protecting all materials, equipment, and work furnished under the Contract from the time such materials and equipment are delivered at the site of the work until final acceptance thereof. He shall, at all times, take necessary precautions to prevent injury or damage by water, freezing, or by inclemencies of the weather to such materials, equipment and work. All injury or damage to materials, equipment, or work resulting from any cause whatsoever shall be made good by the Contractor.

The Engineer shall, in all cases, determine the portion of the site to be used by the Contractor for storage, plant or for other purposes. If, however, it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the work or interference with the work to be done by any other Contractor, the Contractor shall remove and restack such materials at his own expense.

G-4.08 TOOLS AND ACCESSORIES
The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

Spare parts shall be furnished as specified.

Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight and principal rating data.

G-4.09 INSTALLATION OF EQUIPMENT
The Contractor shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character.

Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Plans, unless directed otherwise by the Engineer during installation. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between the various units.

The Contractor shall furnish, install and protect all necessary anchor and attachment bolts and all other appurtenances needed for the installation of the devices included in the equipment specified. Anchor bolts shall be as approved by the Engineer and made of ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.

The Contractor shall, at his own expense, furnish all materials and labor for, and shall properly bed in non-shrink grout, each piece of equipment on its supporting base that rests on masonry foundations. Grout shall completely fill the space between the equipment base and the foundation.

G-4.10 OPERATING INSTRUCTIONS
The Contractor, through qualified individuals, shall adequately instruct designated employees of the City in the operation and care of all equipment installed hereunder, except for equipment that may be furnished by the City.

The Contractor shall also furnish and deliver to the Engineer three complete sets for permanent files, identified in accordance with Subsection G-3.01 hereof, of instructions, technical bulletins and any other printed matter, such as diagrams, prints or drawings, containing full information required for the proper operation, maintenance, and repair, of the equipment installed and the ordering of spare parts, except for equipment that may be furnished by the City.

In addition to the above three copies, the Contractor shall furnish any additional copies that may be required for use during construction and start-up operations.

G-4.11 SERVICE OF MANUFACTURER'S ENGINEER
The Contract prices for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test and place in operation the equipment in conformity with the Contract Documents. After the equipment is placed in

permanent operation by the City, such engineer or superintendent shall make all adjustments and tests required by the Engineer to provide that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the City in the proper operation and maintenance of such equipment.

SECTION 5
INSPECTION AND TESTING

G-5.01 GENERAL
The Contractor's attention is hereby directed to Article 3.03 of the Agreement.

Inspection and testing of materials will be performed by the City unless otherwise specified.

For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.

If, in the making of any test of any material or equipment, it is ascertained by the Engineer that the material or equipment does not comply with the Contract, the Contractor will be notified thereof and he will be directed to refrain from delivering said material and equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the City.

Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.

The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the City formally takes over the operation thereof.

G-5.02 COSTS
All inspection and testing of materials furnished under this Contract will be performed by the City or duly authorized inspection engineers or inspection bureaus without cost to the Contractor, unless otherwise expressly specified.

The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor and such costs shall be deemed to be included in the contract price.

Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the City for compliance. The Contractor shall reimburse the City for the expenditures incurred in making such tests on materials and equipment which are rejected for noncompliance.

G-5.03 INSPECTIONS OF MATERIALS
The Contractor shall give notice, in writing to the Engineer, sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice the Engineer will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or he will notify the Contractor that inspection will be made at a point other than the point of manufacture, or he will notify the Contractor that inspection will be waived. The Contractor must comply with these provisions before shipping any material. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

G-5.04 CERTIFICATE OF MANUFACTURE
When inspection is waived or when the Engineer so requires, the Contractor shall furnish to him authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

G-5.05 SHOP TESTS OF OPERATING EQUIPMENT
Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function, or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the work until the Engineer notifies the Contractor, in writing, that the results of such tests are acceptable.

Five copies of the manufacturer's actual test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be forwarded to the Engineer for approval.

The cost of the shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

G-5.06 PRELIMINARY FIELD TESTS
As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make preliminary field tests of equipment. If the preliminary field tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to the acceptance tests, make all changes, adjustments, and replacements required.

G-5.07 FINAL FIELD TESTS
Upon completion of the work and prior to final payment, all equipment and appliances installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.

The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment, and instruments necessary for all acceptance tests, at no additional cost to the City.

G-5.08 FAILURE OF TESTS
Any defects in the materials and equipment or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor by replacements or otherwise. The decision of the Engineer as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to make those corrections or if the improved materials and equipment, when tested, shall again fail to meet the guarantees or specified requirements, the City, notwithstanding its partial payment for work, and materials and equipment, may reject the materials and equipment and may order the Contractor to remove them from the site at his own expense.

In case the City rejects any materials and equipment, then the Contractor shall replace the rejected materials and equipment within a reasonable time. If he fails to do so, the City may, after the expiration of a period of thirty calendar days after giving him notice in writing, proceed to replace such rejected materials and equipment, and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under this Contract.

The City agrees to obtain other equipment within a reasonable time and the Contractor agrees that the City may use the equipment furnished by him without rental or other charges until the new equipment is obtained.

Materials or work in place that fails to pass acceptability tests shall be retested at the direction of the construction engineer all such retests shall be at the Contractor's expense. The rates charged shall be in accordance with the Department of Public Works current annual inspection contract which is available for inspection at the offices of the Department of Public Works.

G-5.09 FINAL INSPECTION
The procedures for final inspection shall be in accordance with the provisions of Article 4.07 of the Agreement. During such final inspections, the work shall be clean and free from water. In no case will the final estimate be prepared until the Contractor has complied with all the requirements set forth and the Engineer has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily cosntructed in accordance with the requirements of the Contract Documents.

SECTION 6

TEMPORARY STRUCTURES

G-6.01 GENERAL
All false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed in the construction of any part of the work and which are not herein described or specified in detail, must be furnished, maintained and removed by the Contractor, and he shall be responsible for the safety and efficiency of such works and for any damages that may result from their failure or from their improper construction, maintenance, or operation.

G-6.02 PUBLIC ACCESS
At all points in the work where public access to any building, house, place of business, public road, or sidewalk would be obstructed by any action of the Contractor in executing the work required by this Contract, the Contractor shall provide such temporary structure, bridges or roadway as may be necessary to maintain public access at all times. At least one lane for vehicular traffic shall be maintained in streets in which the Contractor is working. Street closure permits are required from the Department of Public Works.

The Contractor shall provide suitable temporary bridges, as directed by the Engineer, at street intersections when necessary for the maintenance of vehicular and pedestrian traffic.

Prior to temporarily cutting of access to driveways and garages, the Contractor shall give twelve (12) hours notice to affected property owners. Interruptions to use of private driveways shall be kept to a minimum.

G-6.03 CONTRACTOR'S FIELD OFFICE
The Contractor shall erect, furnish and maintain a field office with a telephone at the site during the entire period of construction. He or an authorized agent shall be present at this office at all times while his work is in progress. Readily accessible copies of both the Contract Documents and the latest approved working drawings shall be kept at this field office.

G-6.04 TEMPORARY FENCE
If, during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall, at his own expense, if so ordered by the Engineer, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced. The Engineer shall be solely responsible for the determination of the necessity for providing a temporary fence and the type of temporary fence to be used.

G-6.05 RESPONSIBILITY FOR TEMPORARY STRUCTURES
In accepting the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance, or operation and will indemnify and save harmless the City from

all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provisions.

SECTION 7
TEMPORARY SERVICES

G-7.01 WATER
The Contractor shall provide the necessary water supply at his own expense. He shall, if necessary, provide and lay necessary waterlines from existing mains to the place of using, shall secure all necessary permits and pay for all taps to water mains or hydrants and for all water used at the established rates.

G-7.02 LIGHT AND POWER
The Contractor shall provide, at his own expense, temporary lighting and power facilities required for the proper prosecution and inspection of the work. If, in the opinion of the Engineer, these facilities are inadequate, the Contractor will not be permitted to proceed with any portion of the work affected thereby.

G-7.03 SANITARY REGULATIONS
The Contractor shall prohibit and prevent the committing of nuisances on the site of the work or on adjoining property and shall discharge any employee who violates this rule.

Ample washrooms and toilet facilities and a drinking water supply shall be furnished and maintained in strict conformity with the law by the Contractor for use by his employees.

G-7.04 ACCIDENT PREVENTION
Precautions shall be exercised at all times for the protection of persons and property. The safety provisions of applicable laws, building and construction codes shall be observed. The Contractor shall comply with the U. S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596), and under Section 107 of the Contract Work. Hours and Safety Standards Act (PL 91-54), except where state and local safety standards exceed the federal requirements and except where state safety standards have been approved by the Secretary of Labor in accordance with provisions of the Occupational Safety and Health Act.

G-7.05 FIRST AID
The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when men are employed on the work.

G-7.06 HEATING
The Contractor shall provide temporary heat, at his own expense, whenever required on account of work being carried on during cold weather and to prevent freezing of water pipes and other damage to the work.

SECTION 8
LINES AND GRADES

G-8.01 GENERAL
All work done under this Contract shall be constructed in accordance with the lines and grades shown on the Plans, or as given by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.

The Engineer will establish bench marks and base line controlling points. Reference remarks for lines and grades as the work progresses will be located to cause as little inconvenience to the prosecution of the work as possible. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the use of the reference marks provided. He shall remove any obstructions placed by him contrary to this provision.

G-8.02 SURVEYS
The Contractor shall furnish and maintain, at his own expense, stakes and other such materials, and give such assistance, including qualified helpers, as may be required by the Engineer for setting reference marks. The Contractor shall check such reference marks by such means as he may deem necessary and, before using them, shall call the Engineer's attention to any inaccuracies. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the reference marks set by the Engineer, and shall be solely responsible for the accuracy thereof. He shall, however, be subject to the check and review of the Engineer.

The Contractor shall keep the Engineer informed a reasonable time in advance as to his need for line and grade reference marks, in order that they may be furnished and all necessary measurements made for record and payment with the minimum of inconvenience to the Engineer or of delay to the Contractor.

It is the intention not to delay the work for the establishment of reference marks but, when necessary, working operations shall be suspended for such reasonable time as the Engineer may require for this purpose.

G-8.03 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 reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or to removing without authorization such established points, stakes and marks.

The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.

G-8.04 DATUM PLANE
All elevations indicated or specified refer to the Mean Sea Level Datum of the U.S.C. & G.S. (N.O.S.) which is 0.80 feet above the Mean Low Water Datum of the U. S. Army

Corps of Engineers.

SECTION 9
ADJACENT STRUCTURES AND LANDSCAPING

G-9.01 RESPONSIBILITY
The responsibility for removal, replacement, relocation, repair, rebuilding or protection of all public utility installations, including poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes, sewers, traffic control and fire alarm signal circuit installations and other appurtenances and facilities shall be in accordance with G-1.02 and G-1.03.

The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the work. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Plans, and the removal, relocation, and reconstruction of such items called for on the Plans or specified shall be included in the various Contract Items and no separate payment will be made therefor. Where such public and private property, structures of any kind and appurtenances thereto are not shown on the Plans and when, in the opinion of the Engineer, removal or relocation and reconstruction is necessary to avoid interference with the work, payment therefor will be made as provided for extra work in Article 7.02 of the Agreement.

G-9.02 PROTECTION OF TREES
All trees and shrubs shall be adequately protected by the Contractor with boxes or otherwise and, within the City of Tampa, in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Contractor or his employees shall be replaced by him with new stock of similar size and age, at the proper season, and at the sole expense of the Contractor.

Beneath trees or other surface structures, where possible, pipelines may be built in short tunnels, backfilled with excavated materials, except as otherwise specified, or the trees or structures carefully supported and protected from damage.

The City may order the Contractor, for the convenience of the City, to remove trees along the line of trench excavation. If so ordered, the City will obtain any permits required for removal of trees. Such tree removal ordered shall be paid for under the appropriate Contract Items.

G-9.03 LAWN AREAS
Lawn areas shall be left in as good condition as before the starting of the work. Where sod is to be removed, it shall be carefully removed and later replaced, or the area where sod has been removed shall be restored with new sod in the manner described in the Technical Specifications section.

G-9.04 RESTORATION OF FENCES
Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good a condition as before the starting of the work. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the Engineer. The cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate Contract Item or Items, or if no specific Item is provided therefor, as part of the overhead cost of the work, and no additional payment will be made therefor.

SECTION 10
PROTECTION OF WORK AND PUBLIC

G-10.01 TRAFFIC REGULATIONS
The Contractor shall arrange his work to comply with Article G-6.02. The work shall be done with the least possible inconvenience to the public and to that end the work may be confined by the Engineer to one block at a time.

G-10.02 BARRIERS AND LIGHTS
During the prosecution of the work, the Contractor shall put up and maintain at all times such barriers, and lights, as will effectually prevent accidents. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public. Such barriers and signs shall be constructed to State of Florida Department of Transportation standards and placed as recommended by the Traffic Division of the City's Department of Public Works.

No open fires will be permitted.

G-10.03 SMOKE PREVENTIONS
The Contractor shall use hard coal, coke, oil or gas as fuel for equipment generating steam. A strict compliance with ordinances regulating the production and emission of smoke will be required.

G-10.04 NOISE
The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all gasoline motors or other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.

Except in the event of an emergency, no work shall be done between the hours of 7:00 p.m. and 7:00 a.m., or on Sundays. If the proper and efficient prosecution of the work requires operations during the night, the written permission of the Engineer shall be obtained before starting such items of the work.

G-10.05 ACCESS TO PUBLIC SERVICES
Neither the materials excavated nor the materials or plant used in the construction of the work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.

G-10.06 DUST PREVENTION
The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the streets sprinkled with water at all times.

G-10.07 PRIVATE PROPERTY
The Contractor shall so conduct the work that no equipment, material, or debris will be placed or allowed to fall upon private property in the vicinity of the work unless he shall have obtained the owner's written consent thereto and shall have shown this consent to the Engineer.

SECTION 11
SLEEVES AND INSERTS

G-11.01 COORDINATION
When the Contract requires the placing of conduits, saddles, boxes, cabinets, sleeves, inserts, foundation bolts, anchors, and other like work in floors, roofs, or walls of buildings and structures, they shall be promptly installed in conformity with the construction program. The Contractor who erects the floors, roofs, and walls shall facilitate such work by fully cooperating with the Contractors responsible for installing such appurtenances. The Contractor responsible for installing such appurtenances shall arrange the work in strict conformity with the construction schedule and avoid interference with the work of other contractors.

G-11.02 OPENINGS TO BE PROVIDED
In the event timely delivery of sleeves and other materials cannot be made and to avoid delay, the affected Contractor may arrange to have boxes or other forms set at the locations where the appurtenances are to pass through or into the floors, roofs, walls, or other work. Upon the subsequent installation of these appurtenances, the Contractor erecting the structure shall fill around them with materials as required by the Contract. The necessary expenditures incurred for the boxing out and filling in shall be borne by the Contractor or Contractors required to furnish the sleeves and inserts. Formed openings and later installation of sleeves will not be permitted at locations subject to hydrostatic pressure.

SECTION 12
CUTTING AND PATCHING

G-12.01 GENERAL
The Contractor shall do all cutting, fitting, or patching of his portion of the work that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the Engineer and in accordance with the Plans and Specifications. The work must be done by competent workmen skilled in the trade required by the restoration.

SECTION 13
CLEANING

G-13.01 DURING CONSTRUCTION
During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris, and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable.

The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefor develops.

G-13.02 FINAL CLEANING
At the conclusion of the work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver such materials and equipment undamaged in a bright, clean, polished, and new appearing condition.

SECTION 14
MISCELLANEOUS

G-14.01 PROTECTION AGAINST SILTATION AND BANK EROSION
The Contractor shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed watercourses and drainage ditches.

G-14.02 EXISTING FACILITIES
The work shall be so conducted to maintain existing facilities in operation insofar as is possible. Work shall be scheduled to minimize bypassing during construction. Requirements and schedules of operations for maintaining existing facilities in service during construction shall be as described in the Special Provisions.

G-14.03 USE OF CHEMICALS
All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.

* * * * * * *

SPECIFIC PROVISIONS

SP-1.01 TSS TECHNICAL SPECIFICATIONS:

Division II and III of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction dated 2015 shall be incorporated for construction and materials with the exception of Contractor QAQC requirement.
The following hierarchy of the contract documents shall apply:

SP-2.01 BID ITEMS:

It is the intent of these Contract Documents that any items of work and all costs for which compensation is not directly provided by a bid item but are incidental to various project items of work, shall be prorated and included in the bid item for which they are required. Failure of the Contractor to follow this procedure shall be basis for rejection of its bid.

SP-2.02 WORK DIRECTIVE CHANGE:

A Work Directive Change is a written directive to the Contractor, issued on or after the date of the execution of the Agreement, and signed by the Engineer on behalf of the City, ordering an addition, deletion or revision in the work, or responding to an emergency. A Work Directive Change will not change the contract price or the time for completion, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the contract price or the time of completion.

Without invalidating the Agreement, certain additions, deletions or revisions in the work may, at any time or from time to time, be authorized by a Change Order or a Work Directive Change. Upon receipt of any such document, the Contractor shall promptly proceed with the work involved.

SP-2.03 LINES AND GRADES:

The General Provisions Section G-8.01 and G-8.02 are revised to read as follows:

G-8.01 General:

All work done under this contract shall be constructed in accordance with the lines and grades as shown on the plans or as directed by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.
The Engineer will establish Bench Marks and baseline controlling points only.

G-8.02 Surveys:

The Contractor shall furnish and maintain, with no additional payment, stakes and other such material as may be required for setting reference marks; and shall, with no additional payment, establish all working or construction lines and grades as required from the reference marks set by a Florida Registered Professional Surveyor and Mapper hired and/or employed by the Engineer, and shall be solely responsible for the accuracy thereof. The Contractor shall, however, be subject to the check and review of a Florida Registered Professional Surveyor and Mapper hired and/or employed by the Engineer the Engineer.

Pay items requiring survey information, such as embankment or excavation, shall be documented by of a Florida Registered Professional Surveyor and Mapper. In addition, plotted cross sections and quantity computations must be supplied and certified.

Pay items requiring survey information, such as embankment or excavation, shall be documented by of a Florida Registered Professional Surveyor and Mapper. In addition, plotted cross sections and quantity computations must be supplied and certified. All surveys shall be performed using electronic data collection for data acquisition. All drawings shall be submitted in the most current version of AutoCad being used by the COT department requiring the survey. All surveys must meet the Minimum Technical Standards set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 5J-17, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes. All surveys must also meet any standards or specifications which may be included as part of the scope of contract.

SP-2.04 REQUIREMENTS FOR CONTROL OF THE WORK:

Prior to the start of the work included in this contract, a Preconstruction Conference will be held by the Engineer to be attended by the Contractor and representatives of the various utilities and others for the purpose of establishing a schedule of operations which will coordinate the work to be done under this contract with all related work to be done by others within the limits of the project. The Contractor shall be prepared for this meeting and shall present a comprehensive construction schedule for all items of work to be accomplished, which will be used as the basis for the development of an overall operational schedule and a list of subcontractors and material suppliers to be used on this work.

All items of work in this contract shall be coordinated so that progress on each related work item will be continuous from week to week. The progress of the work will be reviewed by the Engineer at the end of each week, and if the progress on any item of work during that week is found to be unsatisfactory, the Contractor shall be required to adjust the rate of progress on that item or other items as directed by the Engineer.
The Contractor shall conduct operations in such a manner as will result in the minimum of inconvenience to occupants of adjacent homes and business establishments and shall provide temporary access as directed or as conditions in any particular location may require.

Access to adjacent residential, public and commercial properties shall be provided at all times during the contract period.

The Contractor shall restore to its previous condition as directed by the Engineer any private property, City property, or utilities damaged by its construction. No payment shall be made to the Contractor for any required restoration of private property, City property or utilities, unless otherwise noted.

SP-2.05 REFERENCE STAKES – Not applicable

SP-2.06 CONTRACTOR'S WEEKLY SCHEDULE:

In order that the Department of Public Works personnel may be advised of the work to be performed, the Contractor may be required to submit weekly to the Engineer of its designated representative a schedule indicating the proposed work plan for the forthcoming week. Such shall be delivered to DPW not later than Friday preceding the work plan week unless other arrangements have been made for this submittal.

SP-2.07 MONTHLY CONSTRUCTION ESTIMATES AND RELEASE OF LIEN:

The Contractor shall prepare on or about the first day of each month an estimate of the work completed in the preceding month. Said estimate shall be prepared on standard forms provided by the Engineer, and three (3) signed

originals shall be provided by the Contractor. Any disputed quantities shall be adjusted as directed by the Engineer prior to each partial payment, as provided for in Article 10.05 of the Agreement.
Certification that all subcontractors have been paid for the previous month's work shall be submitted with each partial payment request on forms provided by the Engineer.
An update of the overall project schedule shall be submitted with each partial payment request.

SP-2.08 CONTRACTOR'S REPRESENTATIVE:

Add to Article 8.02 of the Agreement:

"The Contractor shall submit in writing to the Construction Engineer the name of its duly authorized representative who will be present on the job during all work activities and is authorized to make decisions for the Contractor. Any change in the contractor's representative shall require written notification to the Construction Engineer prior to such change".

SP-2.09 NOTICE AND SERVICE THEREOF:

All notices, which shall include demands, instruction, requests, approvals, and claims, shall be in writing.

Any notice to or demand upon the Contractor shall be sufficiently given if delivered to the Contractor's representative at the construction site or to the office of the Contractor specified in the bid (or to such other offices as the Contractor may, from time to time, designate to the City in writing), or if deposited in the United States mail in a sealed, postage prepaid envelope, or delivered, with charges prepaid, to any telegraph company for transmission, in each case addressed to such office.

All notices required to be delivered to the City shall, unless otherwise specified in writing to the Contractor, be delivered to the Engineer, 3806 E. 26th Avenue, Tampa, Florida 33605, and any notice to or demand upon the City shall be sufficiently in the United States mail in a sealed, postage-prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to said Engineer or to such other representative of the City or to such other address as the City may subsequently specify in writing to the Contractor or to its representative at the construction site for such purposes.

Any such notice or demand shall be deemed to have been given or made as of the time of actual delivery or (in the case of mailing) when the same should have been received in due course of post or (in the case of telegram) at the time of actual receipt, as the case may be.

SP-2.10 CONTRACTOR'S FIELD OFFICE:

The Contractor will not be required to provide a Contractor's field office.

The Contractor, however, shall have Contract Documents, the latest approved working drawings, standard drawings and a representative of the Contractor available at the site during regular working days.

SP-2.11 ENGINEERING'S FIELD OFFICE:

An Engineering field office shall not be required for this project.

A functional, portable cellular telephone and separate lockable sanitary facilities shall be provided to the Engineer for use throughout the duration of the project.

All costs associated with the cellular telephone (local calls only) and sanitary facilities shall be borne by the

Contractor. No separate payment shall be made for these services.

SP-2.12 DAMAGE TO ADJACENT STREETS:

Any streets (including detour routes) consisting of travel lanes, curbs, gutters and shoulders, outside the project area (not designated for construction), which are determined by the Engineer to have been damaged due to negligent construction related operations and/or equipment, shall be restored by the Contractor to its original or better condition without any cost to the City and to the satisfaction of the Engineer.

SP-2.13 PROJECT PHOTOGRAPHS:

The Contractor will not be required to furnish photographs of the project; however, the Engineer may or may not take photographs of the area immediately prior to and after completion of the construction for record and information. To assure that there will not be any conflict with this photography, the Contractor shall not perform clearing operations or actions which will disturb any street or area within the project until the Engineer has been advised thereof and has had adequate opportunity to perform the desired photography.

SP-2.14 PRECONSTRUCTION VIDEO:

Prior to commencing work, the Contractor shall submit to the Engineer for approval, a DVD containing a continuous color video recording including complete coverage of pre-construction conditions of all surface features within the construction's zone of influence, (including detour routes) simultaneously produced audio commentary and electronic display of time and date. The video recording shall be sufficient to fulfill the technical and forensic requirements of the project and provide continuous unedited coverage, establishing locations and viewer orientation with clear, bright, steady and sharp video images with accurate colors free of distortion or other imperfections. The DVD must be accompanied by a detailed log of its contents including date, locations, video counter numbers and features. No work shall be allowed until the completed DVD and log are approved by the Engineer.

The costs associated with preparing the project's preconstruction video shall be included in the contract price for Mobilization

SP-2.15 PROJECT CLEAN-UP:

Clean-up on this project is extremely important and the Contractor will be responsible for keeping the construction site neat and clean with debris being removed regularly as the work progresses.

If project cleanliness and/or dust control reaches an unacceptable level in the opinion of the Engineer, the Engineer will notify the Contractor in writing. If the Contractor does not act to correct the situation within 4 hours in the case of dust control or within 24 hours in the case of general cleanliness, the Engineer may call upon outside forces to provide the appropriate services. Cost of all such activities shall be charged to the Contractor via contract change order.

SP-2.16 CITY PERMITS:

The Contractor shall be responsible for obtaining all applicable City permits for this project. These can include but may not be limited to: Right-of-way permit(s), tree removal/site clearing permit(s), and drainage/earthwork permit(s).

The Contractor shall supply any required plans or other information to the issuing department.

The time required to prepare, submit, review, and issue the permits shall be included in the contract time and no payment shall be made for any delay incurred by this process.

Cost for obtaining City permits shall be included in the lump sum cost for mobilization (Item No. 101-1), and no separate payment shall be made. Right-of-way permit fee shall be waived by the City.

All subcontractors working on the project shall obtain their own, separate permits as above.

SP-2.17 AS-BUILT PLANS:

The Contractor shall provide the Engineer with "As-Built" plans, as follows:

1. All As-Built information shall be annotated by a Florida Registered Professional Surveyor and Mapper on a separate layer of each AutoCAD drawing file as provided on a disk by the City. Annotation of the new drawing files shall be in accordance with City of Tampa DPW drafting standards, as well as the Minimum Technical Standards set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 61G17-6, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes. Settings shall be as follows: Color: CYAN, Linetype: CONTINUOUS, Font: ROMANS, Layer Name: AS-BUILT, AutoCAD Menu Name: ACAD.MNU, and File Format: AUTOCAD latest version.

2. All surveys shall be completed and certified by a Florida Registered Professional Surveyor and Mapper hired and/or employed by the Contractor, and shall be in accordance with the Minimum Technical Standards set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 61G17-6, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes. Survey data shall be submitted as an electronic data file in AutoCad latest version. The Contractor shall also include as supporting data the ASCII files of digital raw survey data, closure reports, adjustment reports, and/or copies of any hand written field notes or sketches.

3. "As-Built", or "Record", surveys, as may be required by contract, or agreement, shall consist of survey data collected on all constructed improvements, so they may be compared to and contrasted with the design plans and/or construction drawings. The annotated disk shall delineate all changes and deviations to the planned improvements within the project limits, to include, but not be limited to, pavement, curb & gutter, sidewalk, driveways, inlets, manholes, all piping, inverts, ditches, ponds, valves, hydrants, water meters, signalization, hand holes, signing & pavement marking, landscaping, and irrigation. All changes and deviations shall be delineated by Station-Offset and vertical alignment values and shall be clearly shown on the drawing files.

4. The Contractor shall comply with the above requirements and shall submit one check print set of the plans at the same scale as the construction plans, and all the supporting survey data files, to the Engineer for review within three weeks of substantial completion of the project. Final payment for the project shall not be made until the As-Built information is received for review, any corrections are made, and approval granted by the Engineer. Upon approval, the Contractor shall provide the final As-Built drawings on the disk, at the same scale as the construction plans. These files shall be
AutoCad Drawings or AutoCad Design Web Format and Adobe PDF
The cost for this work shall be included in the contract price for Mobilization and no separate payment
Shall be made for meeting the above As-Built requirements.

SP-3.01 STREET CLOSURE AND MAINTENANCE OF TRAFFIC:

A City of Tampa permit for construction and maintenance operations within public Rights of Way will be required for every street, lane, or sidewalk closure within City of Tampa Rights of Way.
These permits will establish the requirements for the closure related to number of lanes and/or time of day lanes or street may be closed. The Contractor shall adhere to the requirements as described in the permit(s).
The Contractor shall furnish and maintain all necessary signs, pavement markings, barricades, lights, and flagmen

necessary to control traffic and provide for safety of the public, all in compliance with the current Florida Department of Transportation Roadway and Traffic Design Standards and the FHWA Manual on Uniform Traffic Control Devices.

The Contractor shall observe traffic movements through the work site and inspect all traffic control devices on a regular basis to ensure that all devices are properly installed and functioning as intended.
In cases of closure for street, lane, or sidewalk on the City of Tampa Functionally Classified Network (collectors, minor arterials, and principal arterials), including all State Roads, the Contractor shall provide a maintenance of traffic plan to the City of Tampa, Transportation Division. This plan shall be provided at least seventy-two hours in advance of the closure (excluding weekends) and shall contain the following:

1. Proposed detour routes.
2. Signing of the complete construction area and detour routes.

Advance notice information signs advising the public of scheduled closure of major roadways and/or information signs advising the public of points of closure and detour routes may be required by the Engineer and will be installed at the Contractor's expense.
Payment shall be full compensation for all work, equipment, materials, tools, labor and any incidentals required to maintain safe traffic routes past the work site.
Payment shall be made under:
Item No. 102-1 Maintenance of Traffic L.S.

SP-3.02 TRAFFIC INFORMATION SIGNS – Not applicable

SP-3.03 PROJECT SIGN:

The Contractor shall furnish 3 project sign(s) which shall conform to the general configuration and dimensions as per page SIGN-1 which is made a part of these specifications. The sign(s) shall be maintained in good condition until the completion of the project, and shall be located as instructed by the Construction Engineer.
The cost of furnishing and maintaining the signs shall be included in the various contract items and no additional compensation shall be made.

SP-3.04 TEMPORARY SIGNALIZATION – Not applicable

SP-3.05 NIGHT WORK:

All or portions of the work are to be performed at night, as shown in the maintenance-of-traffic plan, or as specified herein.

All night work shall meet the requirements of Subarticle 8-4.1 from the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, 1991 edition.
No additional payment shall be made for night work required by the project plans or specifications.

SP-3.06 TEMPORARY TRAFFIC STRIPING – Not applicable

SP-4.01 DENSITY REQUIREMENTS – Not applicable

SP-4.02 STABILIZATION – Not applicable

SP-4.03 SOIL BORING INFORMATION – Not applicable

SP-4.04 TEMPORARY STOCKPILING – Not applicable

SP-4.05 DEWATERING – Not applicable

SP-4.06 COMPACTION OF SUITABLE CLAY FILL MATERIAL – Not applicable

SP-5.01 UTILITY PROTECTION CONSIDERATIONS:

The Contractor shall protect all utilities and other facilities within and adjacent to the construction as covered in Section G- 1.03, unless a utility firm has conclusively indicated, or such is shown on the plans, that the certain adjustment, removal, reconstruction, or protection of the utility's facility will be performed by that respective utility. The Contractor shall make every effort to protect all water mains. If the main is damaged or lost, the Contractor shall replace the affected line in strict accordance with the City of Tampa Water Department Specifications and Construction Standards, latest, edition, at no extra cost to the City, and he shall assure that service is maintained at all times.

The Contractor shall make every effort to protect all sanitary sewer lines. If the main is damaged or lost, the Contractor shall replace the affected line in strict accordance with the City of Tampa Department of Sanitary Sewer Specifications and Construction Standards, latest edition, at no extra cost to the City.

It will be the Contractor's responsibility to preserve all existing sanitary sewer services without interruption during the construction of storm sewers or the repairs or reconstruction of sanitary sewers.

When the construction of storm sewers, repair or reconstruction of sanitary sewers has been completed, all temporary connections shall be removed. Sewers shall be cleaned of all settled solids.

The cost of handling sanitary sewers during construction, including cost of all labor, materials, and equipment or other items incidental to completing the job, shall be included in the contract price as bid for the contract items and no separate payment shall be made.

It will be the Contractors responsibility to preserve all existing ditches, swales, force main, gravity main, laterals, etc., and other stormwater appurtenances and facilities pertaining thereto whether owned or controlled by City, other governmental bodies or privately owned by individuals, firms or corporations.

Any temporary measures constructed shall first be approved by the Engineer. The cost of such temporary measures shall be included in the contract price bid for storm sewer items and no separate payment shall be made.

The Contractor shall furnish, install, and remove sheeting and shoring and other protective measures as may be necessary to satisfactorily accomplish the construction of this project. The cost of such sheeting and shoring and other protective measures shall be included in the unit prices as bid for the storm sewer items and no separate payment shall be made.

Compensation for steel sheeting and shoring furnished, installed and removed shall be paid for as extra work in accordance with Article 7.02, EXTRA WORK, on Page A-18 of the Tampa Agreement when approved for use by the Engineer. Such approval shall be for its use only, and the Contractor shall have full responsibility for the design, installation, and removal of the sheeting and shoring. The Contractor shall obtain the services of a registered Professional Engineer to design and certify the sheeting and shoring plans.

SP-5.02 ADJUSTMENT OF UTILITIES AND PUBLIC SERVICE INSTALLATIONS:

Storm and sanitary sewer manhole covers, valve covers or boxes, water meter boxes, and vaults located within the limits of construction of the pavement or sidewalk area to be constructed, reconstructed or overlaid shall be relocated or adjusted by the Contractor to conform with the new pavement or sidewalk elevation as a part of the work of

constructing or reconstructing the pavement or sidewalk and no separate payment will be provided therefor. Appurtenances of other utilities will be relocated or adjusted by the utility company owning or having jurisdiction over the respective utility.

SP-5.03 REMOVAL OR ADJUSTMENT OF PUBLIC UTILITIES:

The City will make necessary arrangements with public utility owners, other than City of Tampa Water and Sanitary Sewers, for removal or adjustments of existing utilities, whether shown or not shown on the plans, where such removal or adjustment is determined by the Engineer to be essential to the performance of the required construction, provided normal construction procedures are used by the Contractor.

Relocations or adjustments requested by the Contractor on the basis of the use of a particular method of construction or a particular type of equipment shall not be considered as being essential to the construction of the project if other commonly used methods or equipment could be employed without the necessity of relocating or adjusting the utility.

The Engineer will determine the responsibility for any such adjustment of utilities.

Relocations or adjustments requested for the Contractor's convenience or because of delivery of materials to the job site shall be the responsibility of and at the expense of the Contractor.

The Contractor shall be required to coordinate its activities with relocation work by the utilities. A schedule for relocation work will be presented to the Contractor at the pre-construction conference. This schedule may be adjusted to "fit" the Contractor's proposed schedule, but it will include periods during which the Contractor's ability to perform work in the relocation area will be limited, with no additional compensation.

SP-6.01 USE OF CITY WATER SYSTEM:

A Tampa Water Department portable meter shall be utilized when obtaining water from the City system.

SP-6.02 WATER MAIN CONSTRUCTION AND/OR OFFSET:

The work specified consists of the offset and/or construction of water mains, tees, fittings, valves, valve box, thrust blocks, joint restraints, hydrants, and other related appurtenances in conformity with the location, lines, and grades shown in the plans or as directed by the Engineer. All materials and workmanship shall be in accordance with City of Tampa Water Department Technical Specifications and Construction Standards and Materials Specifications, latest edition and are available from the Tampa Water Department.

The Contractor's shall notify citizens subject to interruption of service at least 24 hours in advance. The Contractor is further required to make this notification in writing, providing the following information in addition to the starting time and duration of interruption:

1. Contractor's name, address, and telephone number.
2. Name of Contractor's project superintendent and telephone number(s) which allow 24- hour per day contact.
3. Name of the Engineer and telephone number(s) which all 24-hour per day contact.
4. Name of City of Tampa Water Department Engineer and telephone number(s) which allow 24-hour per day contact.
5. Data and time of notification.
6. A written log of addresses notified.

The written notification should be in such format as to be easily affixed to the structure, such as a "hang tag", should no citizen be in the building at the time of notification.

All newly laid pipe, including fittings and valves shall be pressure tested in accordance with AWWA Standard C 600 and current City of Tampa, Water Department standards. Not less than three (3) days notice shall be given prior to start of such tests, and such testing shall not be included until preliminary testing by the Contractor has indicated that the test section is ready for testing. The schedule and procedures for testing shall be determined by the Contractor and reviewed with the Water Department's Construction Engineer prior to testing.

Concurrently with pressure testing, pipelines shall be subjected to leakage tests. Leakage measurements shall not be started until a constant test pressure has been established in excess of 150 psi and not greater than 190 psi. The duration of each leakage test shall be at least two hours and the test pressure shall be as specified for the pressure tests.

Before the system is put into operation, all potable water mains and appurtenances and any item of new construction with which the water comes in contact shall be flushed, pressure-tested and disinfected. Prior to disinfection, the lines shall have been "pigged" and flushed to remove all sand and other foreign matter. The lines shall be disinfected in accordance with the applicable requirements of AWWA Standard C 601.

Upon completion of the hydrostatic test and disinfection, the Contractor shall contact the Water Department Inspection Division requesting a bacteria test. The Contractor shall install sample taps on the new main and at the end of each new branch of the piping system. The Water Department will pull a water sample on two consecutive days allowing 24-hours for each sample to be analyzed and processed.

If samples do not demonstrate satisfactory results, the disinfection procedure shall be repeated until two (2) consecutive sets of satisfactory samples are obtained. The period between such series of samples shall be a minimum of 24 hours.

After completing the testing and disinfection and regardless of ground conditions, all samples taps and corporation stops shall be removed from the pipe and replaced with tapered brass plugs.

SP-6.03 WATER SERVICE CONNECTIONS – Not applicable

SP-7.01 SANITARY SEWER CONSTRUCTION – Not applicable

SP-7.02 SANITARY SEWER HOUSE LATERAL EXTENSION – Not applicable

SP-8.01 FILLING LOW AREAS WITHIN CITY LIMITS – Not applicable

SP-8.02 ENVIRONMENTAL PROTECTION – Not applicable

SP-8.03 CONFLICT STRUCTURE – Not applicable

SP-8.04 REINFORCED CONCRETE PIPE/BOX – Not applicable

SP-8.05 CONSTRUCTION OF PAVED SUMP BETWEEN INLET AND EDGE OF PAVEMENT – Not applicable

SP-8.06 DRAINAGE STRUCTURES – Not applicable

SP-8.07 RIP-RAP – Not applicable

SP-8.08 STANDARD FOR FILTER FABRIC – Not applicable

SP-8.09 CONNECTION TO EXISTING INLET OR MANHOLE – Not applicable

SP-8.10 EROSION CONTROL PLAN – Not applicable

SP-8.11 CONCRETE STRUCTURES AND CONCRETE BOX CULVERTS – Not applicable

SP-8.12 DRAINAGE STRUCTURE AND PIPE BEDDING – Not applicable

SP-9.01 EXISTING SIDEWALKS, DRIVEWAYS AND PARKING AREAS – Not applicable

SP-9.02 PRIME/TACK COAT – Not applicable

SP-9.03 PAVEMENT REPLACEMENT AND TOTAL RESTORATION – Not applicable

SP-9.04 CONCRETE CURB OR CURB-AND-GUTTER – Not applicable

SP-9.05 ASPHALT LEVELING COURSE – Not applicable

SP-9.06 PAVEMENT MIX DESIGNS – Not applicable

SP-9.07 USE OF RECLAIMED ASPHALT – Not applicable

SP-9.09 PEDESTRIAN RAMPS – Not applicable

SP-10.01 GRASSING AND/OR SODDING – Not applicable

SP-10.02 TREE REMOVAL:

The work included in this Section consists of removal of all trees within the area of construction with trunks 5 inches or more in diameter. Tree removal shall comply with the City of Tampa Tree Ordinance. The Contractor will be responsible for obtaining the necessary permit(s) and paying the necessary fees.

All trees with trunks less than 5 inches in diameter are not included in this section. The cost of removing trees less than 5 inches in diameter shall be included within the various contract items and no additional payment shall be made.

The diameter of the trunk shall be determined by measuring the circumference of the trunk at a point 4.5 feet above the existing ground level and dividing by 3.14.

All stumps and roots shall be removed to a depth of at least 2 feet below the finished grade.

Disposal of timber, stumps, roots or any other material resulting from the tree removal operation shall be the sole responsibility of the Contractor. Such disposal shall have the approval of the Engineer.

Payment shall be full compensation for all work, equipment, tools, labor and any incidentals required for completion of the work.

Cost of tree removal and disposal of these items shall be included in the lump sum price for Clearing and Grubbing,

and no separate payment shall be made.

SP-10.03 LIVE OAK TREES – Not applicable

SP-10.04 ROOT PRUNING:

The Contractor shall make provisions for tree protection to the satisfaction of the Engineer prior to any excavation or clearing and grubbing. All applicable site inspections by the City of Tampa Parks Department and all permits required for tree work shall be obtained by the Contractor prior to commencing work.

The Contractor shall furnish all labor, materials, equipment and services necessary to prune the tree roots as shown on the plans, as specified, and as directed by the Engineer. The Contractor shall provide root pruning services only as shown on the plans and as directed by the Engineer.

All root pruning shall be performed by a qualified, licensed tree professional as approved by the Engineer. Root pruning shall be performed with a chain saw, stump grinder, trencher, Dasco root pruner or equal, as approved by the Engineer.

Root pruning along pipelines, manholes, inlets, and other underground appurtenances and structures will be included for payment under this contract item. The quantity of root pruning, in linear feet, to be measured for payment will be the actual length of root pruning performed within the limits shown on the plans, in the specifications, or as directed by the Engineer. Depth of root pruning shall be as directed by the Engineer.

All roots designated to be removed shall be severed at the perimeter of the designated protected radius leaving a smooth, uniform section at the remaining root end to prevent root damage.

The work includes all cutting, excavation, removal, hauling, and disposal of roots; filling, grading, mulching, barricading and other appurtenant work complete, in place.

Cost of root pruning and disposal shall be included in the lump sum price for Clearing and Grubbing, and no separate payment shall be made.

SP-10.05 TRANSPLANTING TREES – Not applicable

SP-10.06 RESTORATION OF LANDSCAPING WITHIN RIGHT-OF-WAY:

The Contractor shall remove any shrubbery, trees less than 5 inches in diameter, other landscaping, walkways, planters, other landscaping, and irrigation systems which are in conflict with the proposed construction. These items shall be restored, relocated, and/or reconstructed as shown in the plans or as directed by the Engineer.

Cost of removing, restoring, relocating, and reconstructing the above items shall be included in the lump sum price for Clearing and Grubbing, and no separate payment shall be made.

SP-10.07 TREE PROTECTION:

Tree barricades shall be constructed and maintained at trees indicated on the plans as "to be protected" and/or as directed by the Engineer. Generally, barricades are to be placed ten (10) feet from the trunk of each protected tree. Barricades shall be constructed of commercially available pine lumber, as follows: Vertical members shall be 2" x 2" or larger, generally spaced twelve (12) feet apart. Horizontal members shall consist of one (1) 1" x 2" board.

The Contractor shall provide the services of an approved licensed tree professional when it is necessary to trim or cut a branch from a tree.

Payment for tree protection and tree cutting or trimming shall be included in the lump sum price bid for mobilization and/or clearing and grubbing and no separate payment shall be made.

SP-10.09 TREE TRIMMING:

In addition to Tree Trimming required in the FDOT Standard Specification Section 110, the Contractor shall trim tree limbs and shrubbery to a height of 8 feet above sidewalks and to the right-of-way in the project area, and as directed by the Engineer.

Cost of trimming and disposal of these items shall be included in the lump sum price for Clearing and Grubbing, and no separate payment shall be made.

SP-11.02 USE OF EXPLOSIVES – Not applicable

SP-11.03 EXISTING PUBLIC FACILITIES – Not applicable

SP-11.04 METAL PRODUCTS – Not applicable

SP-11.05 WATER FOR DUST CONTROL – Not applicable

SP-11.09 CONCRETE BLOCK RETAINING WALLS WITH CONCRETE FOOTING – Not applicable

SP-11.10 MAILBOX RELOCATION – Not applicable

SP-11.11 SIGNALIZATION CONDUIT – Not applicable

SP-11.12 RESTORATION OF MONUMENTATION – Not applicable

SP-11.13 INSTALLATION OF SIGNALIZATION POLES AND MAST ARMS – Not applicable

SP-11.14 SIGNALIZATION CONTROLLER AND CABINET – Not applicable

SP-11.15 VEHICULAR TRAFFIC SIGNAL ASSEMBLIES – Not applicable

SP-11.16 CONTINGENCY ALLOWANCE

Payment from the Contingency Allowance shall be made only at the direction of the Engineer under:
Item No. SP-11-16 Contingency Allowance L.S.

City of Tampa – DMI Sub-(Contractors/Consultants/Suppliers) Payments

(FORM MBD-30)

[ ] Partial [ ] Final

Contract No.: _____ WO#,(if any):_____ Contract Name:_____

Contractor Name:_____ Address:_____

Federal ID:_____ Phone:_____ Fax:_____ Email:_____

GC Pay Period:_____ Payment Request/Invoice Number:_____ City Department:_____

Total Amount Requested for pay period: $_____ Total Contract Amount(including change orders):$_____

-Type of Ownership - (F=Female M=Male), BF BM = African Am., HF HM = Hispanic Am., AF AM = Asian Am., NF NM = Native Am., CF CM = Caucasian S = SLBE

Type Trade/Work Activity []Sub []Supplier Federal ID		Total Sub Contract Or PO Amount	Amount Paid To Date Amount Pending Previously Reported	Amount To Be Paid For This Period Sub Pay Period Ending Date
			$	$
			$	$
			$	$
			$	$
			$	$
			$	$

(Modifying This Form or Failure to Complete and Sign May Result in Non-Compliance)

Certification: I hereby certify that the above information is a true and accurate account of payments to sub – contractors/consultants on this contract.

Signed:_____ Name/Title:_____ Date:_____

Note: Detailed Instructions for completing this form are on the next page

Page 2 of 2 – DMI Payment

Instructions for completing The DMI Sub-(Contractors/Consultants/ Suppliers) Payment Form (Form MBD-30)

This form must be submitted with all invoicing or payment requests where there has been subcontracting rendered for the pay period. If applicable, after payment has been made to the subcontractor, "Waiver and Release of Lien upon Progress Payment", "Affidavit of Contractor in Connection with Final Payment", or an affidavit of payment must be submitted with the amount paid for the pay period. The following will detail what data is required for this form. The instructions that follow correspond to the headings on the form required to be completed. **(Modifying or omitted information from this form my result in non-compliance).**

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **W.O.#** If the report covers a work order number (W.O.#) for the contract, please indicate it in that space.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.** A number assigned to a business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **Pay Period.** Provide start and finish dates for pay period. (e.g. 05/01/13 – 05/31/13)
- **Payment Request/Invoice Number.** Provide sequence number for payment requests. (ex. Payment one, write 1 in space, payment three, write 3 in space provided.)
- **City Department**. The City of Tampa department to which the contract pertains.
- **Total Amount Requested for pay period.** Provide all dollars you are expecting to receive for the pay period.
- **Total Contract Amount (including change orders).** Provide expected total contract amount. This includes any change orders that may increase or decrease the original contract amount.
- **Signed/Name/Title/Date**. This is your certification that the information provided on the form is accurate.
- **See attached documents.** Check if you have provided any additional documentation relating to the payment data. Located at the bottom middle of the form.
- **Partial Payment.** Check if the payment period is a partial payment, not a final payment. Located at the top right of the form.
- **Final Payment.** Check of this period is the final payment period. Located at the top right of the form.

The following instructions are for information of any and all subcontractors used for the pay period.

- **(Type) of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business or SLBE.
- **Trade/Work Activity.** Indicate the trade, service, or material provided by the subcontractor.
- **SubContractor/SubConsultant/Supplier.** Please indicate status of firm on this contract.
- **Federal ID.** A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **Company Name, Address, Phone & Fax**. Provide company information for verification of payments.
- **Total Subcontract Amount.** Provide total amount of subcontract for subcontractor including change orders.
- **Amount Paid To Date.** Indicate all dollars paid to date for the subcontractor.
- **Amount Pending, Previously Reported.** Indicate any amount previously reported that payments are pending.
- **Amount To Be Paid for this Period.** Provide dollar amount of dollars requested for the pay period.
- **Sub Pay Period Ending Date.** Provide date for which subcontractor invoiced performed work.

Forms must be signed and dated or will be considered incomplete. The company authorized representative must sign and certify the information is true and accurate. Failure to sign this document or return the document unsigned can be cause for determining a company is in non-compliance of Ordinance 2008-89.

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

SIGN EXAMPLE ONLY GRAPHIC TO BE DEVELOPED BY CONTRACTOR

scale: 3" = 3"

Sign Information

Building a Better Tampa

David L. Tippin Water Treatment Facility
Caustic Soda Piping Improvements

Project provides for improvements at the David L. Tippin Water Treatment Facility to improve the reliability and safety of the Sodium Hydroxide System of the water distribution system within the facility.

$TBD investment
Scheduled for completion in TBD 2014

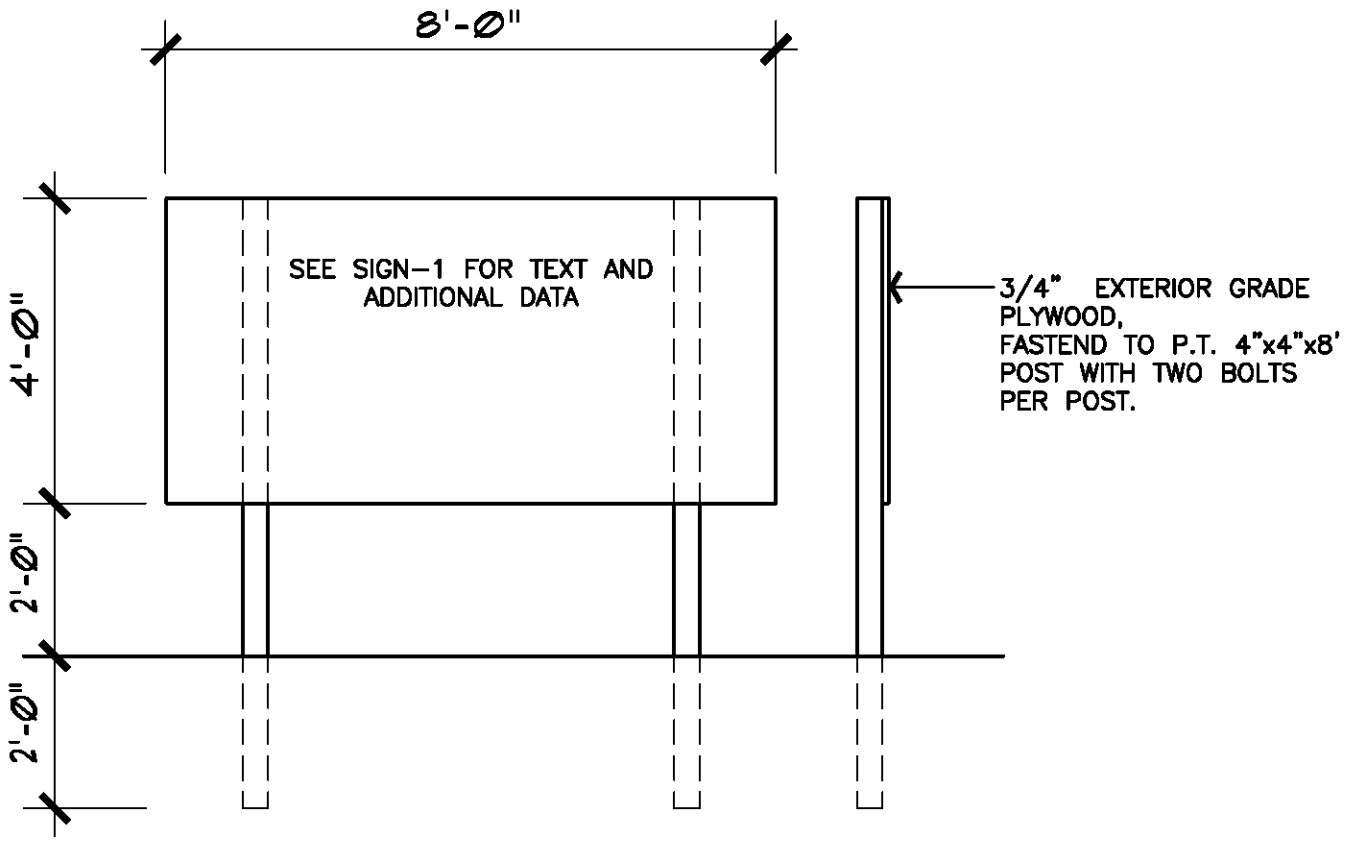
TBD

Colors

Blue: Sherwin Williams Naval SW6244
Green: Sherwin Williams Center Stage SW6920
White: Sherwin Williams Pure White SW7005

Font

Franklin Gothic



CITY OF TAMPA–PROJECT SIGN
REVISED 4/28/04

SECTION 01010 - SUMMARY OF WORK

1.0 GENERAL:

The work shall consist of furnishing all materials, labor, equipment, tools, and all items and services required for the complete construction in conformity with Contract Documents of:

Scott Street Improvements
Between Orange Avenue and East 7th Avenue
for the
City of Tampa

All construction work and materials, in addition to complying with requirements of Contract Documents, shall fully comply with all requirements of local building codes, all ordinances, and regulations of other Federal, State and public authorities having jurisdiction over this type of work in the given area.

2.0 SCOPE:

The work shall include but not be limited to, construction of storm water infiltration planters, sediment basins and curbing along with landscaping, concrete walkways with brick inlay and site furnishings, with all associated work required for a complete project, as shown and indicated on the Drawings and in the Specifications.

3.0 LEGAL DESCRIPTION OF PROJECT SITE:

Legal description as shown on the drawings, Sheet G-1.

4.0 VERIFICATION OF OWNER'S SURVEY DATA:

Prior to commencing any work, the Contractor shall satisfy himself as to accuracy of all survey data which shall affect his work as indicated in these plans and specifications and/or provided by the City.

Should the Contractor discover any inaccuracies or errors which will affect his work, he shall notify the Engineer and/or Architect in order that proper adjustments can be ordered.

The exact location of the building and related items shall be determined on site jointly by the Contractor and the Engineer and/or Architect. NO work shall commence until said final approval of the locations is made by the Engineer and/or Architect.

5.0 CONTRACT DOCUMENTS:

a. BIDDING REQUIREMENTS

b. GENERAL PROVISIONS, SUPPLEMENTARY GENERAL PROVISIONS, AND SPECIAL, CONDITIONS

6.0 SPECIFICATIONS: (DATED: January, 2016)

DIVISION 1 WORKMANSHIP AND MATERIALS

7.0 DRAWINGS: (DATED: January, 2016)

Sheets:

Cover Sheet, E-1 thru E-9, A1.0, R1.0, D1.1 thru D-1.4, R1.1 thru R1.4, R2.1 thru R2.4, H1.0 thru H1.5, H2.1 thru H2.4, L1.0 thru LL1.6, L2.1 and L2.2

8.0 ADDENDA AND LETTERS OF CLARIFICATION:

All addenda and letters of clarification issued prior to bid opening time date.

SECTION 01020 - ALLOWANCES

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes administrative and procedural requirements governing allowances.

Types of allowances include the following:

Contingency allowances.

SELECTION AND PURCHASE

SUBMITTALS

Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

Submit invoices or delivery slips to show the actual quantities of materials delivered to the site for use in fulfillment of each allowance.

CONTINGENCY ALLOWANCES

Use the contingency allowance only as directed by the Owner.

The Contractor's related costs for services, products and equipment ordered by the Owner under the contingency allowance include delivery, installation, taxes, insurance, equipment rental, and similar costs.

Work Directive Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

At Project closeout, credit unused amounts remaining in the contingency allowance to the Owner by Change Order.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

EXAMINATION

Examine products covered by an allowance promptly upon delivery for damage or defects.

PREPARATION

Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

SCHEDULE OF ALLOWANCES

Allowance No. 1: Include a contingency allowance of $25,000 for use according to the Owner's instructions. THE ALLOWANCE SHALL BE INCLUDED IN THE BASE BID.

END OF SECTION 01020

SECTION 02920 - TURF AND GRASSES

1.1 SCOPE

A. Perform all work necessary for installing sod and/or seed as shown on the drawings or inferable there from and/or as specified, in accordance with the requirements of the Contract Documents.

1.2 QUALIFICATIONS

A. Lawn sodding and related work shall be performed by a firm with a minimum of three years (3) experience specializing in this type of work.

1.3 COMPLIANCE WITH REGULATIONS

A. Comply with all Federal and/or State Regulations concerning Classification or transportation of sod and fertilizer materials.

1.4 SOIL STERILANTS

A. No sod or seed shall be placed on soil which has been treated with soil sterilants until sufficient time has elapsed to permit dissipation of toxic materials. The Contractor shall assume full responsibility for any loss or damage to sod or seed arising from improper use of sterilants or due to his failure to allow sufficient time to permit dissipation of toxic materials, whether or not such sterilants are specified herein.

1.5 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 and 2 Specification Sections apply to this Section.

1.6 SOD

A. Class of Sod and Composition - The sod used shall be 97% weed free. It shall be nursery grown and well rooted. Sod shall be subject to review by the Landscape Architect prior to being cut and again before it is laid. The consistency of adherent soil shall be such that it will not break, crumble, or tear during handling and placing of the Sod.

1. Each piece of sod shall be well covered with turf grass, shall be free from noxious weeds and other objectionable plants and shall not contain substances injurious to growth. The grass shall be mown to a length of no less than one and one-half inch (1 1/2") nor more than four inches (4") before the sod is cut.

2. All sod used shall comply with State and Federal laws with respect to inspection for plant diseases and insect infestation. An inspection certificate, required by law to this effect, shall accompany each shipment, and on arrival

shall be filed with the Landscape Architect.

3. Soil of the sod to be used shall be loamy sand and compatible with the soils of the project. No muck or heavy peat soil grown sod will be accepted, unless otherwise specified.

B. Thickness of Cut - Sod shall be machine cut at a uniform soil thickness of three-fourths inch (3/4"), plus or minus one-forth inch (1/4"), at the time of cutting. Measurement for thickness shall exclude top growth and thatch.

C. Pad Size - individual pieces of sod shall be cut to the supplier's standard width and length. Maximum allowable deviation from standard widths and lengths shall be five percent (5%). Broken pads and torn or uneven ends will not be acceptable.

D. Strength of Sod Sections - Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper ten percent (10%) of the section.

E. Moisture Content - Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.

F. Time Limitations - Sod shall be harvested, delivered and installed within a period of forty eight (48) hours. Sod not transplanted within this period shall be inspected prior to its installation.

1.7 SEED

A. Seed shall be true to species as called for on the seeding plans. It shall be domestically grown and comply with current State and Federal regulations purity.

B. All seed shall be delivered to the job site in sacks plainly marked and certified as to content.

C. Germination rate of all seed shall be not less than sixty-five percent (65%) and no seed with an excess of five percent (5%) weed seed shall be used.

1.8 CLEAN UP

A. Prior to seeding or sodding, the surface shall be cleared of all trash, debris and stones larger than one inch (1") in any dimension, and of all roots, brush, wire, grade stakes and other objects that would interfere with planting or maintenance operations.

B. The Contractor shall verify grades during final soil preparation as being true to finish contours shown, and shall maintain such areas until the effective date to begin sodding and/or seeding operations. In such instances where a split responsibility exists between grading and grassing contractors, it shall be the responsibility of the grassing contractor to maintain a suitable grade for grassing once he has accepted the grade provided to him.

C. In all cases the ground shall be hand raked immediately prior to being sodded to remove any irregularities in the grade.

1.9 SODDING OPERATIONS

A. Sodding Time Sod shall be placed when the ground is in a workable condition and temperatures are less than ninety degrees (90) Fahrenheit. Sod shall not be place during extended drought, unless irrigation is available.

B. Transportation Sod shall be in a moist condition at the time of cutting and shall be kept in a moist condition until it is placed. Any sod that has dried out will be rejected and shall be immediately removed from the job site by the Contractor. All sod shall be transported in either a closed van or in open truck properly covered. Sod cut for more than forty-eight (48) hours shall not be used without the concurrence of the Landscape Architect. All sod shall be kept moist and protected from exposure to sun, wind and freezing prior to placing.

C. Misting the Soil During periods of high temperature and after all unevenness in the soil surface has been corrected, the soil shall be lightly irrigated immediately prior to laying the sod.

D. Starter Strip The first row of sod shall be laid in a straight line with subsequent rows placed parallel to and tightly against each other. Lateral joints shall be staggered to promote more uniform growth and strength. Care shall be exercised to insure that the sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots.

E. Sloping Surfaces In ditches, the sod shall be placed with the longer dimension perpendicular to the flow of the water ditch. On slopes, starting at the bottom of the slope, the sod shall be laid with the longer dimension parallel to the contours of the ground. The exposed edge of the sod shall be buried flush with the adjacent sod. On slopes where the sod may be displaced during sodding operations, the workman shall work from ladders or treaded planks.

F. Staking Sod The sod shall be staked on all slopes of 2:1 or steeper. Sod shall be staked with not less than four (4) stakes per square yard with at least one stake for each piece of sod. Stakes shall be lath or similar material, pointed, and driven with the flat side against the slope, six inches (6") into the ground, leave approximately one-half inch (1/2") of the top above the ground.

G. Water and Rolling The Contractor shall water sod immediately after installation to prevent excessive drying during progress of the work. As sodding is completed in any one section, the entire area shall be rolled. It shall then be thoroughly irrigated to a depth sufficient that the underside of the new sod pad and soil immediately below the sod are thoroughly wet.

H. Supplemental Watering During periods of intense heat or abnormal rainfall, supplemental water may be required prior to acceptance of the work. When

supplemental watering is required, Water shall be applied at the rate specified by the Landscape Architect or Owner.

I. Disposal of Surplus Material Surplus and waste materials resulting from sodding operations shall be disposed of by the Contractor at his expense.

1.10 SEEDING OPERATIONS

A. Immediately prior to seeding the ground shall be scarified and raked to provide a friable fine texture.

B. Lawn areas shall be seeded with a mechanical spreader at the rate of application of five pounds per one thousand square feet (5 lbs/1000 sq. ft.) for Bahia grasses. Application rates for other grasses shall be specified in supplemental specifications.

C. After seeding, all areas shall be raked and rolled to satisfactorily cover seed, and then thoroughly watered.

D. The method of seeding may be varied by the contractor on his own responsibility to establish a smooth uniform turf.

1.11 GUARANTEE AND ACCEPTANCE

A. The guarantees for all sod and/or seeding is that it must be alive and in satisfactory growth at the end ninety (90) days, providing appropriate maintenance has been provided by the owner. If improper maintenance is being provided the Contractor shall notify the Owner in writing, with a copy to the Landscape Architect, as to what steps are necessary to be taken.

CLAY PAVERS
SECTION 02950

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clay paver units
B. Sand setting bed and joint sand.

1.02 REFERENCES

A. American Society of Testing Materials (ASTM):

1. C902 Standard Specification for Pedestrian And Light Traffic Paving Brick
2. C1272 Standard Specification for Heavy Vehicular Paving Brick
3. C136 Method for Sieve Analysis for Fine and Coarse Aggregate.
4. C67 Method of Sampling and Testing Brick and Structural Clay Tile.
5. C33 Specification for Concrete Aggregates.
6. C144-89 Standard Specification for Aggregate for Masonry Mortar.

1.03 QUALITY ASSURANCE

A. Installation shall be by an installer with at least two years experience and who has installed at least 200,000 sq. Ft. of sand set pavers in commercial projects.

1.04 SUBMITTALS

A. Submit shop or product drawings and product data.

B. Submit samples of brick paving units to indicate color and size selections. Color will be selected by Architect/Engineer/Landscape Architect from manufacturer's available colors.

C. Submit sieve analysis for grading of bedding and joint sand.

D. Submit test results for compliance of paving unit requirements to ASTM C 902 or ASTM C 1272 from and independent testing laboratory.

E. Submit installer qualifications: provide satisfactory evidence that the installer complies with the qualifications set out in section 1.03.

F. Schedule & Work Plan: submit a detailed schedule and work plan

1.05 MOCK UPS

A. Install a 10 ft. x 10 ft. paver area. This area will be used to determine surcharge of the sand layer, joint sizes, lines, laying pattern(s), color(s), and texture of the job. This area shall be the standard from which the work will be judged.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver brick pavers to the site in steel banded, plastic banded, or plastic wrapped cubes or on pallets capable of transfer by fork lift or clamp lift. Unload pavers at job site in such a manner that no damage occurs to the product.

B. Sand shall be covered with waterproof covering to prevent exposure to rainfall or removal by wind. The covering shall be secured in place.

1.07 ENVIRONMENTAL CONDITIONS

A. Do not install sand or pavers during heavy rain or snowfall.

B. Do not install frozen sand.

PART 2 PRODUCTS

2.01 MANUFACTURED UNITS

Brick pavers may have spacer bars on each unit (if “English Edge” paver is specified). These insure a minimum joint width between each unit in which the sand is placed. Spacer bars help prevent contact of the edges with adjacent pavers and subsequent chipping. Manually installed pavers may be installed with or without spacer bars.

A. Brick pavers shall be A Grade pavers manufactured/supplied by a member of the Brick Institute of America (BIA). The BIA manufacturer/supplier shall be:

Name: **PINE HALL BRICK**
Address: P. O. Box 11044
2701 Shorefair Drive
Winston-Salem, NC 27116-1044
Phone: (800) 334-8689

B. Product name/shape, overall dimensions, and thickness of the permeable clay paver units shall be:
1. Paver Type: English Edge and Rumbled

2. Material Standard: Comply with ASTM C1272 or ASTM C 902
3. Color : Full-Range, Buff, Cocoa
4. Size: 4 inches x 8 inches

C. Pavers shall meet the following requirements set forth in ASTM C 902, Specification for Pedestrian and Light Traffic Paving Brick or C 1272 Specification for Heavy Vehicular Paving Brick and shall conform to the PX standard.

1. Minimum average compressive strength of 10,000 psi.

2. The average cold water absorption shall not be greater than 6% with no individual unit testing greater than 7%. Absorption test results may not be achieved through the use of sealers or other products applied to the clay paver. (Sealer protection degrades over time requiring re-application after several years.).

3. Resistance of 50 freeze-thaw cycles, when tested in accordance with ASTM C67. In addition, the clay paver must pass CSA-A231.2 freeze thaw test in saline solution without the use of sealers or other products applied to the paver. A test report must be submitted by the manufacturer. (Salt is the most common substance used for de-icing during the winter months.)

4. Dimensional tolerances should meet the PX standard. The dimensional tolerances around the mean values for length, width, and depth shall be 1/16". (Studies show that dimensional tolerances are directly linked to joint width size and proper interlock.)

5. The pavers should be solid units without core holes or other perforations.

6. The contractor shall ensure that the manufacturer conducts a test sampling of 24 pavers every 50,000 pavers manufactured to determine the pavers compliance with dimensional and water absorption characteristics. The 24 paver sample shall be representative of the color mix in the typical finished package and chosen on a consistent basis from one kiln car. (Proper control procedures and testing are standard operating procedure for high quality manufacturers.)

2.02 BEDDING AND JOINT SAND

The type of sand used for bedding is often called concrete sand. Sands vary regionally. Contact paver installers local to the project and confirm sand(s) successfully used in previous similar applications.

A. Bedding and joint sand shall be clean, non-plastic, free from deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Grading of samples shall be done according to ASTM C136. The particles shall be sharp and conform to the grading requirements of ASTM C33 as shown in Table 1.

Table 1
Grading Requirements for Bedding and Joint Sand

Sieve Size	Percent Passing
3/8 in.	100
No. 4	95 to 100
No. 8	80 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100	2 to 10

2.03 EDGE RESTRAINTS

A. Edge restraints are required on all installations. Edge restraints are to be pre-cast or cast-in-place concrete, plastic, or steel as specified in the drawings. Install as per manufacturer's specifications.

PART 3 EXECUTION

For installations on a compacted gravel base the subgrade shall be compacted to a minimum of9 5% modified proctor density. Compacted aggregate shall be applied in even lifts of 4" and also compacted to a minimum of 95% modified proctor density. The specifier should be aware that the top surface of the pavers may be 1/8 to 1/4 inch above the final elevations after compaction. This difference in initial and final elevations is to compensate for possible minor settling.

3.01 EXAMINATION

A. Verify that base is dry, uniform, even and ready to support sand, pavers and imposed loads.

B. Verify gradients and elevations of base are correct.

C. Verify location, type, installation and elevations of edge restraints around the perimeter area to be paved.

D. Beginning of installation means acceptance of base and edge restraints.

3.02 INSTALLATION

A. Provide edge restraints as indicated install edge restraints prior to placing unit pavers.

B. Spread the sand evenly over the base course and screed to 1 - 1 ½ inches thickness. The screeded sand should not be disturbed. Sufficient sand shall be placed to ensure that no delay occurs in laying pavers. The screeded bedding sand shall not be subjected to any traffic by either mechanical or pedestrian use.

C. Ensure that pavers are free of foreign material before installation. The installer shall take the pavers from the pallet by row consisting of 18 pavers. Each row shall be installed together to ensure proper color mix.

D. Lay the pavers in the pattern(s) as shown on the drawings. Full pavers are to be laid first. The pavers should be laid hand tight. Maintain straight pattern lines and adjust as necessary.

E. Joints between the pavers shall be between 1/16 inch and 1/8 inch (2 to 3 mm) wide.

F. Fill gaps at the edges of the paved area with cut pavers or edge units. Cut pavers to be placed along the edge using a masonry saw and in such a manner that no segment is smaller than one quarter of a full paver.

G. Use a low amplitude, high frequency plate vibrator capable of 3000 to 5000 lbs. centrifugal compaction force to vibrate the pavers into the sand. Vibrate the pavers, sweeping dry sand into the joints and vibrating until they are full. This will require at least two or three passes with the vibrator. Do not vibrate within three feet of the unrestrained edges of the paving units. (A plate vibrator is not recommended for straight edge pavers, instead use a hand tamp and board method for compaction)

H. All work to within three feet of the laying face must be left fully compacted with sand-filled joints at the completion of each day.

I. Sweep off excess sand when the job is complete. Contractor shall return to the site one month after installation is complete to inspect sand in joints. Contractor is responsible for adding additional sand to fill joints where necessary.

J. The final surface elevations shall not deviate more than 3/8 inch under a 10 foot long straightedge.

K. The surface elevation of pavers shall be 1/8 to 1/4 inch above adjacent drainage inlets, concrete collars or channels.

3.03 FIELD QUALITY CONTROL

A. After removal of excess sand, check final elevations for conformance to the drawings.

3.04 PROTECTION AND CLEAN UP

A. Protection:

1. Protect work from damage, discoloration and theft.

2. All vehicles and equipment operating on the completed pavers before and after application of the joint sand stabilizer shall be maintained in a clean condition, so that oil, tar, rubber or other matter is not deposited on the surface of the pavers or adjacent paving and features.

B. Clean up:

1. All materials generated by construction work in this section shall be removed at the end of each section of the work and the site shall be left in a clean and safe condition.

2. After completion of any repair work, clean all exposed surfaces with clean water and stiff brushes until all stains and dirt are removed. Use cleaning solutions only that are recommended by the paver and stabilizer manufacturers and do not use wire brushes.

3.05 MAINTENANCE

A. Repairs:

1. Repair or replace any damaged work to the original specified condition prior to handover.

2. Where lateral displacement of the pavers has occurred adjacent to edge restraints the cut pavers shall be replaced with new pavers of the correct size to comply with the specified joint widths and the surface shall be re-established.

B. Maintenance: The installer shall return to the site at the Owners request over a period of one year from handover to rectify any problems in the work caused by its failure to adequately align the pavers, compact the bedding sand or fill the joints.

End of Section

GABIONS
SECTION 05 50 00

PART 1 Scope

1.01 The work includes supply, construction of cages and installing rock.

PART 2 Types

2.01 Gabions shall consist of square or rectangular welded mesh constructed to form containers filled with rock. The gabions supplied to site shall conform to the following standards:

2.02 The product shall meet ASTM 185, for all grades of wire including 3mm, 4mm and 5mm, in Galfan Plus, PVC coated and Stainless Steel 316. The welded connections are to have a minimum average shear strength of 70% and a minimum shear strength of 60% of the ultimate tensile strength of the wire. The wire is to be coated in the case of Galfan (Aluminium/ Zinc) prior to forming into mesh.

2.03 The product shall meet ASTM 974.

2.04 Gabions shall be constructed to a tolerance of +/- 5%.

PART 3 Materials

3.01 Gabions shall be assembled and installed in accordance with dimensions as indicated here: 24” long x 24” wide x 12” tall, 3” Mesh with 1.5” mesh reducing panels

3.02 Wire for assembly, including stiffeners, spiral binders and C rings, shall be of the same material type as the gabion (Galfan, PVC, or Stainless Steel).

3.03 If C rings are used as fasteners, they shall be formed from wire and shall be a minimum of Al5% Zn 95%, galfan coated for galfan gabion and stainless steel for stainless steel gabion. The C rings must meet a minimum strength of 1700 N/mm2.

3.04 When PVC coated welded mesh gabions are specified, the galvanised wire shall be coated by fusion bonded PVC material.

3.05 C-Ring fasteners, if used over spirals, shall be formed from galfan wire. Test data must be provided to certify the fasteners provide the joint strength required. A minimum strength of 1700N/mm2. C Ring fasteners must have a minimum wire diameter of 3mm. When C Rings are used for PVC coated welded mesh the C Rings must be stainless steel and spirals must be PVC coated.

3.06 Rock shall conform to the quality requirements. Rock sizes for 75mm x 75mm welded gabion mesh shall be 80mm to 200mm. Rock sizes for 100mm x 50mm welded mesh gabion shall be 80mm to 200mm.

PART 4 Gabion Installation

4.01 Foundation Preparation

A. The foundation on which the gabions are to be placed shall be cut or filled and graded as required. Surface irregularities, loose material, vegetation, and all foreign matter shall be removed from foundation surface area. Gabions and bedding or specified geotextiles shall not be placed until the foundation preparation is completed, and the subgrade surfaces have been inspected and approved by the engineer or the engineer's representative. Compaction of bedding or filter material will be required per plans and specifications. The surface of the finished material shall be to grade and free of mounds, dips or windrows. Extra care should be taken with foundation preparations in order to ensure a level and smooth surface. Geotextile shall be installed in accordance with the requirements of the plans and specifications.

4.02 Assembly and Placement

A. The assembly and placement of gabions shall be in accordance with the following procedures:

B. Assembly. Rotate the gabion panels into position and join the vertical edges with fasteners for gabion assembly. Where spiral fasteners are used, crimp the ends to secure the spirals in place. Where C Rings are used for basket assembly, install the fasteners at a maximum spacing of 150 mm. Use the same fastening procedures to install interior diaphragms where they are required. Interior diaphragms will be required where any inside dimension exceeds 1m for gabion baskets. Diaphragms will be installed to assure that no open intervals are present that exceeds 1m.

C. Placement. Place the empty gabions on the foundation and interconnect the adjacent gabions along the top, bottom, and vertical edges using spirals. Spiral fasteners are commonly used for the assembly and interconnection of welded mesh gabions. Spirals are screwed down at the connecting edges then each end of the spiral is crimped to secure it in place.

D. Interconnect each layer of gabions to the underlying layer of gabions along the front, back, and sides. Stagger the vertical joints between the gabions of adjacent rows and layers by at least one-half of a cell length.

4.03 Filing Cages with Rock

A. After adjacent empty wire gabion units are set to line and grade and common sides properly connected, they shall be placed in straight-line tension to gain a uniform alignment. Staking of the gabions may be done to maintain the

established proper alignment prior to the placement of rock. No temporary stakes shall be placed through geotextile material. Connecting lacing wire and other fasteners (as allowed) shall be attached during the filling operation to preserve the strength and shape of the structure.

B. Internal connecting cross-tile (stiffener) wires shall be placed in each unrestrained gabion cell, including gabion cells left temporarily unrestrained. Two internal connecting wires shall be placed concurrently with rock placement, at each 300 mm interval of depth. In welded mesh gabions these cross ties or stiffeners will be placed across the corners of the gabions (at 300 mm from the corners) providing diagonal bracing. Lacing wire or preformed wire stiffeners may be used.

C. The gabions shall be carefully filled with rock, either by machine or hand methods, ensuring alignment, avoiding bulges, and providing a compact mass that minimizes voids. At no point in the filling process may rock be mechanically placed from a height of over 1m from machine to fill area. Machine placement will require supplementing with handwork to ensure the desired results. The cells in any row shall be filled in stages so that the depth of rock placed in any one cell does not exceed the depth of rock in any adjoining cell by more than 300 mm. Along the exposed faces, the outer layer of stone shall be carefully placed and arranged by hand to ensure a neat, compact placement with a uniform appearance.

D. The last layer of rock shall be uniformly levelled to the top edges of the gabions. Lids shall be placed over the rock filling using only approved lid closing tools as necessary. The use of crowbars or other single point leverage bars for lid closing is prohibited due to the potential for damage to the baskets.

E. The gabion lid shall then be secured to the sides, ends, and diaphragms with spiral binders, approved alternate fasteners, or lacing wire wrapped with alternating single and double half hitches in the mesh openings.

F. Any damage to the wire or coatings during assembly, placement and filling shall be repaired promptly in accordance with the manufacturer’s recommendations or replaced with undamaged gabion baskets.

PERMEABLE CLAY PAVERS
SECTION 32 01 01

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Permeable clay paver units
B. Open graded setting bed (#89)
C. Open-graded base aggregate (#57)
D. Open-graded sub-base aggregate (#2)
E. Bedding and joint/opening filler materials

1.02 RELATED SECTIONS

A. Section 1 – Excavation- Earth & Rock
B. Section 5 – Concrete
C. Section 901 – Course Aggregate
D. Section 902 – Fine Aggregate

1.03 REFERENCES

A. American Society of Testing Materials (ASTM):

1. C902 Standard Specification for Pedestrian And Light Traffic Paving Brick
2. C1272 Standard Specification for Heavy Vehicular Paving Brick
3. C136 Method for Sieve Analysis for Fine and Coarse Aggregate.
4. C67 Method of Sampling and Testing Brick and Structural Clay Tile.
5. D448 Standard Classification for Sizes of Aggregates for Road and Bridge

B. Definitions:

1. Base Course: Layer of open-graded washed aggregate beneath the bedding course comprised of small to medium particle-sized crushed stone (1/2” to 1” typ.). Recommended depth of base layer shall be 4” but shall not exceed 6”.
2. Bedding Course: Commonly called the setting bed is the layer of open-graded washed aggregate directly beneath the clay paver units comprised of small particle-sized crushed stone chips (1/4” to 3/8” typ.). Recommended depth of setting bed is 1” to 2” max.
3. Laying Face: The working edge of the pavement where the laying of the

pavers is occurring.

4. Method Statement: The paver installer's and manufacturer's plan for construction and quality control of the pavers.
5. Spacer Bars: Small protrusions on the sides of pavers which are used to create uniform joint spacing between pavers and minimize chipping.
6. Sub-base Course: Layer of open-graded washed aggregate beneath the base course comprised of large particle-sized crushed stone (2-1/2" to 3" typ.). Recommended depth will vary depending on site conditions and specific water detention volume requirements. Minimum depth of sub-base course shall be 12".
7. Void Filler: Open-graded aggregate used to fill the joints between pavers. The bedding course aggregate may be used as the void filler. Smaller particle-sized stone chips (1/8" to ¼") are preferable if available.
8. Wearing Course: The top surface of the paver.

1.04 QUALITY ASSURANCE

A. Paver Installation Subcontractor Qualifications:
   1. Utilize an installer having successfully completed permeable paver installation similar in design, material and extent indicated on this project.
   2. Utilize an installer holding a completion certificate from the Pave Tech School for Advanced Segmental Paving Permeable Paving Systems course or equivalent.
B. Regulatory Requirements and Approvals: [Specify applicable licensing, bonding or other requirements of regulatory agencies.].
C. Review the manufacturers' quality control plan, paver installation subcontractor's Method Statement and Quality Control Plan with pre-construction meeting of representatives from the manufacturer, paver installer, general contractor, engineer and/or owners representative.

1.05 SUBMITTALS

A. Submit shop or product drawings and
B. Submit permeable clay paver product data.
   1. Manufacturer's (Pine Hall Brick Company, Inc.) product catalog sheets with specifications.
   2. Three representative full-size samples of each paver type, thickness, and color. 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 clay pavers with ASTM

C 902 or C1272.

5. Manufacturer's material safety data sheets for the safe handling of the specified materials and products.

C. Submit sieve analysis for grading of sub-base, base, and bedding materials per ASTM C136

D. Submit minimum 3lb samples of sub-base, base and bedding aggregate materials.

E. Submit test results for compliance of paving unit requirements to ASTM C 902 or ASTM C 1272 from and independent testing laboratory.

F. Erosion and sediment control plan

G. Submit installer qualifications: provide satisfactory evidence that the installer complies with the qualifications set out in section 1.03.

1. The installer shall provide installation history, including references from projects of a similar size and complexity in writing with contact information, demonstrating to the owner's satisfaction their ability to perform the paver installation and related work indicated in the plans and specifications.
2. The installer shall have experienced personnel and a management capability to execute the work detailed in the project drawings and specifications. The installer's foreman should have a minimum of 5 years experience in the installation of unit pavers including clay pavers.

H. Schedule & Work Plan: submit a detailed schedule and work plan

1.06 MOCK UPS

A. Install a 10 ft. x 10 ft. paver area. This area will be used to determine surcharge of the bedding layer, joint sizes, lines, laying pattern(s), color(s), and texture of the job. This area shall be the standard from which the work will be judged.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver brick pavers to the site in steel banded, plastic banded, or plastic wrapped cubes or on pallets capable of transfer by fork lift or clamp lift. Unload pavers at job site in such a manner that no damage occurs to the product.

1.08 ENVIRONMENTAL CONDITIONS

A. Do not install bedding or pavers during heavy rain or snowfall.

B. Do not install frozen bedding.

PART 2 PRODUCTS

2.01 MANUFACTURED UNITS

Permeable clay brick pavers have spacer bars on each unit. These insure a minimum joint width between each unit in which the aggregate is placed. Spacer bars help prevent contact of the edges with adjacent pavers and subsequent chipping.

A. Permeable clay brick pavers shall be A Grade pavers manufactured/supplied by a member of the Brick Institute of America (BIA). The BIA manufacturer/supplier shall be:

Name: **PINE HALL BRICK**
Address: P. O. Box 11044
2701 Shorefair Drive
Winston-Salem, NC 27116-1044
Phone: (800) 334-8689

B. Product name/shape, overall dimensions, and thickness of the permeable clay paver units shall be:

1. Paver Type: StormPave™
2. Material Standard: Comply with ASTM C1272.
3. Color : Full-Range
4. Size: 4 inches x 8 inches x 2-3/4” inches thick.

C. Pavers shall meet the following requirements set forth in ASTM C 902, Specification for Pedestrian and Light Traffic Paving Brick or C 1272 Specification for Heavy Vehicular Paving Brick and shall conform to the PX standard.

1. Minimum average compressive strength of 10,000 psi.

2. The average cold water absorption shall not be greater than 6% with no individual unit testing greater than 7%. Absorption test results may not be achieved through the use of sealers or other products applied to the clay paver. (Sealer protection degrades over time requiring re-application after several years.)

3. Resistance of 50 freeze-thaw cycles, when tested in accordance with ASTM C67. In addition, the clay paver must pass CSA-A231.2 freeze thaw test in saline solution without the use of sealers or other products applied to the paver. A test report must be submitted by the manufacturer. (Salt is the most common substance used for de-icing during the winter months.)

4. Dimensional tolerances should meet the PX standard. In addition, the dimensional tolerances around the mean values for length, width, and depth shall be 1/16". (Studies show that dimensional tolerances are directly linked to joint width size and proper interlock.)

5. The pavers should be solid units without core holes or other perforations.

6. The contractor shall ensure that the manufacturer conducts a test sampling of 24 pavers every 50,000 pavers manufactured to determine the pavers compliance with dimensional and water absorption characteristics. The 24 paver sample shall be representative of the color mix in the typical finished package and chosen on a consistent basis from one kiln car. (Proper control procedures and testing are standard operating procedure for high quality manufacturers.)

2.02 AGGREGATE MATERIALS

A. Bedding Course and Void Filler Aggregate

The bedding course and void filler aggregate shall be washed, crusher run, free of fines, organics and soluble salts or other contaminants likely to cause efflorescence. The grading requirement shall comply with the following table.

Table 1 – ASTM No. 89 Grading Requirements for Bedding Course Aggregates

ASTM Sieve Size	Percent Passing (by weight)
½ in.	100
3/8 in.	90 to 100
No. 4	20 to 55
No. 8	5 to 30
No. 16	0 to 10
No. 50	0 to 5

B. Base Course Aggregates

The base course aggregate shall consist of washed open-graded stone and comply with the following table.

Table 2 – ASTM No. 57 Grading Requirements for Base Course Aggregates

ASTM Sieve Size	Percent Passing (by weight)
1-½ in.	100
1in	95 to 100
½ in.	25 to 60
¼ in.	0 to 10
No. 4	0 to 5

C. Sub-Base Course Aggregate

The sub-base course and void filler aggregate shall be washed, open graded stone and comply with the following table.

Table 3 – ASTM No. 2 Grading Requirements for Sub-Base Course Aggregates

ASTM Sieve Size	Percent Passing (by weight)
3in.	100
2-1/2 in.	90 to 100
2in.	35 to 70
1-1/2 in.	0 to 15
1 in.	0 to 5

2.03 EDGE RESTRAINTS

A. Edge restraints are required on all installations. Edge restraints are to be pre-cast or cast- in-place concrete, plastic, or steel as specified in the drawings. Install as per manufacturer's specifications.

PART 3 EXECUTION

3.01 SUBGRADE

A. The site engineer shall verify that the sub-grade has been shaped and

compacted in conformance to the lines, grades and cross-sections shown on the plans.

B. If necessary, site grades can be raised using the same material as the largest base course (i.e. #2 or #57) being used on the project. The stone should be laid in 6” lifts and compacted using a vibratory smooth-drum roller.

C. The requirements to include sub-drains in the pavement base design would depend on the sub-grade soil conditions. It is recommended that an experienced, qualified geotechnical engineer determine the requirements for sub-drains. If required, the sub-drain pipe shall consist of a four inch diameter pvc perforated pipe wrapped with filter fabric. The pipe would be placed at sub-grade elevation and surrounded with a minimum of four inches of approved open-graded stone. The sub-drain shall drain into a catch basin or other frost-free positive outlet.

3.02 SUB-BASE COURSE

A. The thickness of the sub-base course layer will depend upon the sub-grade soil conditions and the anticipated traffic loadings. It is recommended that a site assessment be carried out by an experienced qualified geotechnical engineer to determine the required thickness of the sub-base course.

B. The sub-base shall consist of a minimum thickness of twelve inches and be compacted using a vibratory smooth-drum roller. It shall be installed in lifts not to exceed six inches. Upon completion of the sub-base course installation, the area shall be proof-rolled using a heavy rubber tired vehicle (such as a loaded tandem truck) to identify any areas requiring additional compaction. The sub-base course shall be installed to the elevation and cross section per the plan documents.

3.03 EDGE RESTRAINTS

A. All edge restraints shall be constructed as shown on the plans and in place prior to the installation of the base course, bedding course and pavers. Poured-in-place concrete curbs are recommended for commercial permeable paver installations.

3.04 BASE COURSE

A. The base course shall consist of a thickness of four inches of aggregate

placed in one lift and compacted using a vibratory smooth-drum roller until there is no visible movement of aggregate under static rolling. The base course shall be installed to the elevation and cross section per the plan documents.

3.05 BEDDING COURSE

A. The bedding course shall be spread loose in a uniform layer to give a depth after compaction of the pavers of two inches, plus or minus ½". The contractor shall screed the bedding course using either a mechanical screed beam apparatus or by the use of screed guides and boards.

B. The screeded bedding aggregate shall not be subjected to any traffic by either mechanical equipment or pedestrian use prior to the installation of the pavers. The voids left after the removal of the screed rails shall be filled with loose aggregate as the paver bedding course proceeds.

3.06 PERMEABLE CLAY PAVERS

A. The pavers should be installed according to the information on the cube tag. The pavers should be laid from several cubes throughout the installation.

B. Lay pavers in the pattern as shown on the drawings. Lay pavers away from the existing laying face or edge restraint in such a manner as to ensure that the pattern remains square. Chalk lines (use a heavier chalk cord) shall be used upon the bedding course to maintain straight lines. Joint spacing between pavers shall be between 1/8" and ¼"; however the joint width may need to be increased to 3/8" to maintain straight lines. Lines and grades shown on the plans shall be established and maintained during the installation of the pavers.

C. Pavers should be cut according to the instructions on the cube tag. Pavers shall be cut using a table mounted masonry wet saw.

D. Once the pavers have been placed upon the bedding course and all cut pavers have been inserted to provide the complete surface, inspect the pavers for damaged units and remove and replace those units. Once all pattern lines have been straightened, the void filler shall then be placed into the paver openings to the top of the chamfer on the pavers and the surface

swept broom clean.

E. The pavement surface shall be compacted to achieve consolidation of the bedding course and pavers and brought to design levels and profiles by two passes of a suitable plate compactor. Compaction of the pavers shall be accomplished by the use of a vibratory plate compactor capable of a minimum of 4,500 pounds of compaction force. No compaction shall be permitted within three feet of unrestrained edges of the pavement. After compaction, inspect the pavers for damaged units and remove and replace those units.

F. After completing compaction, the surface tolerances shall be plus or minus ½" from finished grades. The pavers shall be flush to ½" above edge restraints. Additional void filler material shall be swept into the joints as required, to within ½" from the bottom of the chamfer on the paver. Upon completion, the pavement surface shall be swept clean of all excess materials. Remove from the site all surplus materials, equipment and debris resulting from these operations.

End of Section

SECTION 32 9100

PLANTING SOIL

PART 1 – GENERAL

1.1 SUMMARY

A. The scope of work includes all labor, materials, tools, supplies, equipment, facilities, transportation and services necessary for, and incidental to performing all operations in connection with furnishing, delivery, and installation of Planting Soil and /or the modification of existing site soil for use as Planting Soil, complete as shown on the drawings and as specified herein.

B. The scope of work in this section includes, but is not limited to, the following:

1. Locate, purchase, deliver and install Imported Planting Soil and soil amendments.
2. Harvest and stockpile existing site soils suitable for Planting Soil.
3. Modify existing stockpiled site soil.
   a. Modify existing site soil in place for use as Planting Soil.
   b. Install existing or modified existing soil for use as Planting Soil.
4. Locate, purchase, deliver and install subsurface Drain Lines.
5. Fine grade Planting Soil.
6. Install Compost into Planting Soil.
7. Clean up and disposal of all excess and surplus material.

1.2 CONTRACT DOCUMENTS

A. Shall consist of specifications, general conditions, and the drawings. The intent of these documents is to include all labor, materials, and services necessary for the proper execution of the work. The documents are to be considered as one. Whatever is called for by any parts shall be as binding as if called for in all parts.

1.3 RELATED DOCUMENTS AND REFERENCES

A. Related Documents:

1. Drawings and general provisions of contract, including general and supplementary conditions and Division I specifications, apply to work of this section.
2. Related Specification Section
   a. Section - Planting

B. References: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the Specification to the extent required by the references thereto. In the event that the requirements of the following referenced standards and specification conflict with this specification section the requirements of this specification shall prevail. In the event that the requirements of any of the following referenced standards and specifications conflict with each other the more stringent requirement shall prevail.

1. ASTM: American Society of Testing Materials cited section numbers.
2. U.S. Department of Agriculture, Natural Resources Conservation Service, 2003. National Soil Survey Handbook, title 430-VI. Available Online.
3. US Composting Council *www.compostingcouncil.org* *and* http://compostingcouncil.org/admin/wp-content/plugins/wp-*pdfupload/pdf/191/LandscapeArch_Specs.pdf.*

4. *Methods of Soil Analysis*, as published by the Soil Science Society of America (http://www.soils.org/).
5. Up by Roots: healthy soils and trees in the built environment. 2008. J. Urban. International Society of Arboriculture, Champaign, IL.

1.4 VERIFICATION

A. All scaled dimensions on the drawings are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and quantities, and shall immediately inform the Owner's Representative of any discrepancies between the information on the drawings and the actual conditions, refraining from doing any work in said areas until given approval to do so by the Owner's Representative.

1.5 PERMITS AND REGULATIONS

A. The Contractor shall obtain and pay for all permits related to this section of the work unless previously excluded under provision of the contract or general conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between permit requirements and the work outlined in the contract documents, the Contractor shall promptly notify the Owner's Representative in writing including a description of any necessary changes and changes to the contract price resulting from changes in the work.

B. Wherever references are made to standards or codes in accordance with which work is to be performed or tested, the edition or revision of the standards and codes current on the effective date of this contract shall apply, unless otherwise expressly set forth.

C. In case of conflict among any referenced standards or codes or among any referenced standards and codes and the specifications, the more restrictive standard shall apply or Owner's Representative shall determine which shall govern.

1.6 PROTECTION OF WORK, PROPERTY AND PERSON

A. The Contractor shall adequately protect the work, adjacent property, and the public, and shall be responsible for any damages or injury due to the Contractor's actions.

1.7 CHANGES IN WORK

A. The Owner's Representative may order changes in the work, and the contract sum adjusted accordingly. All such orders and adjustments plus claims by the Contractor for extra compensation must be made and approved in writing before executing the work involved.

B. All changes in the work, notifications and contractor's request for information (RFI) shall conform to the contract general condition requirements.

1.8 CORRECTION OF WORK

A. The Contractor shall re-execute any work that fails to conform to the requirements of the contract and shall remedy defects due to faulty materials or workmanship upon written notice from the Owner's Representative, at the soonest possible time that can be coordinated with other work and seasonal weather demands but not more than 180 (one hundred and eighty) days after notification**.**

1.9 DEFINITIONS

A. Acceptable drainage: Drainage rate is sufficient for the plants to be grown. Not too fast and not too slow. Typical rates for installed Planting Soil are between 1 - 5 inches per hour. Turf soils are often higher, but drainage rates above 2 - 3 inches per hour will dry out very fast. In natural undisturbed soil a much lower drainage rate, as low as $1/8^{th}$ inch per hour can still support good plant growth. Wetland plants can grow on top of perched water layers or even within seasonal perched water layers, but could become unstable in high wind events.

B. Amendment: material added to Topsoil to produce Planting Soil Mix. Amendments are classified as

general soil amendments, fertilizers, biological, and pH amendments.

C. Biological Amendment: Amendments such as Mycorrhizal additives, compost tea or other products intended to change the soil biology.

D. Compacted soil: soil where the density of the soil is greater that the threshold for root limiting, and further defined in this specification.

E. Compost: well decomposed stable organic material as defined by the US Composting Council and further defined in this specification.

F. Drainage: The rate at which soil water moves through the soil transitioning the soil from saturated condition to field capacity. Most often expressed as saturated hydraulic conductivity (Ksat; units are inches per hour).

G. End of Warranty Acceptance: The date when the Owner's Representative accepts that the plants and work in this section meet all the requirements of the warranty. It is intended that the materials and workmanship warranty for Planting, Planting Soil, and Irrigation (if applicable) work run concurrent with each other, and further defined in this specification.

H. Existing Soil: Mineral soil existing at the locations of proposed planting after the majority of the construction within and around the planting site is completed and just prior to the start of work to prepare the planting area for soil modification and/or planting, and further defined in this specification.

I. Fertilizer: amendment used for the purpose of adjusting soil nutrient composition and balance.

J. Fine grading: The final grading of the soil to achieve exact contours and positive drainage, often accomplished by hand rakes or drag rakes other suitable devices, and further defined in this specification, and further defined in this specification.

K. Finished grade: surface or elevation of Planting Soil after final grading and 12 months of settlement of the soil, and further defined in this specification.

L. Graded soil: Soil where the A horizon has been stripped and relocated or re-spread; cuts and fills deeper than 12 inches, and further defined in this specification.

M. Installed soil: Planting soil and existing site soil that is spread and or graded to form a planting soil, and further defined in this specification.

N. Owner's Representative: The person or entity, appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor. The Owner's Representative may appoint other persons to review and approve any aspects of the work.

O. Ped: a clump or clod of soil held together by a combination of clay, organic matter, and fungal hyphae, retaining the original structure of the harvested soil.

P. Planting Soil: Topsoil, or Planting Soil Mixes which are imported or existing at the site, or made from components that exist at the site, or are imported to the site; and further defined in this specification.

Q. *Poor drainage: Soil drainage that is slower than that to which the plants can adapt. This is a wide range of metrics, but generally if the soil is turning grey in color it is reasonable preferable to either to plant moisture adaptive plants at smaller sizes that are young in age with shallow root balls or look at options to improve the drainage*

R. Scarify: Loosening and roughening the surface of soil and sub soil prior to adding additional soil on top, and further defined in this specification.

S. Soil Fracturing: Deep loosening the soil to the depths specified by using a back hoe, and further defined in this specification.

T. Soil Horizons: as defined in the USDA National Soil Survey Handbook

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242.

U. Soil Ripping: Loosening the soil by dragging a ripping shank or chisel thru the soil to the depths and spacing specified, and further defined in this specification.

V. Soil Tilling: Loosening the surface of the soil to the depths specified with a **rotary tine tilling machine, roto tiller, (or spade tiller)**, and further defined in this specification**.**

W. Soil trenching: Cutting narrow trenches thru the soil at the depths and spacing specified to loosen the soil profile, and further defined in this specification.

X. Subgrade: surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing Planting Soil.

Y. Substantial Completion Acceptance: The date at the end of the Planting, Planting Soil, and Irrigation installation (if applicable) where the Owner's Representative accepts that all work in these sections is complete and the Warranty period has begun. This date may be different than the date of substantial completion for the other sections of the project, and further defined in this specification.

Z. Topsoil: naturally produced and harvested soil from the A horizon or upper layers or the soil as further defined in this specification.

AA. Undisturbed soil: Soils with the original A horizon intact that have not been graded or compacted. Soils that have been farmed, subjected to fire or logged but not graded, and natural forested land will be considered as undisturbed.

1.10 SUBMITTALS

A. See the contract General Conditions for policy and procedures related to submittals.

B. Submit all product submittals eight weeks prior to the start of the soil work.

C. Product data and certificates: For each type of manufactured product, submit data and certificates that the product meets the specification requirements, signed by the product manufacturer, and complying with the following:

1. Submit manufacturers or supplier's product data and literature certified analysis for standard products and bulk materials, complying with testing requirements and referenced standards and specific requested testing.

a. For each Compost product submit the following analysis by a recognized laboratory:
1.) pH
2.) Salt concentration (electrical conductivity)
3.) Moisture content %, wet weight basis
4.) Particle size % passing a selected mesh size, dry weight basis
5.) Stability carbon dioxide evolution rate mg CO2-C per g OM per day
6.) Solvita maturity test
7.) Physical contaminants (inerts) %, dry weight basis
8.) US EPA Class A standard, 40CFR § 503.13, Tables 1 and 3 levels Chemical Contaminants mg/kg (ppm)

b. For Coarse Sand product submit the following analysis by a recognized laboratory:
1.) pH
2.) Particle size distribution (percent passing the following sieve sizes):
3/8 inch (9.5 mm)
No 4 (4.75 mm)
No 8 (2.36 mm)
No 16(1.18 mm)
No 30 (.60 mm)
No 50 (.30 mm)
No 100 (.15 mm)
No 200 (.075 mm)

D. Samples: Submit samples of each product and material, where required by Part 2 of the specification, to the Owner's Representative for approval. Label samples to indicate product, characteristics, and locations in the work. Samples will be reviewed for appearance only.

1. Submit samples a minimum of 8 weeks prior to the anticipated date of the start of soil installation.

2. Samples of all Topsoil, Coarse Sand, Compost and Planting Soil shall be submitted at the same time as the particle size and physical analysis of that material.

E. Soil testing for Imported and Existing Topsoil, existing site soil to be modified as Planting Soil and Planting Soil Mixes.

1. Topsoil, existing site soil and Planting Soil Mix testing: Submit soil test analysis report for each sample of Topsoil, existing site soil and Planting Soil from an approved soil-testing laboratory and where indicated in Part 2 of the specification as follows:
   a. Submit Topsoil, Planting Soil, Compost, and Coarse Sand for testing at least 8 weeks before scheduled installation of Planting Soil Mixes. Submit Planting Soil Mix test no more than 2 weeks after the approval of the Topsoil, Compost and Coarse Sand. Do not submit to the testing laboratory, Planting Soil Mixes, for testing until all Topsoil, Compost and Coarse Sand have been approved.
   b. If tests fail to meet the specifications, obtain other sources of material, retest and resubmit until accepted by the Owner's Representative.
   c. All soil testing will be at the expense of the Contractor.

2. Provide a particle size analysis (% dry weight) and USDA soil texture analysis. Soil testing of Planting Soil Mixes shall also include USDA gradation (percentage) of gravel, coarse sand, medium sand, and fine sand in addition to silt and clay.

3. Provide the following other soil properties:
   a. pH and buffer pH.
   b. Percent organic content by oven dried weight.
   c. Nutrient levels by parts per million including: phosphorus, potassium, magnesium, manganese, iron, zinc and calcium. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil for optimum growth of the plantings specified.
   d. Soluble salt by electrical conductivity of a 1:2 soil water sample measured in Milliohm per cm.
   e. Cation Exchange Capacity (CEC).

1.11 SOIL INSTALLATION MOCKUP

A. Prior to installation or modification of Topsoil, site soil, Planting Soil, or Planting Soil Mixes, construct at the site, a mockup of each soil type using the means and methods and equipment proposed by the Contractor to complete the work. Installation of the mockup shall be in the presence of the Owner's Representative. The purpose of the mockup is to test the methods of installation and compaction of the soil and to serve as a benchmark for completed soil compaction and serve to calibrate penetrometer readings to the known proctor density of the mockup. The mockup shall be as follows:

1. Following acceptance of the soil submittals, in areas that can be protected from disturbance and further compaction, install mockups of each soil type and soil modification, 20 foot X 20 foot X the full depth of the deepest installation, using the requirements of these specifications. Compaction methods, including the type of compaction equipment and number of passes required to achieve the required compaction, shall be evaluated and results measured.

2. Compaction in the mockup soil shall be tested using the penetrometer. A minimum of four penetrometer readings from each Planting Soil shall be taken at the specified depths of the soil profile. Record the soil moisture at each penetrometer test site. In the event that the penetrometer readings exceed the specified densities, reconstruct the mockup, adjusting the soil density to achieve the desired results. Where the modification requires ripping, tilling or fracturing soils that are over compacted, start the procedure in a new location so that the process is working on soil

that is similar to the density of the expected soil.

3. Submit a report of the final methods of soil installation, the penetrometer and soil moisture readings to the Owner's Representative.
4. The mockup area may remain as part of the installed work at the end of the project if protected from further compaction, contamination or other disturbance.
5. Provide a protective 4 foot high fence on metal posts around each mockup to keep all work and equipment from entering the surface of the mockup area.

1.12 OBSERVATION OF THE WORK

A. The Owner's Representative may observe the work at any time. They may remove samples of materials for conformity to specifications. Rejected materials shall be immediately removed from the site and replaced at the Contractor's expense. The cost of testing materials not meeting specifications shall be paid by the Contractor.

1. The Owner's Representative may utilize the Contractor's penetrometer and moisture meter at any time to check soil compaction and moisture.

B. The Owner's Representative shall be informed of the progress of the work so the work may be observed at the following key times in the construction process. The Owner's Representative shall be afforded sufficient time to schedule visit to the site. Failure of the Owner's Representative to make field observations shall not relieve the Contractor from meeting all the requirements of this specification.

1. SOIL MOCKUP REVIEW: At the time of construction of all soil mockups.
2. EXISTING SOIL CONDITIONS REVIEW: Prior to the start of any soil modification that will utilize or modify the existing soil.
3. EXCAVATION REVIEW: Observe each area of excavation prior to the installation of any Planting Soil.
4. DRAIN LINE INSTALLATION REVIEW: Upon completion of the installation of drain lines and prior to the installation of any Planting Soil
5. COMPLETION of SOIL MODIFICATIONS REVIEW: Upon completion of all soil modification and installation of planting soil.
6. COMPLETION OF FINE GRADING AND SURFACE SOIL MODIFICATIONS REVIEW: Upon completion of all surface soil modifications and fine grading but prior to the installation of shrubs, ground covers, or lawns.

1.13 PRE-CONSTRUCTION CONFERENCE

A. Schedule a pre-construction meeting with the Owner's Representative at least seven (7) days before beginning work to review any questions the Contractor may have regarding the work, administrative procedures during construction and project work schedule.

1.14 QUALITY ASSURANCE

A. Installer Qualifications: The installer shall be a firm having at least 5 years of experience of a scope similar to that required for the work, including the preparation, mixing and installation of soil mixes to support planting. The installer of the work in Section: Planting, shall be the same firm installing the work in this section.

1. The bidders list for work under this section shall be approved by the Owner's Representative.
2. Installer Field Supervision: When any Planting Soil work is in progress, installer shall maintain, on site, an experienced full-time supervisor who can communicate in English with the Owner's Representative.

3. Installer's field supervisor shall have a minimum of five years experience as a field supervisor installing soil, shall be trained and proficient in the use of field surveying equipment to establish grades and can communicate in English with the Owner's Representative.
4. The installer's crew shall be experienced in the installation of Planting Soil, plantings, and irrigation (where applicable) and interpretation of planting plans, soil installation plans, and irrigation plans (where applicable).
5. Submit references of past projects and employee training certifications that support that the Contractors meet all of the above installer qualifications and applicable licensures.

B. Soil testing laboratory qualifications: an independent laboratory, with the experience and capability to conduct the testing indicated and that specializes in USDA agricultural soil testing, Planting Soil Mixes, and the types of tests to be performed. Geotechnical engineering testing labs shall not be used.

C. All delivered and installed Planting Soil shall conform to the approved submittals sample color, texture and approved test analysis.

1. The Owner's Representative may request samples of the delivered or installed soil be tested for analysis to confirm the Planting Soil conforms to the approved material.
2. All testing shall be performed by the same soil lab that performed the original Planting Soil testing.
3. Testing results shall be within 10% plus or minus of the values measured in the approved Planting Soil Mixes.
4. Any Planting Soil that fails to meet the above criteria, if requested by the Owner's Representative, shall be removed and new soil installed.

D. Soil compaction testing: following installation or modification of soil, test soil compaction with a penetrometer.

1. Maintain at the site at all times a soil cone penetrometer with pressure dial and a soil moisture meter to check soil compaction and soil moisture.
   a. Penetrometer shall be AgraTronix Soil Compaction Meter distributed by Ben Meadows, www.benmeadows.com or approved equal.
   b. Moisture meter shall be "general digital soil moisture meter" distributed by Ben Meadows, www.benmeadows.com or approved equal.
2. Prior to testing the soil with the penetrometer check the soil moisture and penetrometer readings in the mockup soils. Penetrometer readings are impacted by soil moisture and excessively wet or dry soils will read significantly lower or higher than soils at optimum moisture.
3. The penetrometer readings shall be within 20% plus or minus of the readings in the approved mockup when at similar moisture levels.

1.15 SITE CONDITIONS

A. It is the responsibility of the Contractor to be aware of all surface and subsurface conditions, and to notify the Owner's Representative, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with work until unsatisfactory conditions have been corrected.

1. Should subsurface drainage or soil conditions be encountered which would be detrimental to growth or survival of plant material, the Contractor shall notify the Owner's Representative in writing, stating the conditions and submit a proposal covering cost of corrections. If the Contractor fails to notify the Owner's Representative of such conditions, they shall remain responsible for plant material under the warrantee clause of the specifications.
2. This specification requires that all Planting Soil and Irrigation (if applicable) work be completed and accepted prior to the installation of any plants.

1.16 SOIL COMPACTION – GENERAL REQUIREMENTS

A. Except where more stringent requirements are defined in this specification. The following parameters shall define the general description of the threshold points of soil compaction in existing, modified or installed soil and subsoil.

1. *Bulk Density Method*
Units - Bulk density lb./cf or g/cc dry weight. Threshold results that determine critical bulk density are different for each soil texture.
Measurement tool - Bulk density cores.

2. *Standard Proctor Method ASTM D 698*
Units - % maximum dry bulk density as tested by the standard proctor method. Threshold results that determine critical bulk density are the same for each soil texture. A proctor test will typically also provide results as Bulk density lb./cf dry weight.
Measurement Tool - Densitrometer

3. *Penetration Resistance Method*
Units – PSI (lb. pressure per sq. in.) Threshold results that determine critical bulk density are somewhat the same for each soil texture.
Measurement tool - Penetrometer

B. The following are threshold levels of compaction as determined by each method.

1. Acceptable Compaction: Good rooting anticipated, but increasing settlement expected as compaction is reduced and/or in soil with a high organic matter content.
   a. Bulk Density Method – Varies by soil type see Chart on page 32 in Up By Roots.
   b. Standard Proctor Method – 75-85%; soil below 75% is unstable and will settle excessively.
   c. Penetration Resistance Method – about 75-250 psi, below 75 psi soil becomes increasingly unstable and will settle excessively.

2. Root limiting Compaction: Root growth is limited with fewer, shorter and slower growing roots.
   a. Bulk Density Method – Varies by soil type see Chart on page 32 in Up By Roots.
   b. Standard Proctor Method – above approximately 85%.
   c. Penetration Resistance Method – about 300 psi.

3. Excessive Compaction: Roots not likely to grow but can penetrate soil when soil is above field capacity.
   a. Bulk Density Method – Varies by soil type see Chart on page 32 in Up By Roots.
   b. Standard Proctor Method – Above 90%.
   c. Penetration Resistance Method – Approximately above 400 psi

1.17 DELIVERY, STORAGE, AND HANDLING

A. Weather: Do not mix, deliver, place or grade soils when frozen or with moisture above field capacity.

B. Protect soil and soil stockpiles, including the stockpiles at the soil blender's yard, from wind, rain and washing that can erode soil or separate fines and coarse material, and contamination by chemicals, dust and debris that may be detrimental to plants or soil drainage. Cover stockpiles with plastic sheeting or fabric at the end of each workday.

C. All manufactured packaged products and material shall be delivered to the site in unopened containers and stored in a dry enclosed space suitable for the material and meeting all environmental regulations. Biological additives shall be protected from extreme cold and heat. All products shall be freshly manufactured and dated for the year in which the products are to be used.

D. Deliver all chemical amendments in original, unopened containers with original labels intact and legible, which state the guaranteed chemical analysis. Store all chemicals in a weather protected enclosure.

E. Bulk material: Coordinate delivery and storage with Owner's Representative and confine materials to

neat piles in areas acceptable to Owner's Representative.

1.18 EXCAVATING AND GRADING AROUND UTILITIES

A. Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.

B. Determine location of underground utilities and perform work in a manner that will avoid damage. Hand excavate as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.

C. Notification of the *local utility locator service*, *Sunshine 811,* is required for all planting areas. The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the *local utility locator service*.

PART 2 – PRODUCTS

2.1 IMPORTED TOPSOIL

A. Imported Topsoil definition: Fertile, friable soil containing less than 5% total volume of the combination of subsoil, refuse, roots larger than 1 inch diameter, heavy, sticky or stiff clay, stones larger than 2 inches in diameter, noxious seeds, sticks, brush, litter, or any substances deleterious to plant growth. The percent (%) of the above objects shall be controlled by source selection not by screening the soil. Topsoil shall be suitable for the germination of seeds and the support of vegetative growth. Imported Topsoil shall not contain weed seeds in quantities that cause noticeable weed infestations in the final planting beds. Imported Topsoil shall meet the following physical and chemical criteria:

1. Soil texture: USDA loam, sandy clay loam or sandy loam with clay content between 15 and 25%. And a combined clay/silt content of no more than 55%.
2. pH value shall be between 5.5 and 7.0.
3. Percent organic matter (OM): 2.0-5.0%, by dry weight.
4. Soluble salt level: Less than 2 mmho/cm.
5. Soil chemistry suitable for growing the plants specified.

B. Imported Topsoil shall be a harvested soil from fields or development sites. The organic content and particle size distribution shall be the result of natural soil formation. Manufactured soils where Coarse Sand, Composted organic material or chemical additives has been added to the soil to meet the requirements of this specification section shall not be acceptable. Retained soil peds shall be the same color on the inside as is visible on the outside.

C. Imported Topsoil for Planting Soil shall NOT have been screened and shall retain soil peds or clods larger than 2 inches in diameter throughout the stockpile after harvesting.

D. Stockpiled Existing Topsoil at the site meeting the above criteria may be acceptable.

E. Provide a two gallon sample from each Imported Topsoil source with required soil testing results. The sample shall be a mixture of the random samples taken around the source stockpile or field. The soil sample shall be delivered with soil peds intact that represent the size and quantity of expected peds in the final delivered soil.

2.2 COMPOST

A. Compost: Blended and ground leaf, wood and other plant based material, composted for a minimum of 9 months and at temperatures sufficient to break down all woody fibers, seeds and leaf structures, free of toxic material at levels that are harmful to plants or humans. Source material shall be yard waste trimmings blended with other plant or manure based material designed to produce Compost high in fungal material.

1. Compost shall be commercially prepared Compost and meet US Compost Council STA/TMECC criteria or as modified in this section for “Compost as a Landscape Backfill Mix Component”.

   http://compostingcouncil.org/admin/wp-content/plugins/wp-pdfupload/pdf/191/LandscapeArch_Specs.pdf

2. Compost shall comply with the following parameters:
   a. pH: 5.5 - 8.0.
   b. Soil salt (electrical conductivity): maximum 5 dS/m (mmhos/cm).
   c. Moisture content %, wet weight basis: 30 – 60.
   d. Particle size, dry weight basis: 98% pass through 3/4 inch screen or smear.
   e. Stability carbon dioxide evolution rate: mg CO_2-C/ g OM/ day < 2.
   f. Solvita maturity test: > 6.
   g. Physical contaminants (inerts), %, dry weight basis: <1%.
   h. Chemical contaminants, mg/kg (ppm): meet or exceed US EPA Class A standard, 40CFR § 503.13, Tables 1 and 3 levels.
   i. Biological contaminants select pathogens fecal coliform bacteria, or salmonella, meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) level requirements.

B. Provide a two gallon sample with manufacturer’s literature and material certification that the product meets the requirements.

2.3 COARSE SAND

A. Clean, washed, sand, free of toxic materials

1. Coarse concrete sand, ASTM C-33 Fine Aggregate, with a Fines Modulus Index of 2.8 and 3.2.

2. Coarse Sands shall be clean, sharp, natural Coarse Sands free of limestone, shale and slate particles. Manufactured Coarse Sand shall not be permitted.

3. pH shall be lower than 7.0.

4. Provide Coarse Sand with the following particle size distribution:

Sieve	Percent passing
3/8 inch (9.5 mm)	100
No 4 (4.75 mm)	95-100
No 8 (2.36 mm)	80-100
No 16 (1.18 mm)	50-85
No 30 (.60 mm)	25-60
No 50 (.30 mm)	10-30
No 100 (.15 mm)	2-10
No 200 (0.75 mm	2-5

B. Provide a two gallon sample with manufacturer’s literature and material certification that the product meets the requirements.

2.4 EXISTING SOIL (Acceptable for planting with minimum modifications)

A. General definition of existing soil: Surface soil in the areas designated on the soils plan as existing soil, that is not altered, compacted to root limiting density, graded or contaminated before or during the construction process and considered acceptable for planting and long term health of the plants specified either as it exists or with only minor modification.

1. The Owner’s Representative shall verify that the soil in the designated areas is suitable at the beginning of planting bed preparation work in that area. In the event that the work of this project construction has damaged the existing soil in areas designated for use as Planting Soil to the point where the soil is no longer suitable to support the plants specified, the Owner’s Representative may require modification of the damaged soil up to and including removal and replacement with soil of equal quality to the soil that existed prior to construction. Examples of damage include further compaction, contamination, grading, creation of hard pan or drainage

problems, and loss of the O, and or A horizon.
a. Do not begin work on additional modifications until changes to the contract price are approved by Owner's Representative.

B. Protect existing soil from compaction, contamination, and degradation during the construction process.

C. Unless otherwise instructed, remove all existing plants, root thatch, and non-soil debris from the surface of the soil using equipment that does not increase compaction of soil to root limiting levels.

D. Modifications:

1. When results of soil tests recommend chemical adjustments, till surface soil to six inches or greater after chemical adjustments have been are applied.

2. Remove existing turf thatch, ground cover plants and weeds.

3. Provide pre-emergent weed control if indicated.

4. Make chemical adjustment as recommended by the soil test.

2.5 MODIFIED EXISTING SOIL (SOIL SUITABLE FOR PLANTING WITH INDICATED MODIFICATION)

A. General definition: Surface soil in the areas designated on the soils plan as Modified Existing Soil has been altered and or graded before or during the construction process but is still considered acceptable for planting and long term health of the plants specified with the proposed modifications. Modifications respond to the soil problems expected or encountered. The Owner's Representative shall verify that the soil in the designated areas is suitable for modification at the beginning of planting bed preparation work in that area.

1. The Owner's Representative shall verify that the soil in the designated areas is suitable for the specified modification at the beginning of planting bed preparation work in that area. In the event that the work of this project construction has damaged the existing soil in areas designated for modification to the point where the soil is no longer suitable to support the plants specified with the specified modification, the Owner's Representative may require further modification of the damaged soil up to an including removal and replacement with soil of equal quality to the soil that would have resulted from the modification. Damage may include further compaction, contamination, grading, creation of hard pan or drainage problem, and loss of the O, and or A horizon.

2. General requirements for all soil modifications:
a. Take soil samples, test for chemical properties, and make appropriate adjustments.
b. Unless otherwise instructed, remove all existing plants, root thatch, and non-soil debris from the surface of the soil using equipment that does not add to the compaction in the soil.
c. All soil grading, tilling and loosening must be completed at times when the soil moisture is below field capacity. Allow soil to drain for at least two days after any rain event more than 1 inch in 24 hours, or long enough so that the soil does not make the hand muddy when squeezed.
d. Provide pre-emergent weed control after the soil work is complete and plants planted but prior to adding mulch to the surface, if indicated by weed type and degree of threat.

B. Modified existing soil – soil removed, stockpiled, and spread

1. Modifications:
a. Excavate existing soil from the areas and to depths designated on the drawings. Stockpile in zones noted on the drawings or in areas proposed by the Contractor.
1.) Prepare a soil stock pile plan for approval.
b. Excavate soil using equipment and methods to preserve the clumps and peds in the soil. Generally this means using the largest piece of equipment that is practical for the project size and scope.

c. Protect stock piles from erosion by compacting or tracking the soil surface, covering with breathable fabric or planting with annual grasses as appropriate for the season, location, and length of expected time of storage.
d. Re-spread soil as required in Part 3 of this specification.

C. Modified existing soil – compacted surface soil (Tilling Option)

1. Description of condition to be modified: Surface soil compaction to a maximum of 6 inches deep from traffic or light grading. Original A horizon may be previously removed or graded but lower profile intact with acceptable compaction levels and limited grading. The soil organic matter, pH and chemistry in the A horizon may not be suitable for the proposed plants and may need to be modified as required.

2. Modifications:

a. Till top 6 inches or deeper of the soil surface, with a *roto tiller, spade tiller,* ripper or agricultural plow. Spread 2 - 3 inches of Compost on the surface of the tilled soil and make any chemical adjustment as recommended by the soil test.
b. Till or disk the Compost into the loosened soil. Smooth out grades with a drag rake or drag slip.

D. Modified existing soil – compacted surface soil (Radial Trenching Option)

1. Description of condition to be modified: Surface soil compaction to a maximum of 24 inches deep from traffic or light grading. Original A horizon may be previously removed or graded but lower profile below 24 inches intact with acceptable compaction levels and limited grading. The soil organic matter, pH and chemistry in the A horizon may not be suitable for the proposed plants and may need to be modified as required.

2. Modifications:
a. Using a trenching machine, dig trenches to the extent and depth shown on the plans and details.
b. Backfill the trench with the soil removed from the trench. Add additional site soil if needed to fill the trench to be flush to the existing grade after the soil settlement.

E. Modified existing soil – compacted subsoil

1. Description of condition to be modified: Deep soil compaction the result of previous grading, filling and dynamic or static compaction forces. Original A horizon likely removed or buried. The soil organic matter, pH and chemistry in the A horizon is likely not suitable for the proposed plants and should be modified as required.

2. Soil Ripping:
a. Step one: After grading and removing all plants and debris from the surface, using a tracked dozer or similar large grading equipment, loosen the soil by dragging a ripping shank or chisel thru the soil to depths of 24 inches with ripping shanks spaced 18 inches or less apart in two directions. The number of shanks per pull is dependent on the degree of soil compaction and the size of the dozer.
b. Step 2: Spread 3-4 inches of Compost over the ripped area and till into the top 6 inches of the soil surface.

3. Soil Fracturing:
a. Step one: After grading and removing all plants and debris from the surface, spread 2 – 3 inches of Compost over the surface of the soil. Loosen the soil to depth of 18 - 24 inches, using a backhoe to dig into the soil through the Compost. Lift and then drop the loosened soil immediately back into the hole. The bucket then moves to the adjacent soil and repeats the process until the entire area indicated has been loosened.
b. Step 2: Spread 3-4 inches of Compost over the ripped area and till into the top 6 inches of the soil surface.

4. Trenching:
   a. Step one: After grading and removing all plants and debris from the surface using a chain trenching machine, dig 24 inch deep trenches, 24 inches apart across the entire area. Maintain an 18-inch standoff from the edges of all curbs, paving and structures. Backfill the trenches with Compost.
   b. Step 2: Spread 3-4 inches of Compost over the trenches area and till into the top 6 inches of the soil surface. Compost tilling treatment shall extend to the edges of curbs, paving and structures.
5. Following soil ripping or fracturing the average penetration resistance should be less than 250 psi to the depth of the ripping or fracturing.
6. Do not start planting into ripped or fractured soil until soil has been settled or leave grades sufficiently high to anticipate settlement of 10 – 15% of ripped soil depth.

F. Modified existing soil – low organic matter

1. Description of condition to be modified: Low soil organic matter and/or missing A horizon but soil is not compacted except for some minor surface compaction. The soil organic matter, pH and/or chemistry are likely not suitable for the proposed plants and should be modified as required.
2. Modifications:
   a. Spread 3 - 4 inches of Compost over the surface of the soil and make chemical adjustment as recommended by the soil test.
   b. Till Compost into the top 6 inches of the soil.

G. Modified existing soil – soil within the root zone of existing established trees

1. Description of condition to be modified: Surface compaction near or above root limited levels in the upper soil horizon the result of traffic or other mechanical compaction.
2. Modifications:
   a. Remove the tops of all plants to be removed from the root zone. Remove sod with a walk behind sod cutter. Do not grub out the roots of plats to be removed.
   b. Use a pneumatic air knife to loosen the top 9 – 12 inches of the soil. Surface roots may move and separate from soil during this process but the bark on roots should not be broken
      1.) Pneumatic air knife shall be as manufactured by:
      Concept Engineering Group, Inc., Verona, PA (412) 826-8800
      or
      Supersonic Air Knife, Inc., Allison Park, PA (866) 328 5723
   c. Make chemical adjustment as recommended by the soil test and add 2 - 3 inches of Compost over the soil.
   d. Using the pneumatic air knife, mix the Compost into the top 6 – 8 inches of the loosened soil.
   e. Work in sections such that the entire process - including irrigation - can be completed in one day. Apply approximately one inch of water over the loosened soil at the completion of each day's work. Apply mulch or turf as indicated on the drawings within one week of the completion of work.

2.6 PLANTING SOIL MIXES

A. General definition: Mixes of Existing Soil or Imported Topsoil, Coarse Sand, and or Compost to make a new soil that meets the project goals for the indicated planting area. These may be mixed off site or onsite, and will vary in Mix components and proportions as indicated.

B. Planting Mix - moderately slow draining soil for trees and shrub beds

1. A Mix of Imported Topsoil, Coarse Sand and Compost. The approximate Mix ratio shall be:
   Mix component % by moist volume
   Imported Topsoil unscreened 45-50%

Coarse sand	40-45%
Compost	10%

2. Final tested organic matter between 2.75 and 4% (by dry weight).
3. Mix the Coarse Sand and Compost together first and then add to the Topsoil. Mix with a loader bucket to loosely incorporate the Topsoil into the Coarse Sand/Compost Mix. DO NOT OVER MIX! Do not mix with a soil blending machine. Do not screen the soil. Clumps of Soil, Compost and Coarse Sand will be permitted in the overall Mix.
4. At the time of final grading, add fertilizer if required to the Planting Soil at rates recommended by the testing results for the plants to be grown.
5. Provide a two gallon sample with testing data that includes recommendations for chemical additives for the types of plants to be grown. Samples and testing data shall be submitted at the same time.

2.7 PRE-EMERGENT HERBICIDES

A. Chemical herbicides are designed to prevent seeds of selective plants from germinating. Exact type of herbicide shall be based on the specific plants to be controlled and the most effective date of application.

B. Submit report of expected weed problems and the recommendation of the most effective control for approval by Owner's Representative. Provide manufacturer's literature and material certification that the product meets the requirements.

PART 3 – EXECUTION

3.1 SITE EXAMINATION

A. Prior to installation of Planting Soil, examine site to confirm that existing conditions are satisfactory for the work of this section to proceed.

1. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope toward the under drain lines as shown on the drawings.
2. Confirm that surface all areas to be filled with Planting Soil are free of construction debris, refuse, compressible or biodegradable materials, stones greater than 2 inches diameter, soil crusting films of silt or clay that reduces or stops drainage from the Planting Soil into the subsoil; and/or standing water. Remove unsuitable material from the site.
3. Confirm that no adverse drainage conditions are present.
4. Confirm that no conditions are present which are detrimental to plant growth.
5. Confirm that utility work has been completed per the drawings.
6. Confirm that irrigation work, which is shown to be installed below prepared soil levels, has been completed.

B. If unsatisfactory conditions are encountered, notify the Owner's Representative immediately to determine corrective action before proceeding.

3.2 COORDINATION WITH PROJECT WORK

A. The Contractor shall coordinate with all other work that may impact the completion of the work.

B. Prior to the start of work, prepare a detailed schedule of the work for coordination with other trades.

C. Coordinate the relocation of any irrigation lines, heads or the conduits of other utility lines that are in conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the Owner's Representative of any conflicts encountered.

3.3 GRADE AND ELEVATION CONTROL

A. Provide grade and elevation control during installation of Planting Soil. Utilize grade stakes, surveying equipment, and other means and methods to assure that grades and contours conform to the grades indicated on the plans.

3.4 SITE PREPARATION

A. Excavate to the proposed subgrade. Maintain all required angles of repose of the adjacent materials as shown on the drawings or as required by this specification. Do not over excavate compacted subgrades of adjacent pavement or structures. Maintain a supporting 1:1 side slope of compacted subgrade material along the edges of all paving and structures where the bottom of the paving or structure is above the bottom elevation of the excavated planting area.

B. Remove all construction debris and material including any construction materials from the subgrade.

C. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope approximately parallel to the finished grade and/or toward the subsurface drain lines as shown on the drawings.

D. In areas where Planting Soil is to be spread, confirm subgrade has been scarified.

E. Protect adjacent walls, walks and utilities from damage or staining by the soil. Use 1/2 inch plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.

1. At the end of each working day, clean up any soil or dirt spilled on any paved surface.

2. Any damage to the paving or site features or work shall be repaired at the Contractor's expense.

3.5 SOIL MOISTURE

A. Volumetric soil moisture level, in both the Planting Soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilt point and below field capacity for each type of soil texture within the following ranges.

Soil texture	**Permanent wilting point**	**Field capacity**
Sand, Loamy sand, Sandy loam	5-8%	12-18%
Loam, Sandy clay, Sandy clay loam	14-25%	27-36%
Clay loam, Silt loam	11-22%	31-36%
Silty clay, Silty clay loam	22-27%	38-41%

B. The Contractor shall confirm the soil moisture levels with a moisture meter (Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent). If moisture is found to be too low, the planting holes shall be filled with water and allowed to drain before starting any planting operations. If the moisture is too high, suspend planting operations until the soil moisture drains to below field capacity.

3.6 EXISTING SOIL MODIFICATION

A. Follow the requirements for modifying existing soil as indicated in Part 2 for the different types of soil modifications. The extent of the areas of different soil modification types are indicated on the Soils Plan or as directed by the Owner's Representative.

3.7 DRAIN PIPE INSTALLATION

1. Trench lines to depths and widths shown on plans.
2. Place 2 – 3 inches Coarse Sand as bedding for pipes.
3. Place pipe (holes facing down) to invert elevations shown on the plan.
   a. If pipe with holes on all sides is used drape a piece of 4 mil plastic 12 inches wide over top of pipe.
   b. Cover sides and top of pipe with Coarse Sand with min 4 inches of Coarse Sand cover above top of pipe.
   c. Backfill trench with Planting Soil compacted to same level as Planting Soil requirements.
4. Add cleanout pipe reaching the surface at the uphill end of each pipe run as shown on drawings.
5. Connect pipes to manhole or daylight outfall as shown on the drawings.

3.8 PLANTING SOIL AND PLANTING SOIL MIX INSTALLATION

A. Prior to installing any Planting Soil from stockpiles or Planting Soil Mixes blended off site, the Owner's Representative shall approve the condition of the subgrade and the previously installed subgrade preparation and the installation of subsurface drainage.

B. All equipment utilized to install or grade Planting Soils shall be wide track or balloon tire machines rated with a ground pressure of 4 psi or less. All grading and soil delivery equipment shall have buckets equipped with 6 inch long teeth to scarify any soil that becomes compacted.

C. In areas of soil installation above existing subsoil, scarify the subgrade material prior to installing Planting Soil.

   1. Scarify the subsoil of the subgrade to a depth of 3 – 6 inches with the teeth of the back hoe or loader bucket, tiller or other suitable device.
   2. Immediately install the Planting Soil. Protect the loosened area from traffic. DO NOT allow the loosened subgrade to become compacted.
   3. In the event that the loosened area becomes overly compacted, loosen the area again prior to installing the Planting Soil.

D. Install the Planting Soil in 12 - 18 inch lifts to the required depths. Apply compacting forces to each lift as required to attain the required compaction. Scarify the top of each lift prior to adding more Planting Soil by dragging the teeth of a loader bucket or backhoe across the soil surface to roughen the surface.

E. Phase work such that equipment to deliver or grade soil does not have to operate over previously installed Planting Soil. Work in rows of lifts the width of the extension of the bucket on the loader. Install all lifts in one row before proceeding to the next. Work out from the furthest part of each bed from the soil delivery point to the edge of the each bed area.

F. The depths and grades shown on the drawings are the final grades after settlement and shrinkage of the compost material. The Contractor shall install the Planting Soil at a higher level to anticipate this reduction of Planting Soil volume. A minimum settlement of approximately 10 - 15% of the soil depth is expected. All grade increases are assumed to be as measured prior to addition of surface Compost till layer, mulch, or sod.

3.9 COMPACTION REQUIREMENTS FOR INSTALLED OR MODIFIED PLANTING SOIL

A. Compact installed Planting Soil to the compaction rates indicated and using the methods approved for the soil mockup. Compact each soil lift as the soil is installed.

B. Existing soil that is modified by tilling, ripping or fracturing shall have a density to the depth of the modification, after completion of the loosening, such that the penetrometer reads approximately 75 to 250 psi at soil moisture approximately the mid-point between wilting point and field capacity. This will be approximately between 75 and 82% of maximum dry density standard proctor.

C. Installed Planting Soil Mix and re-spread existing soil shall have a soil density through the required depth of the installed layers of soil, such that the penetrometer reads approximately 75 to 250 psi at soil moisture approximately the mid-point between wilt point and field capacity. This will be approximately between 75 and 82% of maximum dry density standard proctor.

D. Planting Soil compaction shall be tested at each lift using a penetrometer calibrated to the mockup soil and its moisture level. The same penetrometer and moisture meter used for the testing of the mockup shall be used to test installed soil throughout the work.

E. Maintain moisture conditions within the Planting Soil during installation or modification to allow for satisfactory compaction. Suspend operations if the Planting Soil becomes wet. Apply water if the soil is overly dry.

F. Provide adequate equipment to achieve consistent and uniform compaction of the Planting Soils. Use the smallest equipment that can reasonably perform the task of spreading and compaction. Use the same equipment and methods of compaction used to construct the Planting Soil mockup.

G. Do not pass motorized equipment over previously installed and compacted soil except as authorized below.

1. Light weight equipment such as trenching machines or motorized wheel barrows is permitted to pass over finished soil work.

2. If work after the installation and compaction of soil compacts the soil to levels greater than the above requirements, follow the requirements of the paragraph "Over Compaction Reduction" below.

3.10 OVER COMPACTION REDUCTION

A. Any soil that becomes compacted to a density greater than the specified density and/or the density in the approved mockup shall be dug up and reinstalled. This requirement includes compaction caused by other sub-contractors after the Planting Soil is installed and approved.

B. Surface roto tilling shall not be considered adequate to reduce over compaction at levels 6 inches or greater below finished grade.

3.11 INSTALLATION OF CHEMICAL ADDITIVES

A. Following the installation of each soil and prior to fine grading and installation of the Compost till layer, apply chemical additives as recommended by the soil test, and appropriate to the soil and specific plants to be installed.

B. Types, application rates and methods of application shall be approved by the Owner’s Representative prior to any applications.

3.12 FINE GRADING

A. The Owner’s Representative shall approve all rough grading prior to the installation of Compost, fine grading, planting, and mulching.

B. Grade the finish surface of all planted areas to meet the grades shown on the drawings, allowing the finished grades to remain higher (10 – 15% of depth of soil modification) than the grades on the grading plan, as defined in paragraph Planting Soil Installation, to anticipate settlement over the first year.

C. Utilize hand equipment, small garden tractors with rakes, or small garden tractors with buckets with teeth for fine grading to keep surface rough without further compaction. Do not use the flat bottom of a loader bucket to fine grade, as it will cause the finished grade to become overly smooth and or slightly compressed.

D. Provide for positive drainage from all areas toward the existing inlets, drainage structures and or the edges of planting beds. Adjust grades as directed to reflect actual constructed field conditions of paving, wall and inlet elevations. Notify the Owner’s Representative in the event that conditions make

it impossible to achieve positive drainage.

E. Provide smooth, rounded transitions between slopes of different gradients and direction. Modify the grade so that the finish grade before adding mulch and after settlement is one or two inches below all paving surfaces or as directed by the drawings.

F. Fill all dips and remove any bumps in the overall plane of the slope. The tolerance for dips and bumps in shrub and ground cover planting areas shall be a 2 inch deviation from the plane in 10 feet. The tolerance for dips and bumps in lawn areas shall be a 1 inch deviation from the plane in 10 feet.

3.13 CLEAN-UP

A. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.

1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.

B. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site. The Owner's Representative seals are to remain on the trees and removed at the end of the warranty period.

1. Make all repairs to grades, ruts, and damage to the work or other work at the site.

2. Remove and dispose of all excess Planting Soil, subsoil, mulch, plants, packaging, and other material brought to the site by the Contractor.

3.14 PLANTING SOIL AND MODIFIED EXISTING SOIL PROTECTION

A. The Contractor shall protect installed and/or modified Planting Soil from damage including contamination and over compaction due to other soil installation, planting operations, and operations by other Contractors or trespassers. Maintain protection during installation until acceptance. Utilize fencing and matting as required or directed to protect the finished soil work. Treat, repair or replace damaged Planting Soil immediately.

B. Loosen compacted Planting Soil and replace Planting Soil that has become contaminated as determined by the Owner's Representative. Planting Soil shall be loosened or replaced at no expense to the Owner.
   a. Till and restore grades to all soil that has been driven over or compacted during the installation of plants.
   b. Where modified existing soil has become contaminated and needs to be replaced, provide imported soil that is of similar composition, depth and density as the soil that was removed.

3.15 PROTECTION DURING CONSTRUCTION

A. The Contractor shall protect planting and related work and other site work from damage due to planting operations, operations by other Contractors or trespassers.

1. Maintain protection during installation until the date of plant acceptance (see specifications section – Planting). Treat, repair or replace damaged work immediately.

2. Provide temporary erosion control as needed to stop soil erosion until the site is stabilized with mulch, plantings or turf.

B. Damage done by the Contractor, or any of their sub-contractors to existing or installed plants, or any other parts of the work or existing features to remain, including large existing trees, soil, paving, utilities, lighting, irrigation, other finished work and surfaces including those on adjacent property, shall be cleaned, repaired or replaced by the Contractor at no expense to the Owner. The Owner's Representative shall determine when such cleaning, replacement or repair is satisfactory. Damage to existing trees shall be assessed by a certified arborist.

3.16 SUBSTANTIAL COMPLETION ACCEPTANCE

A. Upon written notice from the Contractor, the Owners Representative shall review the work and make a determination if the work is substantially complete.

B. The date of substantial completion of the planting soil shall be the date when the Owner's Representative accepts that all work in Planting, Planting Soil, and Irrigation installation sections is complete.

3.17 FINAL ACCEPTANCE / SOIL SETTLEMENT

A. At the end of the plant warrantee and maintenance period, (see Specification section - Planting) the Owner's Representative shall observe the soil installation work and establish that all provisions of the contract are complete and the work is satisfactory.

1. Restore any soil settlement and or erosion areas to the grades shown on the drawings. When restoring soil grades remove plants and mulch and add soil before restoring the planting. Do not add soil over the root balls of plants or on top of mulch.

B. Failure to pass acceptance: If the work fails to pass final acceptance, any subsequent observations must be rescheduled as per above. The cost to the Owner for additional observations will be charged to the Contractor at the prevailing hourly rate of the Owner's Representative.

END OF SECTION 32 9100

SECTION 32 9300
PLANTING

PART 1 – GENERAL

1.1 SUMMARY

A. The scope of work includes all labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for, and incidental to performing all operations in connection with furnishing, delivery, and installation of plant (also known as "landscaping") complete as shown on the drawings and as specified herein.

B. The scope of work in this section includes, but is not limited to, the following:

1. Locate, purchase, deliver and install all specified plants.
2. Water all specified plants.
3. Mulch, fertilize, stake, and prune all specified plants.
4. Maintenance of all specified plants until the beginning of the warranty period.
5. Plant warranty.
6. Clean up and disposal of all excess and surplus material.
7. Maintenance of all specified plants during the warranty period.

1.2 CONTRACT DOCUMENTS

A. Shall consist of specifications and general conditions and the construction drawings. The intent of these documents is to include all labor, materials, and services necessary for the proper execution of the work. The documents are to be considered as one. Whatever is called for by any parts shall be as binding as if called for in all parts.

1.3 RELATED DOCUMENTS AND REFERENCES

A. Related Documents:

1. Drawings and general provisions of contract including general and supplementary conditions and Division I specifications apply to work of this section
2. Related Specification Sections
   a. Section - Planting Soil

B. References: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the specification to the extent required by the references thereto. In the event that the requirements of the following referenced standards and specification conflict with this specification section the requirements of this specification shall prevail. In the event that the requirements of any of the following referenced standards and specifications conflict with each other the more stringent requirement shall prevail or as determined by the Owners Representative.

1. ANSI Z60.1 American Standard for Nursery Stock, most current edition.
2. ANSI A 300 – Standard Practices for Tree, Shrub and other Woody Plant Maintenance, most current edition and parts.
3. Florida Grades and Standards for Nursery Stock, current edition (Florida Department of Agriculture, Tallahassee FL).
4. Interpretation of plant names and descriptions shall reference the following documents. Where the names or plant descriptions disagree between the several documents, the most current document shall prevail.

a. USDA - The Germplasm Resources Information Network (GRIN) http://www.ars-grin.gov/npgs/searchgrin.html
b. Manual of Woody Landscape Plants; Michael Dirr; Stipes Publishing, Champaign, Illinois; Most Current Edition.
c. The New Sunset Western Garden Book, Oxmoor House, most current edition.

5. Pruning practices shall conform to recommendations “Structural Pruning: A Guide For The Green Industry” most current edition; published by Urban Tree Foundation, Visalia, California.

6. Glossary of Arboricultural Terms, International Society of Arboriculture, Champaign IL, most current edition.

1.4 VERIFICATION

A. All scaled dimensions on the drawings are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and quantities, and shall immediately inform the Owner’s Representative of any discrepancies between the information on the drawings and the actual conditions, refraining from doing any work in said areas until given approval to do so by the Owner’s Representative.

B. In the case of a discrepancy in the plant quantities between the plan drawings and the plant call outs, list or plant schedule, the number of plants or square footage of the planting bed actually drawn on the plan drawings shall be deemed correct and prevail.

1.5 PERMITS AND REGULATIONS

A. The Contractor shall obtain and pay for all permits related to this section of the work unless previously excluded under provision of the contract or general conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between permit requirements and the work outlined in the contract documents, the Contractor shall promptly notify the Owner’s Representative in writing including a description of any necessary changes and changes to the contract price resulting from changes in the work.

B. Wherever references are made to standards or codes in accordance with which work is to be performed or tested, the edition or revision of the standards and codes current on the effective date of this contract shall apply, unless otherwise expressly set forth.

C. In case of conflict among any referenced standards or codes or between any referenced standards and codes and the specifications, the more restrictive standard shall apply or Owner’s Representative shall determine which shall govern.

1.6 PROTECTION OF WORK, PROPERTY AND PERSON

A. The Contractor shall adequately protect the work, adjacent property, and the public, and shall be responsible for any damages or injury due to his/her actions.

1.7 CHANGES IN THE WORK

A. The Owner’s Representative may order changes in the work, and the contract sum should be adjusted accordingly. All such orders and adjustments plus claims by the Contractor for extra compensation must be made and approved in writing before executing the work involved.

B. All changes in the work, notifications and contractor’s request for information (RFI) shall conform to the contract general condition requirements.

1.8 CORRECTION OF WORK

A. The Contractor, at their own cost, shall re-execute any work that fails to conform to the requirements of the contract and shall remedy defects due to faulty materials or workmanship upon written notice from the Owner’s Representative, at the soonest as possible time that can be coordinated with other

work and seasonal weather demands**.**

1.9 DEFINITIONS

All terms in this specification shall be as defined in the “Glossary of Arboricultural Terms” or as modified below.

A. Container plant: Plants that are grown in and/or are currently in a container including boxed trees.

B. Defective plant: Any plant that fails to meet the plant quality requirement of this specification.

C. End of Warranty Final Acceptance: The date when the Owner’s Representative accepts that the plants and work in this section meet all the requirements of the warranty. It is intended that the materials and workmanship warranty for Planting, Planting Soil, and Irrigation work run concurrent with each other.

D. Field grown trees (B&B): Trees growing in field soil for at least 12 months prior to harvest.

E. Healthy: Plants that are growing in a condition that expresses leaf size, crown density, color; and with annual growth rates typical of the species and cultivar’s horticultural description, adjusted for the planting site soil, drainage and weather conditions.

F. Kinked root: A root within the root package that bends more than 90 degrees.

G. Maintenance: Actions that preserve the health of plants after installation and as defined in this specification.

H. Maintenance period: The time period, as defined in this specification, which the Contractor is to provide maintenance.

I. Normal: the prevailing protocol of industry standard(s).

J. Owner’s Representative: The person appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor. The Owner’s Representative may appoint other persons to review and approve any aspects of the work.

K. Reasonable and reasonably: When used in this specification relative to plant quality, it is intended to mean that the conditions cited will not affect the establishment or long term stability, health or growth of the plant. This specification recognizes that it is not possible to produce plants free of all defects, but that some accepted industry protocols and standards result in plants unacceptable to this project.

When reasonable or reasonably is used in relation to other issues such as weeds, diseased, insects, it shall mean at levels low enough that no treatment would be required when applying recognized Integrated Plant Management practices.

This specification recognizes that some decisions cannot be totally based on measured findings and that professional judgment is required. In cases of differing opinion, the Owner’s Representative’s expert shall determine when conditions are judged as reasonable.

L. Root ball: The mass of roots including any soil or substrate that is shipped with the tree within the root ball package.

M. Root ball package. The material that surrounds the root ball during shipping. The root package may include the material in which the plant was grown, or new packaging placed around the root ball for shipping.

N. Root collar (root crown, root flare, trunk flare, flare): The region at the base of the trunk where the majority of the structural roots join the plant stem, usually at or near ground level.

O. Shrub: Woody plants with mature height approximately less than 15 feet.

P. Spade harvested and transplanted: Field grown trees that are mechanically harvested and immediately transplanted to the final growing site without being removed from the digging machine.

Q. Stem: The trunk of the tree.

R. Substantial Completion Acceptance: The date at the end of the Planting, Planting Soil, and Irrigation installation where the Owner's Representative accepts that all work in these sections is complete and the Warranty period has begun. This date may be different than the date of substantial completion for the other sections of the project.

S. Stem girdling root: Any root more than ¼ inch diameter currently touching the trunk, or with the potential to touch the trunk, above the root collar approximately tangent to the trunk circumference or circling the trunk. Roots shall be considered as Stem Girdling that have, or are likely to have in the future, root to trunk bark contact.

T. Structural root: One of the largest roots emerging from the root collar.

U. Tree: Single and multi-stemmed plants with mature height approximately greater than 15 feet.

1.10 SUBMITTALS

A. See contract general conditions for policy and procedure related to submittals.

B. Submit all product submittals 8 weeks prior to installation of plantings.

C. Product data: Submit manufacturer product data and literature describing all products required by this section to the Owner's Representative for approval. Provide submittal eight weeks before the installation of plants.

D. Plant growers' certificates: Submit plant growers' certificates for all plants indicating that each meets the requirements of the specification, including the requirements of tree quality, to the Owner's Representative for approval. Provide submittal eight weeks before the installation of plants.

E. Samples: Submit samples of each product and material where required by the specification to the Owner's Representative for approval. Label samples to indicate product, characteristics, and locations in the work. Samples will be reviewed for appearance only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

F. Plant sources: Submit sources of all plants as required by Article – "Selection of Plants" to the Owner's Representative for approval.

G. Close out submittals: Submit to the Owner's Representative for approval.

1. Plant maintenance data and requirements.

1.11 OBSERVATION OF THE WORK

A. The Owner's Representative may observe the work at any time. They may remove samples of materials for conformity to specifications. Rejected materials shall be immediately removed from the site and replaced at the Contractor's expense. The cost of testing materials not meeting specifications shall be paid by the Contractor.

B. The Owner's Representative shall be informed of the progress of the work so the work may be observed at the following key times in the construction process. The Owner's Representative shall be afforded sufficient time to schedule visit to the site. Failure of the Owner's Representative to make field observations shall not relieve the Contractor from meeting all the requirements of this specification.

1. SITE CONDITIONS PRIOR TO THE START OF PLANTING: review the soil and drainage conditions.

2. COMPLETION OF THE PLANT LAYOUT STAKING: Review of the plant layout.

3. PLANT QUALITY: Review of plant quality at the time of delivery and prior to installation. Review

tree quality prior to unloading where possible, but in all cases prior to planting.

4. COMPLETION OF THE PLANTING: Review the completed planting.

1.12 PRE-CONSTRUCTION CONFERENCE

A. Schedule a pre-construction meeting with the Owner's Representative at least seven (7) days before beginning work to review any questions the Contractor may have regarding the work, administrative procedures during construction and project work schedule.

1.13 QUALITY ASSURANCE

A. Substantial Completion Acceptance - Acceptance of the work prior to the start of the warranty period:

1. Once the Contractor completes the installation of all items in this section, the Owner's Representative will observe all work for Substantial Completion Acceptance upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of the observation.

2. Substantial Completion Acceptance by the Owner's Representative shall be for general conformance to specified size, character and quality and not relieve the Contractor of responsibility for full conformance to the contract documents, including correct species.

3. Any plants that are deemed defective as defined under the provisions below shall not be accepted.

B. The Owner's Representative will provide the Contractor with written acknowledgment of the date of Substantial Completion Acceptance and the beginning of the warranty period and plant maintenance period (if plant maintenance is included).

C. Contractor's Quality Assurance Responsibilities: The Contractor is solely responsible for quality control of the work.

D. Installer Qualifications: The installer shall be a firm having at least 5 years of successful experience of a scope similar to that required for the work, including the handling and planting of large specimen trees in urban areas. The same firm shall install planting soil (where applicable) and plant material.

1. The bidders list for work under this section shall be approved by the Owner's Representative.

2. Installer Field Supervision: When any planting work is in progress, installer shall maintain, on site, a full-time supervisor who can communicate in English with the Owner's Representative.

3. Installer's field supervisor shall have a minimum of five years experience as a field supervisor installing plants and trees of the quality and scale of the proposed project, and can communicate in English with the Owner's Representative.

4. The installer's crew shall have a minimum of 3 years experienced in the installation of Planting Soil, Plantings, and Irrigation (where applicable) and interpretation of soil plans, planting plans and irrigation plans.

5. Submit references of past projects, employee training certifications that support that the Contractors meets all of the above installer qualifications and applicable licensures.

1.14 PLANT WARRANTY

A. Plant Warranty:

1. The Contractor agrees to replace defective work and defective plants. The Owner's Representative shall make the final determination if plants meet these specifications or that plants are defective.

Plants warranty shall begin on the date of Substantial Completion Acceptance and continue for the following periods, classed by plant type:

a. Trees – 1 Year.
b. Shrubs – 6 Months.
c. Ground cover and perennial flower plants – 6 Months.
d. Bulbs, annual flower and seasonal color plants – for the period of expected bloom or primary display.

2. When the work is accepted in parts, the warranty periods shall extend from each of the partial Substantial Completion Acceptances to the terminal date of the last warranty period. Thus, all warranty periods for each class of plant warranty, shall terminate at one time.

3. All plants shall be warrantied to meet all the requirements for plant quality at installation in this specification. Defective plants shall be defined as plants not meeting these requirements. The Owner's representative shall make the final determination that plants are defective.

4. Plants determined to be defective shall be removed immediately upon notification by the Owner's Representative and replaced without cost to the Owner, as soon as weather conditions permit and within the specified planting period.

5. Any work required by this specification or the Owner's Representative during the progress of the work, to correct plant defects including the removal of roots or branches, or planting plants that have been bare rooted during installation to observe for or correct root defects shall not be considered as grounds to void any conditions of the warranty. In the event that the Contractor decides that such remediation work may compromise the future health of the plant, the plant or plants in question shall be rejected and replaced with plants that do not contain defects that require remediation or correction.

6. The Contractor is exempt from replacing plants, after Substantial Completion Acceptance and during the warranty period, that are removed by others, lost or damaged due to occupancy of project, lost or damaged by a third party, vandalism, or any natural disaster.

7. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this specification. Make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.

8. The warranty of all replacement plants shall extend for an additional one-year period from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended warranty period, the Owner's Representative may elect one more replacement items or credit for each item. These tertiary replacement items are not protected under a warranty period.

9. During and by the end of the warranty period, remove all tree wrap, ties, and guying unless agreed to by the Owner's Representative to remain in place. All trees that do not have sufficient caliper to remain upright, or those requiring additional anchorage in windy locations, shall be staked or remain staked, if required by the Owner's Representative.

B. End of Warranty Final Acceptance - Acceptance of plants at the end of the warranty period.

1. At the end of the warranty period, the Owner's Representative shall observe all warranted work, upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date for final observation.

2. End of Warranty Final Acceptance will be given only when all the requirements of the work under this specification and in specification sections Planting Soil and Irrigation have been met.

1.15 SELECTION AND OBSERVATION OF PLANTS

A. The Owner's Representative may review all plants subject to approval of size, health, quality, character, etc. Review or approval of any plant during the process of selection, delivery, installation and establishment period shall not prevent that plant from later rejection in the event that the plant

quality changes or previously existing defects become apparent that were not observed.

B. Plant Selection: The Owner's Representative reserves the right to select and observe all plants at the nursery prior to delivery and to reject plants that do not meet specifications as set forth in this specification. If a particular defect or substandard element can be corrected at the nursery, as determined by the Owner's Representative, the agreed upon remedy may be applied by the nursery or the Contractor provided that the correction allows the plant to meet the requirements set forth in this specification. Any work to correct plant defects shall be at the contractor's expense.
   1. The Owner's Representative may make invasive observation of the plant's root system in the area of the root collar and the top of the root ball in general in order to determine that the plant meets the quality requirements for depth of the root collar and presence of roots above the root collar. Such observations will not harm the plant.
   2. Corrections are to be undertaken at the nursery prior to shipping.

C. The Contractor shall bear all cost related to plant corrections.

D. All plants that are rejected shall be immediately removed from the site and acceptable replacement plants provided at no cost to the Owner.

E. Trees shall be purchased from the growing nursery. Re-wholesale plant suppliers shall not be used as sources unless the Contractor can certify that the required trees are not directly available from a growing nursery. When Re-wholesale suppliers are utilized, the Contractor shall submit the name and location of the growing nursery from where the trees were obtained by the re-wholesale seller. The re-wholesale nursery shall be responsible for any required plant quality certifications.

F. The Contractor shall require the grower or re-wholesale supplier to permit the Owner's Representative to observe the root system of all plants at the nursery or job site prior to planting including random removal of soil or substrate around the base of the plant. Observation may be as frequent and as extensive as needed to verify that the plants meet the requirements of the specifications and conform to requirements.

G. Each tree shall have a numbered seal applied by the Contractor. The seal shall be placed on a lateral branch on the north side of the tree. The seal shall be a tamper proof plastic seal bearing the Contractors name and a unique seven-digit number embossed on the seal.
   1. Do not place seals on branches that are so large that there is not sufficient room for the branch growth over the period of the warranty.

H. The Owner's Representative may choose to attach their seal to each plant, or a representative sample. Viewing and/or sealing of plants by the Owner's Representative at the nursery does not preclude the Owner's Representative's right to reject material while on site. The Contractor is responsible for paying any up charge for the Owner's Representative to attach their seal to specific plants.

I. Where requested by the Owner's Representative, submit photographs of plants or representative samples of plants. Photographs shall be legible and clearly depict the plant specimen. Each submitted image shall contain a height reference, such as a measuring stick. The approval of plants by the Owner's Representative via photograph does not preclude the Owner's Representative's right to reject material while on site.

1.16 PLANT SUBSTITUTIONS FOR PLANTS NOT AVAILABLE

A. Submit all requests for substitutions of plant species, or size to the Owner's Representative, for approval, prior to purchasing the proposed substitution. Request for substitution shall be accompanied with a list of nurseries contacted in the search for the required plant and a record of other attempts to locate the required material. Requests shall also include sources of plants found that may be of a smaller or larger size, or a different shape or habit than specified, or plants of the same genus and species but different cultivar origin, or which may otherwise not meet the requirements of the specifications, but which may be available for substitution.

1.17 SITE CONDITIONS

A. It is the responsibility of the Contractor to be aware of all surface and sub-surface conditions, and to notify the Owner's Representative, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with work until unsatisfactory conditions have been corrected.

1. Should subsurface drainage or soil conditions be encountered which would be detrimental to growth or survival of plant material, the Contractor shall notify the Owner's Representative in writing, stating the conditions and submit a proposal covering cost of corrections. If the Contractor fails to notify the Owner's Representative of such conditions, he/she shall remain responsible for plant material under the warranty clause of the specifications.

B. It is the responsibility of the Contractor to be familiar with the local growing conditions, and if any specified plants will be in conflict with these conditions. Report any potential conflicts, in writing, to the Owner's Representative.

C. This specification requires that all Planting Soil and Irrigation (if applicable) work be completed and accepted prior to the installation of any plants.

1. Planting operations shall not begin until such time that the irrigation system is completely operational for the area(s) to be planted, and the irrigation system for that area has been preliminarily observed and approved by the Owner's Representative.

D. Actual planting shall be performed during those periods when weather and soil conditions are suitable in accordance with locally accepted horticultural practices.

1. Do not install plants into saturated or frozen soils. Do not install plants during inclement weather, such as rain or snow or during extremely hot, cold or windy conditions.

1.18 PLANTING AROUND UTILITIES

A. Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.

B. Determine location of underground utilities and perform work in a manner that will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.

C. Notification of *Local Utility Locator Service*, Sunshine *811*, is required for all planting areas: The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the *Local Utility Locator Service*.

PART 2 – PRODUCTS

2.1 PLANTS: GENERAL

A. Standards and measurement: Provide plants of quantity, size, genus, species, and variety or cultivars as shown and scheduled in contract documents.

1. All plants including the root ball dimensions or container size to trunk caliper ratio shall conform to ANSI Z60.1 "American Standard for Nursery Stock" latest edition, unless modified by provisions in this specification. When there is a conflict between this specification and ANSI Z60.1, this specification section shall be considered correct.

2. Plants larger than specified may be used if acceptable to the Owner's Representative. Use of such plants shall not increase the contract price. If larger plants are accepted the root ball size shall be in accordance with ANSI Z-60.1. Larger plants may not be acceptable if the resulting root ball cannot be fit into the required planting space.

3. If a range of size is given, no plant shall be less than the minimum size and not less than 50 percent of the plants shall be as large as the maximum size specified. The measurements specified are the minimum and maximum size acceptable and are the measurements after pruning, where pruning is required.

B. Proper Identification: All trees shall be true to name as ordered or shown on planting plans and shall be labeled individually or in groups by genus, species, variety and cultivar.

C. Plant Quality:

1. insects, eggs, bores, and larvae. At the time of planting all plants shall have a root system, stem, and branch form that will not restrict normal growth, stability and health for the expected life of the plant

2. **Plant quality above the soil line**

a. Plants shall be healthy with the color, shape, size and distribution of trunk, stems, branches, buds and leaves normal to the plant type specified. Tree quality above the soil line shall comply with the project Crown Acceptance details (or Florida Grades and Standards, tree grade Florida Fancy or Florida #1) and the following:
   1.) Crown: The form and density of the crown shall be typical for a young specimen of the species or cultivar pruned to a central and dominant leader.
      a.) Crown specifications do not apply to plants that have been specifically trained in the nursery as topiary, espalier, multi-stem, clump, or unique selections such as contorted or weeping cultivars.
   2.) Leaves: The size, color, and appearance of leaves shall be typical for the time of year and stage of growth of the species or cultivar. Trees shall not show signs of prolonged moisture stress or over watering as indicated by wilted, shriveled, or dead leaves.
   3.) Branches: Shoot growth (length and diameter) throughout the crown should be appropriate for the age and size of the species or cultivar. Trees shall not have dead, diseased, broken, distorted, or otherwise injured branches.
      a.) Main branches shall be distributed along the central leader not clustered together. They shall form a balanced crown appropriate for the cultivar/species.
      b.) Branch diameter shall be no larger than two-thirds (one-half is preferred) the diameter of the central leader measured 1 inch above the branch union.
      c.) The attachment of the largest branches (scaffold branches) shall be free of included bark.
   4.) Trunk: The tree trunk shall be relatively straight, vertical, and free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, conks (fungal fruiting bodies), wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions (mechanical injury).
   5.) Temporary branches, unless otherwise specified, can be present along the lower trunk below the lowest main (scaffold) branch, particularly for trees less than 1 inch in caliper. These branches should be no greater than 3/8-inch diameter. Clear trunk should be no more than 40% of the total height of the tree.

b. Trees shall have one central leader. If the leader was headed, a new leader (with a live terminal bud) at least one-half the diameter of the pruning cut shall be present.
   1.) All trees are assumed to have one central leader trees unless a different form is specified in the plant list or drawings.

c. All graft unions, where applicable, shall be completely closed without visible sign of graft rejection. All grafts shall be visible above the soil line.

d. Trunk caliper and taper shall be sufficient so that the lower five feet of the trunk remains vertical without a stake. Auxiliary stake may be used to maintain a straight leader in the upper

half of the tree.

3. Plant quality at or below the soil line:

a. Plant roots shall be normal to the plant type specified. Root observations shall take place without impacting tree health. Root quality at or below the soil line shall comply with the project Root Acceptance details and the following:

1.) The roots shall be reasonably free of scrapes, broken or split wood.
2.) The root system shall be reasonably free of injury from biotic (e.g., insects and pathogens) and abiotic (e.g., herbicide toxicity and salt injury) agents. Wounds resulting from root pruning used to produce a high quality root system are not considered injuries.
3.) A minimum of three structural roots reasonably distributed around the trunk (not clustered on one side) shall be found in each plant. Root distribution shall be uniform throughout the root ball, and growth shall be appropriate for the species.
    a.) Plants with structural roots on only one side of the trunk (J roots) shall be rejected.
4.) The root collar shall be within the upper 2 inches of the substrate/soil. Two structural roots shall reach the side of the root ball near the top surface of the root ball. The grower may request a modification to this requirement for species with roots that rapidly descend, provided that the grower removes all stem girdling roots above the structural roots across the top of the root ball.
5.) The root system shall be reasonably free of stem girdling roots over the root collar or kinked roots from nursery production practices.
6.) At time of observations and delivery, the root ball shall be moist throughout. Roots shall not show signs of excess soil moisture conditions as indicated by stunted, discolored, distorted, or dead roots.

D. Submittals: Submit for approval the required plant quality certifications from the grower where plants are to be purchased, for each plant type. The certification must state that each plant meets all the above plant quality requirements.
1. The grower's certification of plant quality does not prohibit the Owner's Representative from observing any plant or rejecting the plant if it is found to not meet the specification requirements.

2.2 ROOT BALL PACKAGE OPTIONS: The following root ball packages are permitted. Specific root ball packages shall be required where indicated on the plant list or in this specification. Any type of root ball packages that is not specifically defined in this specification shall not be permitted.

A. BALLED AND BURLAPPED PLANTS

1. All Balled and Burlapped Plants shall be field grown, and the root ball packaged in a burlap and twine and/or burlap and wire basket package.

2. Plants shall be harvested with the following modifications to standard nursery practices.

a. Prior to digging any tree that fails to meet the requirement for maximum soil and roots above the root collar, carefully removed the soil from the top of the root ball of each plant, using hand tools, water or an air spade, to locate the root collar and attain the soil depth over the structural roots requirements. Remove all stem girdling roots above the root collar. Care must be exercised not to damage the surface of the root collar and the top of the structural roots.

b. Trees shall be dug for a minimum of 4 weeks and a maximum of 52 weeks prior to shipping. Trees dug 4 to 52 weeks prior to shipping are defined as hardened-off. Digging is defined as cutting all roots and lifting the tree out of the ground and either moving it to a new location in the nursery or placing it back into the same hole. Tress that are stored out of the ground shall be placed in a holding area protected from extremes of wind and sun with the root ball protected by covering with mulch or straw and irrigated sufficiently to keep moisture in the root ball above wilt point and below saturation

c. If wire baskets are used to support the root ball, a “low profile” basket shall be used. A low profile basket is defined as having the top of the highest loops on the basket no less than 4 inches and no greater than 8 inches below the shoulder of the root ball package.

1.) At nurseries where sandy soils prevent the use of “low profile baskets”, baskets that support the entire root ball, including the top, are allowable. Snip and bend down the top 1/3rd of the wire basket once tree has been set in planting hole.

d. Twine and burlap used for wrapping the root ball package shall be natural, biodegradable material. If the burlap decomposes after digging the tree then the root ball shall be re-wrapped prior to shipping if roots have not yet grown to keep root ball intact during shipping. Remove top 1/3rd of natural burlap and all other tie-down/strapping, nylon mesh/burlap, shrinkwrap once tree has been placed in hole.

3. CONTAINER (INCLUDING ABOVE-GROUND FABRIC CONTAINERS AND BOXES) PLANTS

1. Container plants may be permitted only when indicated on the drawing, in this specification, or approved by the Owner’s Representative.
2. Provide plants shall be established and well rooted in removable containers.
3. Container class size shall conform to ANSI Z60.1 for container plants for each size and type of plant.

2.3 PALMS

A. Except as modified below or where the requirements are not appropriate to the specification of palms, palms shall meet all the requirements of the plant quality section above.

B. Defronding, tying, and hedging:
1. In preparing palm trees for relocation, all dead fronds shall be removed.
2. All remaining fronds above horizontal shall be lifted up and tied together around the crown in an upright position. Up to 2/3 of the oldest live fronds can be removed; all fronds can be removed on Sabal palms. Do not tie too tightly, bind or injure the bud. Jute binder twine shall be used in tying up the fronds; wire will not be permitted. Fronds shall be untied immediately after planting.

C. Digging the root ball:
1. When digging out the root ball, no evacuation shall be done closer than 18 Inches to the trunk at ground level and the excavation shall extend below the major root system to a minimum depth of 3.5 feet. The bottom of the root ball shall be cut off square and perpendicular to the trunk below the major root system.

D. The Contractor shall not free-fall, drag, roll or abuse the tree or put a strain on the crown (bud area) at any time. A protective device shall be used around the trunk of the tree while lifting and relocating so as not to injure the bud, or scar or skin the trunk in any way.

2.4 PLANTING SOIL

A. Planting Soil as used in this specification means the soil at the planting site, or imported as modified and defined in specification Section Planting Soil. If there is no Planting Soil specification, the term Planting Soil shall mean the soil at the planting site within the planting hole.

2.5 MULCH

A. During processing, raw materials shall be stacked and stored in curing piles for no less than 120 days.

B. Mulch shall be made entirely from the above ground portion wood and bark of the Melaleuca Quinquenervia Tree. It shall not contain more than 10% (by volume) bark and shall not contain roots or root pieces. Shreds and chips shall not be larger than 3/4 inch diameter and 1 1/2 inch in length. Mulch shall be free of weed seeds, soil and on other organic or inorganic material.

C. Prior to its final processing, mulch will have been inspected and certified by the Florida Department of Agriculture and Consumer Services, Division of Plant Industry, as free of burrowing nematodes. All proofs of delivery shall bear the official State of Florida stamp of inspection and verification.*

D. Submit supplier's product specification data sheet and a one gallon sample for approval.

2.6 TREE STAKING AND GUYING MATERIAL

A. Tree guying to be flat woven polypropylene material, 3/4 inch wide, and 900 lb. break strength. Color to be Green. Product to be ArborTie manufactured by Deep Root Partners, L.P. or approved equal.

B. Stakes shall be lodge pole stakes free of knots and of diameters and lengths appropriate to the size of plant as required to adequately support the plant.

C. Below ground anchorage systems to be constructed of 2 x 2 dimensional untreated wood securing (using 3 inch long screws) horizontal portions to 4 feet long vertical stakes driven straight into the ground outside the root ball.

D. Submit manufacturer's product data for approval.

2.7 WATERING BAGS

A. Plastic tree watering bags holding a minimum of 15 gallons of water and with a slow drip hole(s) water release system, specifically designed to water establishing trees. Water should release over a several day period, not within a few hours

B. Watering bags shall be:
1. Treegator Irrigation Bags sized to the appropriate model for the requirements of the plant, manufactured by Spectrum Products, Inc., Youngsville, NC 27596.
2. Ooze Tube sized to the appropriate model for the requirements of the plant, manufactured by Engineered Water Solutions, Atlanta, GA.
3. Or approved equal.

C. Submit manufacturer's product data for approval.

PART 3 – EXECUTION

3.1 SITE EXAMINATION

A. Examine the surface grades and soil conditions to confirm that the requirements of the Specification Section – Planting Soil - and the soil and drainage modifications indicated on the Planting Soil Plan and Details (if applicable) have been completed. Notify the Owner's Representative in writing of any unsatisfactory conditions.

3.2 DELIVERY, STORAGE AND HANDLING

A. Protect materials from deterioration during delivery and storage. Adequately protect plants from drying out, exposure of roots to sun, wind or extremes of heat and cold temperatures. If planting is delayed more than 24 hours after delivery, set plants in a location protected from sun and wind. Provide adequate water to the root ball package during the shipping and storage period.

1. All plant materials must be available for observation prior to planting.

2. Using a soil moisture meter, periodically check the soil moisture in the root balls of all plants to assure that the plants are being adequately watered. Volumetric soil moisture shall be maintained above wilting point and below field capacity for the root ball substrate or soil.

B. Do not deliver more plants to the site than there is space with adequate storage conditions. Provide a suitable remote staging area for plants and other supplies.

1. The Owner's Representative or Contractor shall approve the duration, method and location of storage of plants.

C. Provide protective covering over all plants during transporting.

3.3 PLANTING SEASON

A. Planting shall only be performed when weather and soil conditions are suitable for planting the materials specified in accordance with locally accepted practice. Install plants during the planting time as described below unless otherwise approved in writing by the Owner's Representative. In the event that the Contractor request planting outside the dates of the planting season, approval of the request does not change the requirements of the warranty.

3.4 ADVERSE WEATHER CONDITIONS

A. No planting shall take place during extremely hot, dry, windy or freezing weather.

3.5 COORDINATION WITH PROJECT WORK

A. The Contractor shall coordinate with all other work that may impact the completion of the work.

B. Prior to the start of work, prepare a detailed schedule of the work for coordination with other trades.

C. Coordinate the relocation of any irrigation lines, heads or the conduits of other utility lines that are in conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the Owner's Representative of any conflicts encountered.

3.6 LAYOUT AND PLANTING SEQUENCE

A. Relative positions of all plants and trees are subject to approval of the Owner's Representative.

B. Notify the Owner's Representative, one (1) week prior to layout. Layout all individual tree and shrub locations. Place plants above surface at planting location or place a labeled stake at planting location. Layout bed lines with paint for the Owner's Representative's approval. Secure the Owner's Representative's acceptance before digging and start of planting work.

C. When applicable, plant trees before other plants are installed.

D. It is understood that plants are not precise objects and that minor adjustments in the layout will be required as the planting plan is constructed. These adjustments may not be apparent until some or all of the plants are installed. Make adjustments as required by the Owner's Representative including relocating previously installed plants.

3.7 SOIL PROTECTION DURING PLANT DELIVERY AND INSTALLATION

A. Protect soil from compaction during the delivery of plants to the planting locations, digging of planting holes and installing plants.

1. Where possible deliver and plant trees that require the use of heavy mechanized equipment prior to final soil preparation and tilling. Where possible, restrict the driving lanes to one area instead of driving over and compacting a large area of soil.

2. Till to a depth of 6 inches, all soil that has been driven over during the installation of plants.

3.8 SOIL MOISTURE

A. Volumetric soil moisture level, in both the planting soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilting point and below field capacity for each type of soil texture within the following ranges.

Soil type	Permanent wilting point	Field capacity
Sand, Loamy sand, Sandy loam	5-8%	12-18%
Loam, Sandy clay, Sandy clay loam	14-25%	27-36%
Clay loam, Silt loam	11-22%	31-36%
Silty clay, Silty clay loam	22-27%	38-41%

1. Volumetric soil moisture shall be measured with a digital moisture meter. The meter shall be the Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent.

B. The Contractor shall confirm the soil moisture levels with a moisture meter. If the moisture is too high, suspend planting operations until the soil moisture drains to below field capacity.

3.9 INSTALLATION OF PLANTS: GENERAL

A. Observe each plant after delivery and prior to installation for damage of other characteristics that may cause rejection of the plant. Notify the Owner's Representative of any condition observed.

B. No more plants shall be distributed about the planting bed area than can be planted and watered on the same day.

C. The root system of each plant, regardless of root ball package type, shall be observed by the Contractor, at the time of planting to confirm that the roots meet the requirements for plant root quality in Part 2 Products: Plants General: Plant Quality. The Contractor shall undertake at the time of planting, all modifications to the root system required by the Owner's Representative to meet these quality standards.

1. Modifications, at the time of planting, to meet the specifications for the depth of the root collar and removal of stem girdling roots and circling roots may make the plant unstable or stress the plant to the point that the Owner's Representative may choose to reject the plant rather than permitting the modification.

2. Any modifications required by the Owner's Representative to make the root system conform to the plant quality standards outlined in Part 2 Products: Plants General: Quality, or other requirements related to the permitted root ball package, shall not be considered as grounds to modify or void the plant warranty.

3. The resulting root ball may need additional staking and water after planting. The Owner's Representative may reject the plant if the root modification process makes the tree unstable or if the tree is not healthy at the end of the warranty period. Such plants shall still be covered under the warranty

4. The Contractor remains responsible to confirm that the grower has made all required root modifications noted during any nursery observations.

D. Container and Boxed Root Ball Shaving: The outer surfaces of ALL plants in containers and boxes, including the top, sides and bottom of the root ball shall be shaved to remove all circling, descending, and matted roots. Shaving shall be performed using saws, knives, sharp shovels or other suitable equipment that is capable of making clean cuts on the roots. Shaving shall remove a minimum of one inch of root mat or up to 2 inches as required to remove all root segments that are not growing reasonably radial to the trunk.

E. Exposed Stem Tissue after Modification: The required root ball modifications may result in stem tissue that has not formed trunk bark being exposed above the soil line. If such condition occurs, wrap the exposed portion of the stem in a protective wrapping with a white filter fabric. Secure the fabric with biodegradable masking tape. DO NOT USE string, twine, green nursery ties or any other

material that may girdle the trunk if not removed.

F. Excavation of the Planting Space: Using hand tools or tracked mini-excavator, excavate the planting hole into the Planting Soil to the depth of the root ball measured after any root ball modification to correct root problems, and wide enough for working room around the root ball or to the size indicated on the drawing or as noted below.
   1. For trees and shrubs planted in soil areas that are NOT tilled or otherwise modified to a depth of at least 12 inches over a distance of more than 10 feet radius from each tree, or 5 feet radius from each shrub, the soil around the root ball shall be loosened as defined below or as indicated on the drawings.
      a. The area of loosening shall be a minimum of 3 times the diameter of the root ball at the surface sloping to 2 times the diameter of the root ball at the depth of the root ball.
      b. Loosening is defined as digging into the soil and turning the soil to reduce the compaction. The soil does not have to be removed from the hole, just dug, lifted and turned. Lifting and turning may be accomplished with a tracked mini excavator, or hand shovels.
   2. If an auger is used to dig the initial planting hole, the soil around the auger hole shall be loosened as defined above for trees and shrubs planted in soil areas that are NOT tilled or otherwise modified.
   3. The measuring point for root ball depth shall be the average height of the outer edge of the root ball after any required root ball modification.
   4. If motorized equipment is used to deliver plants to the planting area over exposed planting beds, or used to loosen the soil or dig the planting holes, all soil that has been driven over shall be tilled to a depth of 6 inches.

G. For trees to be planted in prepared Planting Soil that is deeper than the root ball depth, compact the soil under the root ball using a mechanical tamper to assure a firm bedding for the root ball. If there is more than 12 inches of planting soil under the root ball excavate and tamp the planting soil in lifts not to exceed 12 inches.

H. Set top outer edge of the root ball at the average elevation of the proposed finish. Set the plant plumb and upright in the center of the planting hole. The tree graft, if applicable, shall be visible above the grade. Do not place soil on top of the root ball.

I. The Owner’s Representative may request that plants orientation be rotated when planted based on the form of the plant.

J. Backfill the space around the root ball with the same planting soil or existing soil that was excavated for the planting space. See Specification Section Planting Soil, for requirements to modify the soil within the planting bed.

K. Brace root ball by tamping Planting Soil around the lower portion of the root ball. Place additional Planting Soil around base and sides of ball in six-inch (6") lifts. Lightly tamp each lift using foot pressure or hand tools to settle backfill, support the tree and eliminate voids. DO NOT over compact the backfill or use mechanical or pneumatic tamping equipment. Over compaction shall be defined as greater than 85% of maximum dry density, standard proctor or greater than 250 psi as measured by a cone penetrometer when the volumetric soil moisture is lower than field capacity.
   1. When the planting hole has been backfilled to three quarters of its depth, water shall be poured around the root ball and allowed to soak into the soil to settle the soil. Do not flood the planting space. If the soil is above field capacity, allow the soil to drain to below field capacity before finishing the planting. Air pockets shall be eliminated and backfill continued until the planting soil is brought to grade level.

L. Where indicated on the drawings, build a 4 inch high, level berm of Planting Soil around the outside of the root ball to retain water. Tamp the berm to reduce leaking and erosion of the saucer.

M. Thoroughly water the Planting Soil and root ball immediately after planting.

N. Remove all nursery plant identification tags and ribbons as per Owner's Representative instructions. The Owner's Representative's seals are to remain on plants until the end of the warranty period.

O. Remove corrugated cardboard trunk protection after planting.

P. Follow additional requirements for the permitted root ball packages.

3.10 PERMITTED ROOT BALL PACKAGES AND SPECIAL PLANTING REQUIREMENTS

A. The following are permitted root ball packages and special planting requirements that shall be followed during the planting process in addition to the above General planting requirements.

B. BALLED AND BURLAPPED PLANTS

1. After the root ball has been backfilled, remove all twine and burlap from the top of the root ball. Cut the burlap away; do not fold down onto the Planting Soil.

2. If the plant is shipped with a wire basket that does not meet the requirements of a "Low Rise" basket, remove the top 6 - 8 inches of the basket wires just before the final backfilling of the tree.

3. Earth root balls shall be kept intact except for any modifications required by the Owner's Representative to make root package comply with the requirement in Part 2 Products.

C. CONTAINER (INCLUDES BOXED AND ABOVE-GROUND FABRIC CONTAINERS) PLANTS

1. This specification assumes that most container plants have significant stem girdling and circling roots, and that the root collar is too low in the root ball.

2. Remove the container.

3. Perform root ball shaving as defined in Installation of Plants: General above.

4. Remove all roots and substrate above the root collar and the main structural roots according to root correction details so root system conforms to root observations detail.

5. Remove all substrate at the bottom of the root ball that does not contain roots.

6. Using a hose, power washer or air excavation device, wash out the substrate from around the trunk and top of the remaining root ball and find and remove all stem girdling roots within the root ball above the top of the structural roots.

3.11 GROUND COVER, PERENNIAL AND ANNUAL PLANTS

A. Assure that soil moisture is within the required levels prior to planting. Irrigation, if required, shall be applied at least 12 hours prior to planting to avoid planting in muddy soils.

B. Assure that soil grades in the beds are smooth and as shown on the plans.

C. Plants shall be planted in even, triangularly spaced rows, at the intervals called out for on the drawings, unless otherwise noted. The first row of Annual flower plants shall be 6 inches from the bed edge unless otherwise directed.

D. Dig planting holes sufficiently large enough to insert the root system without deforming the roots. Set the top of the root system at the grade of the soil.

E. Schedule the planting to occur prior to application of the mulch. If the bed is already mulched, pull the mulch from around the hole and plant into the soil. Do not plant the root system in the mulch. Pull mulch back so it is not on the root ball surface.

F. Press soil to bring the root system in contact with the soil.

G. Spread any excess soil around in the spaces between plants.

H. Apply mulch to the bed being sure not to cover the tops of the plants with or the tops of the root ball with mulch.

I. Water each planting area as soon as the planting is completed. Apply additional water to keep the soil moisture at the required levels. Do not over water.

3.12 PALM PLANTING

A. Palm trees shall be placed at grade making sure not to plant the tree any deeper in the ground than the palm trees originally stood.

B. The trees shall be placed with their vertical axis in a plumb position.

C. All backfill shall be native soil except in cases where planting in rock. Water-settle the back fill.

D. Do not cover root ball with mulch or topsoil.

E. Provide a watering berm at each palm. Berms shall extend a minimum of 18 inches out from the trunk all around and shall be a minimum of (6) inches high.

F. Remove twine which ties fronds together after placing palm in planting hole and securing it in the upright position.

3.13 STAKING AND GUYING

A. Do not stake or guy trees unless specifically required by the Contract Documents, or in the event that the Contractor feels that staking is the only alternative way to keep particular trees plumb.

1. The Owner's Representative shall have the authority to require that trees are staked or to reject staking as an alternative way to stabilize the tree.

2. Trees that required heavily modified root balls to meet the root quality standards may become unstable. The Owner's Representative may choose to reject these trees rather than utilize staking to temporarily support the tree.

B. Trees that are guyed shall have their guys and stakes removed after one full growing season or at other times as required by the Owner's Representative.

C. Tree guying shall utilize the tree staking and guying materials specified. Guying to be tied in such a manner as to create a minimum 12-inch loop to prevent girdling. Refer to manufacturer's recommendations and the planting detail for installation.
1. Plants shall stand plumb after staking or guying.
2. Stakes shall be driven to sufficient depth to hold the tree rigid.

D. For trees planted in planting mix over waterproofed membrane, use dead men buried 24 inches to the top of the dead man, in the soil. Tie the guy to the dead man with a double wrap of line around the dead man followed by a double half hitch. When guys are removed, leave the dead men in place and cut the guy tape 12 inches above the ground, leaving the tape end covered in mulch.

3.14 STRAIGHTENING PLANTS

A. Maintain all plants in a plumb position throughout the warranty period. Straighten all trees that move out of plumb including those not staked. Plants to be straightened shall be excavated and the root ball moved to a plumb position, and then re-backfilled.

B. Do not straighten plants by pulling the trunk with guys.

3.15 INSTALLATION OF FERTILIZER AND OTHER CHEMICAL ADDITIVES

A. Do not apply any soluble fertilizer to plantings during the first year after transplanting unless soil test determines that fertilizer or other chemical additives is required. Apply chemical additives only upon the approval of the Owner's Representative.

B. Controlled release fertilizers shall be applied according to the manufacturer's instructions and standard horticultural practices.

3.16 PRUNING OF TREES AND SHRUBS

A. Prune plants as directed by the Owner's Representative. Pruning trees shall be limited to addressing structural defects as shown in details; follow recommendations in "Structural Pruning: A Guide For The Green Industry" published by Urban Tree Foundation, Visalia CA.

B. All pruning shall be performed by a person experienced in structural tree pruning.

C. Except for plants specified as multi-stemmed or as otherwise instructed by the Owner's Representative, preserve or create a central leader.

D. Pruning of large trees shall be done using pole pruners or if needed, from a ladder or hydraulic lift to gain access to the top of the tree. Do not climb in newly planted trees. Small trees can be structurally pruned by laying them over before planting. Pruning may also be performed at the nursery prior to shipping.

E. Remove and replace excessively pruned or malformed stock resulting from improper pruning that occurred in the nursery or after.

F. Pruning shall be done with clean, sharp tools.

G. No tree paint or sealants shall be used.

3.17 MULCHING OF PLANTS

A. Apply 3 inches of mulch before settlement, covering the entire planting bed area. Install no more than 1 inch of mulch over the top of the root balls of all plants. Taper to 2 inches when abutting pavement.

B. For trees planted in lawn areas the mulch shall extend to a 5 foot radius around the tree or to the extent indicated on the plans.

C. Lift all leaves, low hanging stems and other green portions of small plants out of the mulch if covered.

3.18 PLANTING BED FINISHING

A. After planting, smooth out all grades between plants before mulching.

B. Separate the edges of planting beds and lawn areas with a smooth, formed edge cut into the turf with the bed mulch level slightly lower, 1 and 2 inches, than the adjacent turf sod or as directed by the Owner's Representative. Bed edge lines shall be a depicted on the drawings.

3.19 WATERING

A. The Contractor shall be fully responsible to ensure that adequate water is provided to all plants from the point of installation until the date of Substantial Completion Acceptance. The Contractor shall adjust the automatic irrigation system, if available, and apply additional or adjust for less water using hoses as required.

B. Hand water root balls of all plants to assure that the root balls have moisture above wilt point and below field capacity. Test the moisture content in each root ball and the soil outside the root ball to determine the water content.

C. The Contractor shall install 25 gallon watering bag for each tree to be maintained and used for tree watering during the warranty period.

1. The watering bags shall remain the property of the Owner at the completion of the work.

3.20 CLEAN-UP

A. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less

than once a week.

1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.

B. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site. The Owner's Representative's seals are to remain on the trees and removed at the end of the warranty period.

C. Make all repairs to grades, ruts, and damage by the plant installer to the work or other work at the site.

D. Remove and dispose of all excess planting soil, subsoil, mulch, plants, packaging, and other material brought to the site by the Contractor.

3.21 PROTECTION DURING CONSTRUCTION

A. The Contractor shall protect planting and related work and other site work from damage due to planting operations, operations by other Contractors or trespassers. Maintain protection during installation until Substantial Completion Acceptance. Treat, repair or replace damaged work immediately.

B. Damage done by the Contractor, or any of their sub-contractors to existing or installed plants, or any other parts of the work or existing features to remain, including roots, trunk or branches of large existing trees, soil, paving, utilities, lighting, irrigation, other finished work and surfaces including those on adjacent property, shall be cleaned, repaired or replaced by the Contractor at no expense to the Owner. The Owner's Representative shall determine when such cleaning, replacement or repair is satisfactory.

3.22 PLANT MAINTENANCE PRIOR TO SUBSTANTIAL COMPLETION ACCEPTANCE

A. During the project work period and prior to Substantial Completion Acceptance, the Contractor shall maintain all plants.

B. Maintenance during the period prior to Substantial Completion Acceptance shall consist of pruning, watering, cultivating, weeding, mulching, removal of dead material, repairing and replacing of tree stakes, tightening and repairing of guys, repairing and replacing of damaged tree wrap material, resetting plants to proper grades and upright position, and furnishing and applying such sprays as are necessary to keep plantings reasonably free of damaging insects and disease, and in healthy condition. The threshold for applying insecticides and herbicide shall follow established Integrated Pest Management (IPM) procedures. Mulch areas shall be kept reasonably free of weeds, grass.

3.23 SUBSTANTIAL COMPLETION ACCEPTANCE

A. Upon written notice from the Contractor, the Owners Representative shall review the work and make a determination if the work is substantially complete.

1. Notification shall be at least 7 days prior to the date the contractor is requesting the review.

B. The date of substantial completion of the planting shall be the date when the Owner's Representative accepts that all work in Planting, Planting Soil, and Irrigation installation sections is complete.

C. The Plant Warranty period begins at date of written notification of substantial completion from the Owner's Representative. The date of substantial completion may be different than the date of substantial completion for the other sections of the project.

3.24 MAINTENANCE DURING THE WARRANTY PERIOD BY OTHERS

A. After Substantial Completion Acceptance, the Contractor shall make sufficient site visits to observe the Owner's maintenance and become aware of problems with the maintenance in time to request

changes, until the date of End of Warranty Final Acceptance.

1. Notify the Owner's Representative in writing if maintenance, including watering, is not sufficient to maintain plants in a healthy condition. Such notification must be made in a timely period so that the Owner's Representative may take corrective action.
    a. Notification must define the maintenance needs and describe any corrective action required.
2. In the event that the Contractor fails to visit the site and or notify, in writing, the Owner's Representative of maintenance needs, lack of maintenance shall not be used as grounds for voiding or modifying the provisions of the warranty.

3.25 MAINTENANCE DURING THE WARRANTY PERIOD BY THE PLANT INSTALLER

A. During the warranty period, provide all maintenance for all plantings to keep the plants in a healthy state and the planting areas clean and neat.

B. General requirements:
1. All work shall be undertaken by trained planting crews under the supervision of a foreman with a minimum of 5 years experience supervising commercial plant maintenance crews.
2. All chemical and fertilizer applications shall be made by licensed applicators for the type of chemicals to be used. All work and chemical use shall comply with all applicable local, provincial and federal requirements.
3. Assure that hoses and watering equipment and other maintenance equipment does not block paths or be placed in a manner that may create tripping hazards. Use standard safety warning barriers and other procedures to maintain the site in a safe manner for visitors at all times.
4. All workers shall wear required safety equipment and apparel appropriate for the tasks being undertaken.
5. The Contractor shall not store maintenance equipment at the site at times when they are not in use unless authorized in writing by the Owner's Representative.
6. Maintenance vehicles shall not park on the site including walks and lawn areas at any time without the Owner's Representative's written permission.
7. Maintain a detailed log of all maintenance activities including types of tasks, date of task, types and quantities of materials and products used, watering times and amounts, and number of each crew. Periodically review the logs with the Owner's Representative, and submit a copy of the logs at the end of each year of the maintenance agreement.
8. Meet with the Owner's Representative a minimum of three times a year to review the progress and discuss any changes that are needed in the maintenance program. At the end of the warranty period attend a hand over meeting to formally transfer the responsibilities of maintenance to the Owner's Representative. Provide all information on past maintenance activities and provide a list of critical tasks that will be needed over the next 12 months. Provide all maintenance logs and soil test data. Make the Contractor's supervisor available for a minimum of one year after the end of the warranty period to answer questions about past maintenance.

C. Provide the following maintenance tasks:
1. Watering; Provide all water required to keep soil within and around the root balls at optimum moisture content for plant growth.
    a. Maintain all watering systems and equipment and keep them operational.
    b. Monitor soil moisture to provide sufficient water. Check soil moisture and root ball moisture with a soil moisture meter on a regular basis and record moisture readings. Do not over water.
2. Soil nutrient levels: Take a minimum of 4 soil samples from around the site in the spring and fall and have them tested by an accredited agricultural soil testing lab for chemical composition of plant required nutrients, pH, salt and % organic matter. Test results shall include laboratory recommendations for nutrient applications. Apply fertilizers at rates recommended by the soil test.
    a. Make any other soil test and/or plant tissue test that may be indicated by plant conditions that may not be related to soil nutrient levels such as soil contaminated by other chemicals or lack

of chemical uptake by the plant.

3. Plant pruning: Remove cross over branching, shorten or remove developing co dominant leaders, dead wood and winter-damaged branches. Unless directed by the Owner's Representative, do not shear plants or make heading cuts.
4. Restore plants: Reset any plants that have settled or are leaning as soon as the condition is noticed.
5. Guying and staking: Maintain plant guys in a taught position. Remove tree guys and staking after the first full growing season unless directed by Owner's Representative.
6. Weed control: Keep all beds free of weeds. Hand-remove all weeds and any plants that do not appear on the planting plan. Chemical weed control is permitted only with the approval of the Owner's Representative. Schedule weeding as needed but not less *12 times per year*.
7. Trash removal: Remove all trash and debris from all planting beds and maintain the beds in a neat and tidy appearance. The number of trash and debris removal visits shall be no less than 12 times per year and may coincide with other maintenance visits.
8. Plant pest control: Maintain disease, insects and other pests at manageable levels. Manageable levels shall be defined as damage to plants that may be noticeable to a professional but not to the average person. Use least invasive methods to control plant disease and insect outbreaks.
    a. The Owner's Representative must approve in advance the use of all chemical pesticide applications.
9. Plant replacement: Replace all plants that are defective as defined in the warranty provisions, as soon as the plant decline is obvious and in suitable weather and season for planting as outlined in above sections. Plants that become defective during the maintenance period shall be covered and replaced under the warranty provisions.
10. Mulch: Refresh mulch once a year to maintain complete coverage but do not over mulch. At no time shall the overall mulch thickness be greater that 4 inches. Do not apply mulch within 6 inches of the trunks or stems of any plants. Replacement mulch shall meet the requirements of the original approved material. Mulch shall be no more than one inch on top of the root ball surface.
11. Bed edging: Check and maintain edges between mulch and lawn areas in smooth neat lines as originally shown on the drawings.
12. Leaf, fruit and other plant debris removal: Remove fall leaf, spent flowers, fruit and plant part accumulations from beds and paved surfaces. Maintain all surface water drains free of debris. Debris removal shall be undertaken at each visit to weed or pick up trash in beds.
13. Damage from site use: Repair of damage by site visitors and events, beyond normal wear, are not part of this maintenance. The Owner's Representative may request that the Contractor repair damage beds or plantings for an additional cost. All additional work shall be approved in advance by the Owner's Representative.

3.26 END OF WARRANTY FINAL ACCEPTANCE / MAINTENANCE OBSERVATION

A. At the end of the Warranty and Maintenance period the Owner's Representative shall observe the work and establish that all provisions of the contract are complete and the work is satisfactory.
    1. If the work is satisfactory, the maintenance period will end on the date of the final observation.
    2. If the work is deemed unsatisfactory, the maintenance period will continue at no additional expense to the Owner until the work has been completed, observed, and approved by the Owner's Representative.

B. FAILURE TO PASS OBSERVATION: If the work fails to pass final observation, any subsequent observations must be rescheduled as per above. The cost to the Owner for additional observations will be charged to the Contractor at the prevailing hourly rate of the Owners Representative.

END OF SECTION 32 9300

WORKMANSHIP AND MATERIALS

SECTION 1 – EXCAVATION - EARTH AND ROCK

W-1.01 General

Open cut excavations shall be made to the widths and depths necessary for constructing all structures, pipelines and other conduits included in the Contract, according to the Plans, and includes the excavation of any material which, in the opinion of the Engineer, is desirable to be excavated for any purpose pertinent to the construction of the work. Banks more than 5 feet high, where a danger of slides or cave-ins exists, shall be shored or sloped to the angle of repose.

Where excavations are to be made below groundwater, the Contractor shall submit to the Engineer for approval, in detail, his proposed method for control of groundwater, including a description of the equipment he plans to use and the arrangement of such equipment. No such excavation shall be started until approval of the Engineer has been obtained. Dewatering work shall be included in the Contract Items for pipelines, box culverts, inlets, manholes and other structures, and pumping stations, and no separate payment will be made therefor.

W-1.02 Clearing

The site of all open cut excavations shall first be cleared of obstructions preparatory to excavation. This includes the removal and disposal of vegetation, trees, stumps, roots and bushes, except as specified under the subsection headed "Trench Excavation."

W-1.03 Authorized Additional Excavation

In case the materials encountered at the elevations shown are not suitable, or in case it is found desirable or necessary to go to an additional depth, or to an additional depth and width, the excavation shall be carried to such additional depth and width as the Engineer may direct in writing. The Contractor shall refill such excavated space with either Class D concrete, or select sand or crushed stone fill material, as ordered. Where necessary, fill materials shall be compacted to avoid future settlement. Additional earth excavations so ordered and concrete, or selected sand or crushed stone fill material ordered for filling such additional excavation and compaction of select sand or crushed stone fill material will be paid for under the appropriate Contract Items or where no such items exist, as extra work as specified in Article 7 of the Agreement.

W-1.04 Unauthorized Excavation

Wherever the excavation is carried beyond or below the lines and grades shown or given by the Engineer, except as specified in the subsection headed "Authorized Additional Excavation," all such excavated space shall be refilled with such material and in such manner as may be directed in order to ensure the stability of the various structures. Spaces beneath all manholes, structures or pipelines excavated without authority shall be refilled by the Contractor at his own expense, with Class D concrete, or select sand or crushed stone fill material, and properly compacted, as ordered by the Engineer, and no separate payment will be made therefor.

W-1.05 Segregation and Disposal of Material

Topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments shall be stockpiled separately on the site in locations approved by the Engineer. Excavated and other material shall not be stored nearer than 4 feet from the edge of any excavation and shall be so stored and retained as to prevent its falling or sliding back into the excavation. Surplus excavated material and excavated material unsuitable for backfilling or embankments shall become the property of the Contractor and shall be transported, as approved by the Engineer, away from the site of the work to the Contractor's own place of disposal.

W-1.06 Shoring and Sheeting

All excavations shall be properly shored, sheeted, and braced or cut back at the proper slope to furnish safe working conditions, to prevent shifting of material, to prevent damage to structures or other work, and to avoid delay to the work, all in compliance with the U. S. Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). The minimum shoring, sheeting and bracing for trench excavations shall meet the general trenching requirements of the safety and health regulations. Before starting excavation for jacking pits and structures, the Contractor shall submit complete design calculations and working drawings of proposed sheeting and bracing arrangements which have been prepared, signed and sealed by a Professional Engineer registered in the State of Florida. Bracing shall be so arranged as not to place any strain on portions of completed work until the general construction has proceeded far enough, in the opinion of the Engineer, to provide ample strength. If the Engineer is of the opinion that at any point the sheeting or supports furnished are inadequate or unsuited for the purpose, he may order additional sheeting or supports to be installed. Whether or not such orders are issued, the sole responsibility for the design, methods of installation, and adequacy of the sheeting and supports shall be and shall remain that of the Contractor.

Tight sheeting shall be used in that portion of the excavation in City collector and arterial streets and in State and County highways below the intersection of a 1 on 1 slope line from the edge of the existing pavement to the nearest face of the excavation.

In general, sheeting for pipelines shall not be driven below the elevation of the top of the pipe. If it is necessary to drive the sheeting below that elevation in order to obtain a dry trench or satisfactory working conditions, the sheeting shall be cut off at the top of the pipe and left in place below the top of the pipe at no additional cost.

The sheeting and bracing shall be removed as the excavation is refilled in such a manner as to avoid the caving in of the bank or disturbance to adjacent areas or structures except as otherwise shown or directed. Voids left by the withdrawal of the sheeting shall be carefully filled by ramming or otherwise as directed.

Permission of the Engineer shall be obtained before the removal of any shoring, sheeting, or bracing. Such permission by the Engineer shall not relieve the Contractor from the responsibility for injury or to other property or persons from failure to leave such sheeting and bracing in place.

W-1.07 Sheeting Left in Place

The Engineer may order, in writing, any or all sheeting or bracing to be left in place for the purpose of preventing injury to the structures or to other property or to persons, whether such sheeting or bracing was shown on the Plans or placed at his direction or otherwise. If left in place, such sheeting shall be cut off at the elevation ordered, but, in general, such cutoffs shall be at least 18 inches below the final ground surface. Bracing remaining in place shall be driven up tight.

The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders.

Sheeting and bracing left in place, by written order of the Engineer, will be paid for under the appropriate Contract Item if included in the Proposal or otherwise by provisions of extra work as specified in Section 7 of the Agreement.

W-1.08 Removal of Water

At all times during the excavation period and until completion and acceptance of the work at final inspection, ample means and equipment shall be provided with which to remove promptly and dispose of properly all water entering any excavation or other parts of the work.

The excavation shall be kept dry. No water shall be allowed to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set satisfactory to the Engineer and, in any event, not sooner than 12 hours after placing the masonry or concrete. Water pumped or drained from the work hereunder shall be disposed of in a safe and suitable manner without damage to adjacent property or streets or to other work under construction. Water shall not be discharged onto streets without adequate protection of the surface at the point of discharge. No water shall be discharged into sanitary sewers. No water containing settleable solids shall be discharged into storm sewers. Any and all damage caused by dewatering the work shall be promptly repaired by the Contractor.

W-1.09 Structure Excavation

Excavations shall be of sufficient size and only of sufficient size to permit the work to be economically and properly constructed in the manner and of the size specified. The bottom of the excavation in earth and rock shall have the shape and dimensions of the underside of the structure wherever the nature of the ground will permit.

W-1.10 Trench Excavation

Before starting trench excavation, all obstructions which are to be removed or relocated shall be cleared away. Trees, shrubs, poles, and other structures which are to be preserved shall be properly braced and protected. All trees and large shrubs shall be preserved with damage to the root structure held to a minimum, unless otherwise shown or specified. Small shrubs may be preserved or replaced with equivalent specimens.

The width of trenches shall be such as to provide adequate space for workmen to place, joint, and backfill the pipe properly, but shall be kept to a minimum. Unless otherwise approved by the Engineer, the clear width of the trench at the level of the top of the pipe shall not exceed the sum of the outside diameter of the pipe barrel plus 24 inches.

In sheeted trenches, the clear width of the trench at the level of the top of the pipe shall be measured to the inside of the sheeting.

Should the Contractor exceed the maximum trench widths specified above, without written approval of the Engineer, he may be required to provide, at his own expense, concrete cradle or encasement for the pipe as directed by the Engineer, and no separate payment will be made therefor.

The Contractor shall excavate trenches to the respective depths, below the bottom of the pipe, for the various classes of pipe bedding shown on the Plans so that pipe bedding material can be placed in the bottom of the trench and shaped to provide a continuous, firm bearing for the pipe barrel and bells.

If unstable material is exposed at the level of the bottom of the trench excavation, it shall be excavated in accordance with the subsection headed "Authorized Additional Excavation." When in the judgment of the Engineer the unstable material extends to an excessive depth, he may advise the Contractor in writing to stabilize the trench bottom with a crushed stone, sand mat or gravel mat to ensure firm support for the pipe by other suitable methods. Payment for such trench stabilization will be made under the appropriate Contract Items or where no such items exist, as extra work as specified in Section 7 of the Agreement.

The open excavated trench preceding the pipe laying operation and the unfilled trench with pipe in place shall be kept to a minimum length causing the least disturbance to traffic and use of adjacent property. Ladders shall be provided and so located as to provide means of exit from the trench without more than 25 feet of lateral travel.

W-1.11 Rock Excavation

The term "rock" as used herein shall include all materials which have compressive strengths in excess of 300 psi in their natural undisturbed state and which, in the opinion of the Engineer, require drilling and blasting, wedging, sledging, barring or breaking with power tools not otherwise required for normal excavating.

Rock shall be excavated, within the boundary lines and grades as shown on the Plans, specified, or given by the Engineer. Rock removed from the excavation shall become the property of the Contractor and shall be removed by him away from the site of the work to his own place of disposal, and no separate payment will be made therefor.

All shattered rock and loose pieces shall be removed.

For trench excavation in which pipelines or other conduits are to be placed, the rock shall be excavated to a minimum depth of 6 inches below the bottom of the pipe and the excavated space refilled with pipe bedding material. Placing, compacting, and shaping pipe bedding material shall be included in the various classified unit price Contract Items for pipelines, and no separate payment will be made therefor.

For manhole excavation, the rock shall be excavated to a minimum depth of 8 inches below the bottom of the manhole base for pipelines 24 inches in diameter and larger, and 6 inches below the bottom manhole base for pipelines less than 24 inches in diameter and the excavated space refilled with crushed stone. Placing, compacting, and shaping crushed stone for manhole bases shall be included in the appropriate Contract Items for manhole bases, and no separate payment will be made therefor.

For cast-in-place structures, the rock shall be excavated only to the bottom of the structure or foundation slab.

Excavated space in rock below structures, pipelines, and manholes which exceeds the depths
specified above shall be refilled with Class D concrete, crushed stone, or other material as directed by the Engineer. Refilling of over-excavated rock in rock shall be included as part of the rock excavation, and no separate payment will be made therefor.

Where applicable, the requirements of the subsections on "Trench Excavation" and "Structure Excavation" shall be followed.

Blasting may be performed only when approved by the Engineer and authorized by the Agency having jurisdiction over the subject location and in accordance with all laws, ordinances, and regulations of the Agency.

W-1.12 Excavation for Jacking and Augering

Excavation for jacking or augering shall meet the requirements of the Workmanship and Materials section headed "Jacking and Augering."

* * *

SECTION 2 – BACKFILLING

W-2.01 General

All excavation shall be backfilled to the original surface of the ground or to such other grades as may be shown or directed. For areas to be covered by topsoil, backfill shall be left 4 inches below the finished grade or as shown on the Plans. The time elapsing before backfilling is begun shall be subject to the approval of the Engineer. In all backfilling, all compressible and destructible rubbish and refuse which might cause later settlement and all lumber and braces shall be removed from the excavated space before backfilling is started, except that sheeting and bracing shall be left in place or removed as the work progresses.

Construction equipment used to backfill against and over cast-in-place concrete structures shall not be permitted to travel over these structures until the designated concrete strength has been obtained as verified by concrete test cylinders. In special cases where conditions warrant, as determined by the Engineer, the above restriction may be modified if the concrete has gained sufficient strength, as determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.

W-2.02 Unsuitable Backfill Material

Before backfilling around structures, all rubbish shall be removed from behind the walls.

When the excavated material contains garbage, cinders, glass, tin cans, wood, or other trash or objectionable organic material, as determined by the Engineer, it shall not be used for backfill but shall be disposed of by the Contractor away from the site of the work to his own place of disposal. The unsuitable materials shall be replaced with backfill material which shall be sand, clay, gravel, sandy loam, or other excavated material free of objectionable organic matter, as approved by the Engineer.

W-2.03 Select Fill Material – General

Select fill material shall be used for pipe bedding, manhole bedding, trench and structure backfill, and other purposes as shown on the Plans, specified, and ordered in writing by the Engineer.

Select fill material shall be sand, conforming to the requirements of the subsections headed "Select Fill Material - Sand" or crushed stone or limestone screenings, conforming to the requirements of the subsection headed "Select Fill Material - Crushed Stone."

W-2.04 Select Fill Material – Sand

Sand used for pipe bedding or as select fill material for trench or structure backfill shall consist of job excavated sand or imported sand which can be readily and thoroughly

compacted. Sand shall be reasonably well graded and shall fall within the following gradation limits:

Passing No. 4 sieve - 95 percent (minimum)
Passing No. 200 sieve - 10 percent (maximum)

Sand containing more than 10 percent of material passing the No. 200 sieve or sand which, in the opinion of the Engineer, would have a tendency to flow under pressure when wet will not be acceptable for use as pipe bedding or select fill material for trench or structure backfill Sand shall not be used for bedding for manholes or other structures.

W-2.05 Select Fill Material - Crushed Stone

Crushed stone used for pipe bedding, manhole base bedding, or as select fill material for trench or structure backfill shall consist of clean, durable rock, angular in shape, which can be readily and thoroughly compacted. Crushed stone shall be reasonably well graded and shall be no greater than a No. 57 stone.

W-2.06 Pipe and Structure Bedding

All pipelines shall be bedded in well graded, compacted select fill material. Select fill material shall be sand, conforming to the subsection headed "Select Fill Material - Sand" and/or crushed stone, conforming to the subsection headed "Select Fill Material - Crushed Stone," as shown on the Plans, specified or ordered in writing by the Engineer. Pipe bedding shall be constructed in accordance with the details shown on the Plans.

When shown on the Plans or ordered in writing by the Engineer, pipelines (except PVC) shall be laid in Class D concrete cradle or encasement.

Precast concrete manhole bases shall be bedded on No. 57 stone, conforming to the subsection headed "Select Fill Material - Crushed Stone," as shown on the Plans.

Cast-in-place manhole bases and other foundations for structures shall be cast against undisturbed earth in clean and dry excavations.

Existing underground structures, tunnels, conduits and pipes crossing the excavation shall be bedded with compacted select fill material. Bedding material shall be placed under and around each existing underground structure, tunnel, conduit or pipe and shall extend underneath and on each side to a distance equal to the depth of the trench below the structure, tunnel, conduit or pipe.

W-2.07 Bedding Placement for Pipelines

Select fill material, used as pipe bedding, shall be placed by hand, in uniform layers not greater than 6 inches in loose thickness and thoroughly compacted in place. Select fill material pipe bedding shall extend to one foot over the top of the pipe.

Each layer of select fill shall be thoroughly tamped and compacted in place by hand or with suitable mechanical or pneumatic tools to a dry density not less than 95 percent of the maximum dry density as determined by AASHTO Des: T-180. No large stone fragments shall be placed in the pipe bedding nor closer than two feet to any point on any pipe.

W-2.08 Bedding Placement for Precast Concrete Manholes

No. 57 stone used for bedding beneath precast manhole bases shall be placed in uniform layers not greater than 6 inches in loose thickness and thoroughly compacted in place with suitable mechanical or pneumatic tools.

W-2.09 Structure Backfill

Backfill around manholes, risers, and structures shall be suitable job excavated material, selected fill material, or other material approved by the Engineer. Such backfill shall extend from the bottom of the excavation or top of structure bedding to the bottom of pavement base course, subgrade for lawn replacement, the top of the existing ground surface, or to such other grades as may be shown or given by the Engineer.

The backfill shall be placed in uniform layers not greater than 18 inches in loose thickness and thoroughly compacted in place with suitable mechanical or pneumatic tools to a dry density of not less than 98 percent of the maximum dry density as determined by AASHTO Des: T-180.

W-2.12 Finish Grading

Finish grading shall be performed to meet the existing contour elevations and grades shown on the Plans or given by the Engineer and shall be made to blend into adjacent natural ground surfaces. All finished surfaces shall be left smooth and free to drain.

Grading outside of pipelines or structure lines shall be performed in such a manner as to prevent accumulation of water within the area. Where necessary or where shown on the Drawings, finish grading shall be extended to ensure that water will be carried to drainage ditches, and the construction area left smooth and free from depressions holding water.

W-2.13 Responsibility for After Settlement

Any depression which may develop in backfilled areas from settlement within one year after the work is fully completed and accepted shall be the responsibility of the Contractor. The Contractor shall, at his own expense, provide as needed additional backfill material, pavement base replacement, permanent pavement sidewalk curb and driveway repair or replacement, and lawn replacement and shall perform the necessary reconditioning and restoration work to bring such depressed areas to proper grade as approved by the Engineer.

W-2.14 Inspection and Testing of Backfilling

All backfill shall be subject to test by the Engineer with the assistance of the Contractor.

* * *

SECTION 4 - CONCRETE, MORTAR AND GROUT MATERIALS

W-4.01 General

The materials covered under this section are cement, sand, crushed stone, gravel, admixtures and water for use in concrete, mortar and grout.

W-4.02 Uniformity of Materials

Cement, fine and coarse aggregate and admixtures used in concrete for interior and exterior concrete surfaces shall be identical in type, color and size to provide a consistently uniform concrete finish.

W-4.03 Cement

Cement shall be that as manufactured by Florida Portland Cement or equal and shall be a domestic product from a source approved by the Engineer. Notarized Certificates of Manufacture as evidence that the cement conforms to the specified requirements shall be furnished. These certificates shall include mill-test reports on the cement. Cement shall be standard portland cement meeting the requirements of ASTM C 150 Type II.

Standard portland cement without an air-entraining agent shall be used in the manufacture of concrete pressure pipe and may be used in the manufacture of concrete sewer pipe by processes using a nonplastic (0 slump) mix.

W-4.04 Fly Ash

Fly ash shall be a local product from a source approved by the Engineer with cementitious properties conforming to the requirements of ASTM C 618, Class C or F, with the following exceptions:

Loss on ignition - 5% maximum
Sulfur trioxide - 4% maximum

Fly ash shall have a uniform light color. Notarized Certificates shall be furnished by the supplier to verify that the fly ash meets these requirements.

Fly ash shall be stored at the concrete mixing plant separate from the cement, in accordance with the requirements specified for storage of cement. Cement and fly ash shall not be intermixed prior to being added to the concrete mix.

W-4.05 Delivery and Storage of Cement

Cement delivered in bulk to the batching plant shall be stored in weathertight bins and batched by an appropriate weighing device, in accordance with ASTM C 94. Cement shall be stored in weathertight buildings, bins or silos which will exclude moisture and contaminants. Cement that has deteriorated from storage shall not be used. Cement stored for a period longer than 6 months after testing shall be retested before use, and rejected if it fails to meet all of the specified requirements. Accepted cement that has been in storage for more than one year from the time of original acceptance shall not be used.

Cement delivered to the job site shall be in strong, well-made bags plainly marked with the brand, name of manufacturer and net weight. Packages received in a damaged condition will be rejected.

Ready-mixed concrete delivered shall be accompanied by delivery tickets showing the following:

1. Date and time leaving the plant
2. Type of cement and weight
3. Quantity of water and time added
4. Aggregate moisture correction factor
5. Admixtures and weight
6. Site arrival time
7. Site leaving time
8. Type of fly ash and weight

W-4.06 Samples of Aggregates

At least 15 days before the first concrete is to be used, a 50-pound representative sample of each aggregate shall be submitted to the Engineer for approval. As the work proceeds, additional samples shall be submitted if and when required by the Engineer.

W-4.07 Fine Aggregate

Fine aggregate shall be natural sharp sand meeting the requirements of ASTM C 33, except as modified herein.

Fine aggregate subjected to the test for organic impurities and producing a color darker than standard will be rejected without exceptions.

Fine aggregate shall meet the requirements of the soundness test set forth in Paragraph 7.1 of ASTM C 33. The exceptions stated in Paragraphs 7.2 and 7.3 shall not apply.

Fine aggregate for mortar and grout shall be well graded within the following limits by weight when tested in accordance with ASTM C 136.

	Percentage Passing	
Sieve	Mortar	Grout
3/8-inch	100	100
No. 4	100	100
No. 8	96 to 100	96 to 100
No. 16	70 to 90	70 to 90
No. 30	40 to 70	50
No. 50	15 to 35	5 to 35
No. 100	5 to 15	5 to 15

W-4.08 Coarse Aggregate

Coarse aggregate shall consist of gravel or crushed stone meeting the requirements of ASTM C 33. The limits for deleterious substances and physical property requirements given in Table 3 shall apply for each concrete class designation without exception. Coarse aggregate shall be graded according to Size No. 467, No. 57, or No. 67 Table 2.

Size No. 57 or No. 67 shall be used for all thin or closely reinforced concrete work, such as floors and roofs less than 7 inches thick, walls less than 9 inches thick, all beams, girders, struts, columns, and all fireproofing. Size No. 57, 67 or No. 467 shall be used for all other concrete work; however, gradation sizes shall not be mixed.

W-4.09 Storage and Handling of Aggregates

Aggregates shall be kept clean and free from all other materials during transportation and handling. They shall be kept separated from each other until measured in batches and placed in the mixer.

Aggregates shall be stockpiled in a manner to prevent segregation unless finish screening is provided at the batch plant.

W-4.10 Admixtures

Admixtures shall be used as specified under the Workmanship and Materials section headed "Concrete".

The use of admixtures shall be limited to an air-entraining admixture conforming to ASTM C 260, water-reducing admixtures conforming to ASTM C 494, Type A, and water-

reducing set retarders conforming to ASTM C 494, Type D. All concrete, except Class D, shall contain an air-entraining admixture.

Water-reducing and set-retarding admixtures shall be used only with the written permission of the Engineer. Test data shall be provided indicating that the concrete containing the admixtures has improved workability and does not show any abnormal behavior such as premature stiffening or slump loss for at least 30 minutes after mixing has been completed, or any other abnormal differences when compared with concrete made without the admixture. Such test data shall be based on fresh concrete from the proposed supplier, using batching equipment proposed for use on the project.

Admixtures containing calcium chloride, thiocyanates or more than 0.05 percent chloride ion are not permitted. Written conformance to the above requirements and the chloride ion content of each admixture will be required from the admixture manufacturer prior to mix design review by the Engineer.

When more than one admixture is used, each admixture shall be dispensed separately into the mix, and at different times during mixing, in accordance with the recommendation of ACI Committee 212. After system approval, no changes shall be made in batching equipment or concrete constituents without approval of the Engineer.

* * *

SECTION 5 - CONCRETE

W-5.01 General

Concrete supplied and placed under this Contract shall be divided into various classes according to use and compressive strength.

Class A concrete shall be used for all precast concrete units.

Class B concrete shall be used for all reinforced concrete structures designed for high strength and watertightness; and shall be used for columns, walls, beams, slabs and, in general, wherever formwork other than simple forms is required.

Class C concrete shall be used for all reinforced concrete structures designed for high strength and watertightness; and shall be used for bottoms of structures, electrical duct encasement, and, in general, where concrete is deposited directly on the bottoms or slopes of excavations and where only simple forms are required.

Class D concrete shall be used for low-strength concrete, plain or reinforced, used for work mats beneath structures, soil stabilization, pipe cradles and encasement, filling, and other similar purposes. Clean boulders or fragments of rock excavated during construction may be embedded in large volumes of Class D concrete to provide added bulk. Care shall be taken in placing the boulders or rock fragments so that there will be no voids in the concrete.

W-5.02 Strength

The specified compressive strength of concrete in pounds per square inch for the classes previously described shall be as follows. The 28-day strength shall be designated as f'c.

Class	7-Day Test	28-Day Test
A	3,400	5,000
B	2,700	4,000
C	2,700	4,000
D	1,300	2,000

Concrete shall be proportioned and produced to provide an average 28-day compressive strength in excess of the specified compressive strength, f'c. The required proportions shall be based on tests of cylinders made, cured and tested as prescribed herein.

Mix designs shall be prepared for each type of concrete required and submitted for approval. Concrete of any class which will be placed by pumping methods will require a separate mix design and mix design approval, as described herein, in addition to the mix design approval required for other placement methods.

W-5.03 Selection of Concrete Proportions

Concrete proportions shall be selected to provide the required strength and durability and to provide workability and consistency so that the concrete can be worked into forms and around reinforcement without segregation or excessive bleeding.

Concrete for all water-containing structures and all structures constructed below grade shall be watertight. For this concrete, the maximum water-cement ratio shall not exceed 0.50 by weight of the total cementitious constituent. The quantity of water shall be the total quantity, including free surface moisture contained in the aggregates.

Class B and C concrete may contain fly ash in an amount not to exceed 150 pounds per cubic yard, and shall have a minimum cement content of 350 pounds per cubic yard.

Concrete proportions including the water-cement ratio shall be established on the basis of field experience or trial mixtures with the materials to be used in accordance with Section 4.3 of ACI 318. All test results shall be submitted for approval a minimum of 35 days before concrete is placed.

W-5.04 Entrained Air Content

All Class B and C concrete shall be air entrained with an average total air content of 5 percent. Tolerance on air content as delivered shall be plus or minus 1.5 percent. Air content tests in accordance with ASTM C 138 or C 173 shall be submitted with mix design data.

W-5.05 Consistency

When tested in accordance with ASTM C 143, concrete mix design slumps shall be within the following limits:

Minimum and Maximum Slump in Inches

Concrete Placement	Class A, B, C	Class D
Normal	3 to 4	2 to 4
Pumped	4 to 6	4 to 6

Mix design slump shall be based on the concrete mix without water reducing admixture. For production concrete, slump may be increased up to 1 inch by use of specified water reducing admixtures. For pumped concrete, slump shall be measured at end of hose.

The combined aggregates shall be graded such that when a sample of the mix is separated on No. 4 standard sieve, the weight passing the sieve shall be not less than 30 percent nor greater than 45 percent of the total, unless otherwise specified.

W-5.06 Water Reducing Admixtures

Where the proportions of aggregates, cement and mixing water conforming to the specification requirements produce a concrete with a slump less than the minimum required, a water-reducing admixture shall be used to obtain improved workability. Water-reducing admixtures shall comply with the requirements of the Workmanship and Materials section headed “Concrete, Mortar and Grout Materials.”

W-5.07 Strength Tests - Laboratory Cured Cylinders

Concrete test cylinders will be tested at a laboratory designated by the Engineer. The costs for testing and preparation of reports will be the responsibility of the Engineer. The Contractor shall furnish all labor and materials required to assist the Engineer in making concrete test cylinders.

During the progress of the work, concrete compressive strength tests shall be made as directed and as required. Test cylinders shall be made, cured, and stored in accordance with ASTM C 31 and will be tested in accordance with ASTM C 39. Each test shall consist of three cylinders. One laboratory-cured cylinder will be tested at 7 days, and one field-cured cylinder will be tested at 28 days. If the 7-day cylinder is not satisfactory, the third cylinder, a laboratory-cured cylinder, will be tested at 7-days. Otherwise, the third cylinder will be tested at 28 days.

The strength level of the concrete mix for each individual class of concrete shall be considered satisfactory when:

a. The average of all sets of three consecutive 28-day strength tests equal or exceed the specified compressive strength (f'c).
b. No individual 28-day strength test (average of two cylinders) falls below f'c by more than 500 psi.

If the requirements of either (a) or (b) are not met, changes in the mix proportions shall be made immediately to achieve the required strength.

W-5.08 Low Concrete Strength Test Results

If the Engineer determines the serviceability of the concrete is significantly reduced by low concrete strength test results, test cores shall be taken by the Contractor from the area in question. Cores shall be drilled and tested in accordance with ASTM C 42 except as noted. Three cores shall be taken for each strength test more than 500 psi below the specified f'c.

Concrete in the area represented by core tests shall be accepted if the average of three cores is equal or greater than 0.85f'c and no single core is less than 0.75f'c.

Concrete which does not meet the core tests requirements shall be removed and replaced at the expense of the Contractor.

W-5.09 Measurement and Mixing

Measurement and mixing of concrete shall be performed in accordance with recommendations of ACI 304, as modified herein.

Cement and fine and coarse aggregates shall be measured separately by weight by equipment providing an accuracy within one percent of the net load weighed. Cement and water shall be measured within 1 percent accuracy. Aggregates shall be measured within 2 percent accuracy. Admixtures shall be measured within 3 percent accuracy by weight.

The accuracy of the weighing equipment shall meet the requirements of the United States Bureau of Standards. Standard testing weights and other necessary equipment shall be available at all times for testing the equipment.

Concrete shall be mixed in a rotary, batch-type mixer of adequate design to produce a thorough mix, homogeneous in composition and uniform in color. Each batch of one cubic yard or less shall be mixed not less than 1-1/2 minutes after the last of the ingredients have been added to the mixer. The mixing time shall be increased 15 seconds for each additional cubic yard or fraction thereof.

W-5.10 Ready-Mixed Concrete

Ready-mixed concrete shall meet the requirements of ASTM C 94, except as modified in the following paragraphs, and shall be subject to all provisions herein relative to materials, strength, proportioning, consistency, and testing. Article 18 of ASTM C94, however, shall not apply. In the event of low strengths, procedures outlined in the subsection headed "Low Concrete Strength Test Results" shall apply.

The rate of delivery of the mixed concrete shall be such that the interval between placing of fresh concrete in contact with concrete already placed from previous batches shall not exceed 45 minutes. The elapsed time between the introduction of mixing water to the cement and aggregates and depositing concrete in the work shall not exceed 60 minutes, including mixing and agitating time.

Delivery of concrete in nonagitating equipment will not be permitted.

No water shall be added to the concrete at the site, unless approved by the Engineer for a specific batch. Approval of such addition to one batch shall not be construed as approval of additions to subsequent deliveries.

The Contractor shall prepare a detailed concrete field record in which the following information is identified:

a. Number of concrete batches produced.
b. Proportions of materials used.
c. Approximate location of final deposit of each batch in the structure.
d. Time and date of mixing and placing.

W-5.11 Forms – General

Forms shall be designed in accordance with the recommendations of ACI 347. The presence of fly ash in the mix will delay the setting time, which shall be considered in the design of the forms. The Contractor shall be solely responsible for adequate design of all form elements for support of the wet concrete mixtures specified and as delivered.

Forms shall be designed to produce concrete members identical in shape, lines and dimensions to the members shown. They shall be substantial, properly braced, and tied together to maintain position and shape and to resist all pressures to which they may be subjected. Forms shall be sufficiently tight to prevent leakage of mortar. The thickness and character of form lumber and size and spacing of studs and wales shall be determined by the nature of the work and the height to which concrete is placed and shall be adequate to produce true, smooth surfaces with not more than 1/8-inch variation in either direction from a geometrical plane. Horizontal joints shall be level, and vertical joints shall be plumb.

Forms for the sides of columns and beam and girder soffits shall be constructed with 2-inch lumber, and all joints shall be tight and even. Beam and girder soffits shall be erected with a camber of ½-inch in 20 feet and sufficiently braced, shored, and wedged to prevent deflection. Column sides shall be clamped with metal column clamps, which shall be spaced according to the manufacturer's directions, in accordance with this specification.

Beam and girder soffits shall be erected with a camber of 1/2-inch in 20 feet and sufficiently braced, shored, and wedged to prevent deflection. Column sides shall be clamped with metal column clamps, which shall be spaced according to the manufacturer's directions, in accordance with this specification.

External angles of walls, beams, pilasters, columns, window openings and girders shall be provided with ¾-inch bevel strips.

Forms for repeated use shall be supplied in sufficient number to ensure the required rate of progress. All forms shall be thoroughly cleaned before reuse and shall be inspected

immediately before concrete is placed. Deformed, broken, or defective forms shall be removed from the work. Temporary openings shall be provided in forms at convenient locations to facilitate cleaning and inspection.

The entire inside surfaces of forms shall be coated with a suitable form release agent immediately before, during or after erection just prior to placing concrete. No form release agent shall be permitted on the reinforcing steel.

The Contractor shall be responsible for the adequacy of all forms and for remedying any defects resulting from their use.

	Minimum Time	Minimum Strength (psi)
Columns	7 days	2700
Side forms for girders and beams	7 days	2700
Walls	7 days	2700
Bottom forms of slabs:		
Under 10 feet clear span	4 days	2300
10 to 20 feet clear span	7 days	2700
Over 20 feet clear span	10 days	2900
Bottom forms of beams and girders:		
Under 10 feet clear span	7 days	2700
10 to 20 feet clear span	14 days	3000
Over 20 feet clear span	21 days	3500

Butt joints at corners and bottoms of placements shall be sealed with closed cell impressible form gaskets with adhesive bucking.

W-5.12 Removal of Forms

In general, forms shall not be removed until the concrete has hardened sufficiently to support its own load safely, plus any superimposed load that might be placed thereon. The forms shall be left in place for the minimum length of time indicated below or until the concrete has reached the minimum strength indicated as determined by testing, whichever time is reached first. The times indicated represent cumulative days or hours, not necessarily consecutive, during which the air surrounding the concrete is above 50 degrees F. These times may be decreased if reshores are installed.

Forms for vertical architectural concrete surfaces shall not be removed sooner than 12 hours nor longer than 24 hours after placement of concrete.

These times shall be increased as required if the concrete temperature following placement is permitted to drop below 50 degrees F, or if fly ash is used in the concrete mix.

The removable portion of form ties shall be withdrawn from the concrete immediately after the forms are removed. Holes left by such ties shall be filled with grout from a grout gun and the entire surface shall be finished with a steel spatula or rubbed with sackcloth in accordance with the subsection entitled Concrete Surfaces. On architectural concrete and on exposed interior surfaces of buildings, where appearance is important, white cement shall be added in the patching grout to achieve uniformity in color. Prior to patching tie holes in any area where appearance is important, a sample section varying the proportions of white cement to gray cement shall be prepared to determine the proper mixture necessary to achieve a uniformly colored surface.

W-5.13 Reshoring

In the event early stripping of forms becomes necessary, the Contractor shall develop a system for such early removal. The system shall include details and schedules for each element which is to be reshored.

W-5.14 Placing Concrete

Concrete shall be placed only in the presence of the Engineer. Where the procedure is not specified, the placing of concrete shall be in accordance with the recommendations of ACI 304.

No concrete shall be placed after its initial set has occurred, and no retempered concrete shall be used under any conditions. Concreting operations shall be continuous until the section, panel, or scheduled placement is completed. Should the concreting operations be unavoidably interrupted, construction joints shall be formed at proper locations as specified. Concrete shall be conveyed and placed with minimum handling and shall be deposited in the forms as close as possible to its final position and in no case more than 5 feet in a horizontal direction therefrom. Rehandling of concrete will not be permitted.

Concrete shall be placed in horizontal layers shallow enough so that the previous layer is still soft when the next layer is added and the two layers can be vibrated together. Layers shall not exceed 18 inches in depth.

Wall and column concrete shall be deposited through heavy duck canvas or galvanized steel chutes equipped with suitable hopper heads. Chutes shall be of variable lengths so that the free fall of concrete shall not exceed 3 feet. Where required, illumination shall be provided

inside the forms so that the concrete is visible from the deck and runways at the point of deposit.

Freshly placed exposed concrete shall be protected against damage from the elements or other sources.

W-5.15 Vibrating

All concrete shall be consolidated by means of mechanical internal vibrators applied directly into the concrete in a vertical position in accordance with the recommendations of ACI 309.

The intensity and duration of vibration shall be sufficient to cause concrete to combine with previously placed concrete, to fill corners, to compact thoroughly and to embed reinforcement, pipes, conduits, and similar work completely. Vibrators shall be inserted into and withdrawn from the concrete vertically at close intervals. Vibrators shall not be used to cause concrete to move laterally.

A sufficient number of vibrators shall be on hand to assure that the incoming concrete can be properly compacted within 15 minutes after placing. Reserve vibrators shall be on hand for use when others are being serviced. No placement of any concrete shall commence with a single vibrator on hand.

W-5.16 Hot Weather Requirements

For placement of concrete during hot weather, the recommendations of ACI 305.1 shall be followed. No concrete shall be placed if the temperature of the concrete at the time of placement exceeds 90 degrees F. Where the temperature of the concrete being placed is consistently above 75 degrees F and a noticeable decrease in slump or an increase in mixing water demand occurs, a retarding admixture shall be used. Admixtures shall conform to the Workmanship and Materials section headed "Concrete, Mortar and Grout Materials" and shall be used only with the written permission of the Engineer.

Unformed surfaces of concrete placed during hot weather shall be protected from drying by continuous moist curing for at least 24 hours. Curing shall be started as soon as the concrete has hardened sufficiently to withstand surface damage. If moist curing is not carried beyond 24 hours, the surface while damp shall be covered with a suitable heat-reflecting plastic membrane or sprayed with a white pigmented curing compound.

W-5.17 Cold Weather Requirements

For placement of concrete during cold weather, the recommendations of ACI 306.1 shall be followed, except set-accelerators will not be permitted.

Before placement of concrete, all ice, snow and frost shall be completely removed from all surfaces to be in contact with the concrete. Concrete shall not be placed on a frozen subgrade. Surfaces to be in contact with the concrete shall be at a temperature as near as practical to that of the concrete being placed.

When mean daily temperatures at the site are generally below 40 degrees F, the temperature of the concrete as placed shall be not less than 50 degrees F, except for mass concrete where the temperature of the concrete as placed shall be not less than 45 degrees F. Heating of aggregates or mixing water or both shall be used to obtain these placement temperatures. The concrete temperatures as mixed shall not be permitted to exceed the placement temperature by more than 10 degrees F for air temperatures of 0 degree to 30 degrees F, nor by more than 15 degrees F for air temperatures below 0 degree F.

Concrete in place shall be maintained at a temperature of 50 degrees F by keeping forms in place, covering with insulated blankets, heated enclosures or combinations of these for the following minimum time intervals except that forms shall not be removed in less than the time specified in the subsection headed “Removal of Forms.”

a. Footings and walls below grade 2 days and slabs on grade
b. Exposed walls and columns 3 days carrying no load
c. Exposed floor slab, beams and girders 6 days above grade and partially loaded

Exposed surfaces of new concrete shall be protected from drying out. When dry heating is used for protection against low temperatures, exposed concrete surfaces shall be covered with an approved sheet material or membrane as specified in the subsection headed “Curing.” Water curing may be used if icing problems can be avoided.

Concrete shall be cured during the period of low temperature protection for such additional time as required. Curing shall conform to the requirements of the subsection headed "Curing." During periods of very cold weather, the Contractor shall continue the protection against low temperature during the extended curing period to prevent freezing of the concrete as required.

Concrete which is to be exposed to freezing temperatures shall be permitted to undergo some drying just prior to and during the period of adjustment to ambient cold-weather conditions. When protection against low temperatures is removed, the resulting temperature drop in any part of the concrete shall not exceed 5 degrees F per hour nor 40 degrees F for the first 24 hour period.

W-5.18 Curing

In general, the recommendations of ACI 308 shall be followed for curing concrete.

Standard portland cement concrete surfaces normally exposed to the atmosphere shall be protected against too rapid drying by curing for a minimum period of 7 days. When daily average temperatures are below 70 degrees F, the curing period shall be extended as required in the subsection headed "Cold Weather Requirements." The curing period shall commence immediately following the placing of the concrete. Curing shall be accomplished by one of the following methods. Should there be any delay in the application of the method of curing used, the concrete shall be covered with moistened burlap held in complete contact with the surface or kept wet by continuous sprinkling.

a. Water Curing. Water curing shall be accomplished by the use of quilted covers wetted and applied to the concrete surface as soon as the forms have been removed, or in the case of slabs, as soon as the concrete has set up sufficiently to prevent marring of the surface. These quilted covers shall consist of an outer covering of burlap or cotton or other approved material, and a needled, punched or sandwiched inner layer of cotton batting or other approved material, in all weighing not less than 20 ounces per square yard. The covering material shall be maintained in a thoroughly saturated condition and shall show the presence of free water between the mat and the surface of the concrete at all times throughout the curing period.

b. Sheet Materials. Curing of concrete slabs may be accomplished through the use of sheet materials such as waterproof paper or polyethylene film, both meeting the requirements of ASTM C 171, and applied to the concrete surface as soon as it has set sufficiently hard to prevent marring. The concrete surface shall first be thoroughly wetted, and the sheet materials shall then be placed in direct contact and anchored thereto in a manner to assure continuous contact throughout the curing period. The sheet materials shall be lapped a minimum of 3 inches with the seams taped, cemented, or glued. The paper shall consist of one ply of an approved type of fiber, reinforced waterproof building paper, consisting of cross fibers embedded in asphalt, between two layers of waterproof building paper, the whole being combined under heat and pressure to form a monolithic sheet. Polyethylene film shall be white opaque sheeting manufactured from virgin resin and shall contain no scrap or additives. It shall be not less than 4 mils in thickness and shall not easily tear, puncture, or otherwise become unfit for use. If, in the opinion of the Engineer, discoloration is objectionable, polyethylene film shall not be used on floors which have been steel troweled to a hard finish.

c. Membrane Curing. Membrane curing shall be started immediately after removal of forms or in the case of unformed surfaces, as soon as the water sheen has disappeared from the surface of the concrete and shall be accomplished by coating the entire exposed surface with a liquid membrane-forming compound containing a temporary color indicator applied uniformly by means of an approved pressure spray distributor at the rate of 200 square feet per gallon of material. The material shall be applied so that the concrete surface is completely coated and sealed at one application. The compound shall meet the requirements of ASTM C 309 Type I.

Membrane shall not be applied to faces of construction joints or other surfaces against which additional concrete will be placed. Such surfaces shall be kept continuously wet by other means.

Membrane curing shall not be used on surfaces which are to be covered with a coating material applied directly to the concrete or with a covering material bonded to the concrete, such as other concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials unless otherwise approved by the Engineer.

W-5.19 Joints and Bonding

Construction joints shall be made where shown or permitted. Such joints shall be located to ensure stability, strength, and watertightness, and shall have a waterstop where shown. All corners shall be built monolithically, and the concrete on either side shall be continuous to points shown.

At least 2 hours shall elapse after placing concrete in the columns or walls before depositing concrete in beams, girders, or slabs supported thereon. Beams, girders, brackets, column capitals, and haunches shall be considered as part of the floor system and shall be placed integrally therewith.

Horizontal keyways shall be built to permit flushing water to escape from the keyways.

Joints shall have continuous, straight, and regular keys or grooves. Exposed concrete surfaces shall be brought to a true level line at the top of every horizontal construction joint. The exposed construction joints shall have a row of form ties located in the concrete at from 4 to 6 inches from the joint to tighten the forms for subsequent sections. Reinforcing rods shall be set to extend into subsequent sections of construction, as shown. Water stops, if required, shall have watertight splices and corner intersections and meet the requirements of the Workmanship and Materials section headed "Construction and Expansion Joints for Concrete." All bulkheads or other joint forming material shall be removed before placing adjacent concrete.

The placing of concrete shall be carried on continuously between the construction joints shown. If for any reason it becomes necessary to stop the placing of concrete at locations other than those indicated, such locations and the manner of making the joint shall be subject to the approval of the Engineer.

Concrete surfaces against which the new concrete is to be placed shall be thoroughly cleaned and wetted. Just prior to placing new concrete, horizontal surfaces and joints shall be slushed with at least 2 inches of cement grout of the same mixture as the concrete but with coarse aggregate omitted. Special care shall be used in placing and puddling concrete at vertical joints to ensure a bond with existing concrete. Vertical construction joints shall not be made in watertight construction, unless shown or approved in writing.

W-5.20 Inserts and Sleeves

Pipes, anchor bolts, sleeves, steps, castings, floor drains, manhole frames, cast-in reglets, dovetail anchor slots, and other inserts shall be encased in concrete as shown. Special care shall be taken to place and maintain them to the proper lines and grades and to compact concrete thoroughly around them to prevent the passage of water. Insofar as possible, they shall be set before placing concrete and thoroughly braced to prevent movement during the progress of the work.

Water stops which may intersect such inserts and sleeves shall be miter jointed around them in a manner and location approved by the Engineer. Concrete placement shall follow the arrangement of the water stop.

All concrete walls faced with masonry shall have dovetail anchor slots spaced not more than 24 inches apart.

W-5.21 Grouting

Grout shall be placed under column setting plates, under equipment bases, in conjunction with the setting of anchors or dowels in holes drilled in concrete, and elsewhere as required.

Grout shall be a flowable, prepackaged, nonshrink grout without dependence on gas expansion forces or enlargement of metal particles for its nonshrinking characteristics. There shall be no shrinkage below placement volume under ASTM C 827 and no drying shrinkage under CRDC- 621.

The Contractor shall furnish the Engineer with recent independent laboratory tests showing that the grout is nonshrink at various ages in accordance with CRD-C-621, shows no expansion after set (ASTM C 827), develops 3,000 psi with a trowelable mix within 24 hours (ASTM C 109), and has a placement time based on initial set of not less than 60 minutes (ASTM C 191). Test results shall be supplied showing that in projects of similar scope and size, the effective bearing area (EBA) shall be between 95 and 100 percent. Grout that contains water reducers, accelerators or fluidifiers shall have no drying shrinkage greater than the equivalent sand cement and water mix as tested under ASTM C 596.

Where grout will be exposed to the weather, it shall be free of discoloration without the necessity of special surface treatments. The grout shall be packed in moisture proof bags with general instructions for placement printed on the bag. All grout shall be mixed and placed in accordance with manufacturer's instructions. Technical service shall be supplied by manufacturer upon request.

W-5.22 Water Stops

Water stops shall be installed in construction joints on reglets cut into existing concrete work as shown or specified. Water stops shall be made of extruded polyvinyl chloride. Water stops shall be in accordance with the Workmanship and Materials section headed "Construction and Expansion Joints for Concrete".

* * *

SECTION 6 - REINFORCING STEEL

W-6.01 Standards

Reinforcing steel bars for concrete reinforcement shall be deformed bars meeting the requirements of ASTM Des: A 615, Grade 60, unless shown or specified otherwise. They shall be free from defects, kinks, and from bends that cannot be readily and fully straightened in the field. Test certificates of the chemical and physical properties covering each shipment shall be submitted for approval.

Reinforcing mesh shall be of the electrically welded type, with wires arranged in rectangular patterns, of the sizes shown or specified and shall meet the requirements of ASTM A 185.

W-6.02 General

Reinforcing steel bars shall be supplied in lengths which will allow them to be conveniently placed in the work and provide sufficient lap at joints. Dowels of proper lengths, size, and shape shall be provided for tying walls, beams, floors, and the like together when shown, specified, or ordered.

Stirrups and ties shall have a minimum inside radius of bend of 2-1/2 bar diameters. All other bars No. 7 and smaller shall have a minimum inside radius of bend of 3 bar diameters, and No. 8 bars and larger shall have a minimum inside radius of bend of 4 bar diameters.

Splices in all reinforcements shall be lapped as specified hereinafter in "Table 1 - Grade 60 Reinforcing Bar Splice Lapping Lengths" unless shown or specified otherwise. All splices shall be staggered, unless otherwise approved by the Engineer.

TABLE 1 - GRADE 60

REINFORCING BAR SPLICE LAPPING LENGTHS

Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11
Top Bars – ACI Class B	13	17	22	28	38	50	64	81	100
Top Bars – ACI Class C	17	23	29	37	50	66	83	106	130
Other Bars – ACI Class B	12	12	16	20	27	36	46	58	71
Other Bars - ACI	12	16	20	26	36	47	60	75	93

Notes:
1. Splice length given in inches.
2. Top bars are all horizontal reinforcement so placed that more than 12 inches of concrete is cast in the member below the bar. This includes horizontal wall reinforcement.
3. Where lapping bars of different sizes, use lap required for larger bar.
4. For all bars spaced closer than 6 inches, increase lap length 25 percent.
5. Unless otherwise specified, the length of lap for splices shall be as shown for ACI Class B where no more than 50 percent of the bars are lap spliced, and as shown for ACI Class C where more than 50 percent of the bars are lap spliced.

W-6.03 Detailing

The Contractor shall submit detailed placing drawings and bar listed to the Engineer for approval in accordance with the requirements for "Working Drawings" of the General Provisions, except as otherwise specified herein.

All provisions of the latest ACI "Manual of Standard Practice for Detailing Reinforced Concrete Structures" shall be followed in the preparation of placing drawings and bar lists.

Wall and slab reinforcing shall not be billed in sections. Complete elevations of all walls and complete plans of all slabs must be shown, except that when more than one wall or slab are identical only one such elevation or plan will be required. These plans or elevations need not be true views of the walls or slabs shown. Every reinforcing bar in a slab or a wall shall be billed on either a plan or an elevation. Where necessary, sections shall be taken to clarify the arrangement of the steel reinforcement. All bars shall be identified on such sections, but in no case shall bars be billed on such sections.

For all reinforcing bars, unless the location of a bar is perfectly obvious, the location of such bar or bars shall be given by a dimension to some structural feature which must be readily distinguishable at the time bars are placed.

The set of placing drawings shall be complete in and by themselves to the extent that the bar setters will have no occasion to refer to the design drawings.

Before submittal to the Engineer, every placing drawing and bar list shall be completely checked including the quantity, size, type, length, bend dimensions, and type of support for all bars or mesh, and all other information on the drawing and list. The checking shall be done by a qualified person and all necessary corrections made.

If after placing drawings and bar lists have been submitted to the Engineer for approval, a partial or spot check by the Engineer reveals that the placing drawings obviously have not been checked by a qualified person, they will be returned to the Contractor for such a check and corrections, after which they shall be resubmitted for approval by the Engineer.

W-6.04 Delivery

Reinforcing steel shall be delivered to the work in bundles strongly tied, and each group of both bent and straight bars shall be identified with a metal tag giving the identifying number orderly manner, at least 12 inches off the ground and kept clean and protected from the weather, as directed by the Engineer, after delivery at the site of the work.

W-6.05 Protection

Reinforcing steel shall be delivered without rust other than that which may have accumulated during transportation to the work. It shall at all times be fully protected from moisture, grease, dirt, mortar, and concrete. Before being placed in position, it shall be thoroughly cleaned of all loose mill scale and rust and of any dirt, coatings, or other material that might reduce the bond. If there is a delay in depositing concrete, the steel shall be inspected and satisfactorily cleaned immediately before the concrete is placed.

W-6.06 Fabrication and Installation – Bars

Bars shall be cut to required length and accurately bent before placing. Bars shall be bent in the shop unless written approval of field bending is obtained from the Engineer. If field bending is permitted, it shall be done only when the air temperature where the bending operation is performed is above 30 degrees F.

The bars shall be placed in the exact positions shown with the required spacing and shall be securely fastened in position at intersections to prevent displacement during the placing of the concrete. The bars shall be fastened with annealed wire of not less than 18 gauge or other approved devices. Spacing chairs of a type approved by the Engineer shall be furnished and properly placed to support and hold reinforcing bars in position in all beams and slabs, including slabs placed directly on the subgrade. Chairs which rest on the forms for slabs, the underside of which will be exposed to view in the finished work, shall have those portions galvanized or plastic coated which come in contact with the forms.

Splices in all reinforcement shall be lapped as specified in "Table 1 - Grade 60 Reinforcing Bar Splice Lapping Lengths" in the subsection headed "General." Splices at points of maximum tensile stress shall be avoided wherever possible. Temperature bars shall have a minimum clear spacing of 2-1/2 diameters. All bar splices shall be staggered where possible.

All welded splices shall be full penetration, butt welds, made by certified welders in accordance with AWS D12.1. Thermite welding or Cadweld type couplers may be used where approved by the Engineer.

On any section of the work where horizontal bars run further than the length of the forms, the form or head against which the work ends shall be perforated at the proper places to allow the bars to project through a distance at least equal to the lap specified. The projecting

ends, however, unless otherwise directed by the Engineer, shall be of different lengths so that in no place will laps in adjoining bars in the same place occur opposite each other.

W-6.07 Installation – Mesh

Reinforcing mesh shall be placed in the positions shown, specified, or required to fit the work. Suitable spacing chairs or supports as specified for bars shall be furnished and placed to maintain the mesh in correct location. Where a flat surface of mesh is required, the mesh shall be rolled or otherwise straightened to make a perfectly flat surface before placing. The length of laps not indicated shall be approved by the Engineer.

W-6.08 Concrete Protection for Reinforcing Steel

Reinforcing steel shall be placed and held in position so that the concrete cover, as measured from the surface of the bar to the surface of the concrete, shall be not less than the following, except as otherwise shown, specified, or directed:

1. General

a. Concrete deposited directly against soil	- 3 inches.
b. Concrete in contact with soil or exposed to weather or sewage	- 2 inches

2. Slabs (See Item 6)

a. Top all surfaces	- 2 inches

3. Beams - Girders - Columns (See Item 6)

a. To main reinforcement	- 2 inches
b. To ties	- 1-1/2 inches

4. Walls (See Item 6)

a. 12 inches or more thick	- 2 inches
b. Less than 12 inches thick:	
(1) #6 bars or larger	- 2 inches
(2) #5 bars or smaller	- 1-1/2 inches

5. Footings and Base Slabs

a. Top face	- 3 inches
b. Sides and ends	- 3 inches

c. Bottom, Concrete deposited directly against ground - 3 inches
Concrete deposited directly against lean concrete work mat - 2 inches

6. Add 1/2 inch for surfaces contacting or exposed to water or sewage.

7. Laps - as specified in "Table 1 - Grade 60 Reinforcing Bar Splice Lapping Lengths" in the subsection headed "General."

8. Spacing - clear distance between parallel bars - 2 inches minimum.

***

SECTION 7 - CONSTRUCTION AND EXPANSION JOINTS FOR CONCRETE

W-7.01 General

Construction and expansion joints shall be placed at all locations shown. No additions, deletions, or changes in location of construction and expansion joints shall be made without the written approval of the Engineer. Construction joints shall include a formed key and shall include a water stop where shown. Expansion joints shall include a joint filler between concrete faces, and shall include a water stop, and sealant with back-up rod where shown.

Water stops in the walls shall be carried into lower slabs and shall join the water stops in the slabs. All water stops shall be continuous. Water stops shall be set accurately to the position and line shown. Edges shall be held and securely fixed in position at intervals of not more than 24 inches so that they will not move during the placing of the concrete. No nails shall be driven through the water stops.

The Contractor shall submit samples and specifications of the materials he proposes to use.

All materials shall be installed or applied in accordance with the manufacturer's recommendations, unless otherwise specified herein.

W-7.02 Water Stops

Water stops shall be made of extruded polyvinyl chloride. No reclaimed plastic material shall be used in the manufacture of the water stops. Plastic water stops shall meet the requirements of the Corps of Engineer Specification CRD-C572, except as modified herein. The Shore A/10 durometer hardness shall be between 73 and 79, the tensile strength not less than 1,850 psi, and the specific gravity not more than 1.38.

Unless otherwise shown, water stops for construction joints shall be flat, at least 6 inches wide, and not less than 3/8 inch thick at the thinnest section. The water stop shall have ribbed longitudinal strips.

Unless otherwise shown, water stops for expansion joints shall be at least 9 inches wide and not less than 1/4 inch thick at the narrowest point and not less than 3/8 inch thick immediately adjacent to the center of the water stop. The water stop shall have ribbed longitudinal strips with a 3/4-inch inside diameter hollow bulb center. The water stop shall permit a joint movement of 1/4 inch under a tensile force of not more than 500 pounds per lineal inch.

Corners and intersections for all water stops shall be prefabricated so that only butt joints need be made in the field. Field fabrication of corners and intersections requires approval of the

Engineer. Corners and intersections shall be mitered and assembled with approved equipment, as described for field joints.

Field joints shall be made by cutting the ends of the sections to be spliced so they will form a smooth even butt joint. The cut ends shall be heated with the splicing tool until the plastic melts. The two ends shall be pressed together until the plastic cools. Splicing shall cause as little damage to the continuity of the ribbed strips as possible.

W-7.03 Joint Filler for Expansion Joints

Joint filler shall be used for all expansion joints. Joint filler shall be closed cell polyethylene Sonoflex F Foam as manufactured by Sonneborn Building Products, or PVC joint filler No. 327, by A. C. Horn, or equal, of the thickness shown.

Joint filler shall be placed against the completed portion of the work before the concrete for the next section is placed. The filler shall be fastened to the hardened concrete with a compatible adhesive in accordance with manufacturer's instructions. The filler shall extend through the thickness of the wall or slab and shall be flush with the finished surface, except where a joint sealant is shown. In joints having a water stop, the filler shall be fitted accurately on each side of the water stop to prevent the intrusion of concrete.

W-7.04 Joint Sealant

Expansion joints shall be finished with a join sealant where shown or specified.

Joint sealant materials may be either a single component urethane compound meeting the requirements of Fed. Spec. TT-S-00230C, or a two-component urethane compound meeting the requirements of Fed. Spec. TT-S-00227E, except as modified herein.

The urethane sealant shall be 100 percent polymer, nonextended, containing no solvent, lime, or coal tar. Color shall be as selected by the Engineer, but shall not be black. Sealant properties shall conform to the following table:

Property	Value	Test Method
Maximum final cure (days)	3	
Tensile strength (psi)	250-400	ASTM D 412
Minimum elongation (%)	400	ASTM D 412
Modulus at 100% elongation (psi)	40-60	Fed. Spec.
Shore A hardness	30-40	Shore Durometer
Solid content (%)	98-100	
Peel strength (lb/in.)	50-60	Fed. Spec.
Minimum recovery (%)	75-85	Fed. Spec.
Initial tack-free cure (hrs.)	24-48	Fed. Spec.

The two-component sealant shall be mixed using a slotted paddle and slow speed mixer for 5 to 8 minutes, continually working paddle from top to bottom until sealant color is uniform. The side of the container and paddle blade shall be scraped down several times during the mixing operation to ensure uniform mixing.

Joint surfaces shall be properly prepared by removing all foreign matter and concrete laitance so that concrete surfaces are structurally sound, clean, dry, and free of all oil, grease, wax, waterproofing compounds, or form release materials prior to the application of primer and sealant. All concrete joint surfaces and all surfaces exposed to water shall be primed prior to sealing, with no exceptions. Priming of other surfaces shall be as recommended by the manufacturer of the sealant. The primer shall be as recommended by the manufacturer of the sealant, subject to the approval of the Engineer. Primer shall be applied by either brushing or spraying on the joint surfaces. Sealant shall be installed within 2 to 24 hours after the application of primer.

For horizontal joints, sealant may be installed by pouring directly from a suitable shaped can or by flowing from a bulk-loading gun. Vertical joints shall be filled from a gun, starting from the bottom, to avoid bridging and the formation of air voids. Overhead joints shall be filled from a gun, by laying a bead along each side of the joint and then filling the middle. Immediately after installation, sealant shall be tooled in order to establish firm contact with joint surfaces and to provide a smooth sealant surface. Method of tooling shall be in accordance with manufacturer's instructions.

Joint depth shall be controlled with the use of joint fillers and backup materials. Fillers and backup materials in contact with sealant shall be nonimpregnated and free from asphalt, creosote, oil, or extractable plasticizers. Backup material shall be closed cell polyethylene foam rod, such as Sealtight Backer Rod, Sonofoam Backer Rod, or equal, with a diameter 1/4 inch larger than the joint width. Joint widths and sealant depths shall be as shown, except that sealant depth shall not exceed 1/2 inch.

W-7.05 Unbonded Horizontal Joints

Unbonded horizontal joints shall be used as shown or required where slabs or beams must be prevented from bonding to footings, walls, columns, or other rigid parts of the structure.

Bonding shall be prevented by use of structural grade neoprene pads meeting the requirements of Section 25, Division 2 of the AASHTO Standard Specifications for Highway Bridges. The pads shall be placed over the bearing surface of the footing, wall, or other supporting part of the structure so as to isolate it from the new concrete being placed. The neoprene pads shall not be thinner than 1/4 inch.

* * *

SECTION 16 - RESTORATION OF STREET PAVEMENTS

W-16.01 General

The various street surfaces disturbed, damaged, or destroyed during the performance of the work under this Contract shall be restored and maintained as shown, specified, and directed. Included in this classification are permanent pavement surfaces of all types, pavement bases, curb, curb and gutter, alleys, driveways, and sidewalks.

The quality of workmanship and materials used in the restoration shall produce a street surface equal to or better than the condition before the work began.

Service boxes, manhole frames and covers, and similar structures not conforming to the new work shall be set to established grade at the Contractor's expense, and no separate payment will be made therefor.

All portland cement and asphaltic concrete pavements shall be removed in rectangular sections with sawed vertical cuts, or to existing joints, as directed by the Engineer. Concrete pavements shall be cut with a concrete saw. Asphaltic concrete pavements one-inch thick or greater shall be cut with a tool having a square neat edge. The edges of adjacent pavement shall be trimmed to straight lines which a roller can follow. Where reinforced concrete pavement is removed, one foot of existing reinforcement on each side of the excavation shall be left exposed and tied to the replaced reinforcing steel.

The equipment necessary for the proper performance of pavement replacement shall be on the site in satisfactory working condition and shall be subject to approval of the Engineer before the work is started.

All replaced concrete pavements shall have a minimum bearing on undisturbed earth outside the line of excavations of at least nine (9) inches.

W-16.02 Standards

The restoration of street pavement shall be performed in strict conformance with the standards relating to equipment, materials, and methods of construction of the authority having jurisdiction over the pavements, unless otherwise specified herein. Pavements to be restored are under the jurisdiction of the several agencies as follows:

1. State Highways are under the jurisdiction of the State of Florida Department of Transportation. Work on such pavements shall conform to the Department of Transportation Standard Specifications for Road and Bridge Construction.

2. City Streets are under the jurisdiction of the Department of Public Works. Work on such pavements shall conform to the Florida Department of Transportation Standard

Specifications for Road and Bridge Construction, latest edition, except that densities (including for subgrade) and other testing requirements shall follow current Department of Public Works specifications, and except that Sections 330 and 331 shall be modified as shown in this Section. The type and thickness of pavement, base and stabilization shall be as shown, specified, and directed by the Engineer.

3. County Roads are under the jurisdiction of the Manatee County Engineering Department. Work on such pavements shall conform to County specifications.

All specifications of the several agencies having jurisdiction over pavement restoration work shall be the current issue of such specifications as of the date of the "Notice to Bidders," except as specified otherwise herein.

W-16.03 Temporary Restoration

Upon completion of backfilling, the street or sidewalk surface damaged or destroyed shall be promptly placed in condition for safe temporary use. Temporary work shall be maintained in a suitable and safe condition for traffic until the permanent pavement is laid, or until final acceptance of the work.

Where the area over which existing pavement has been disturbed is to be repaved as part of an overall project by the agency having jurisdiction, any special temporary pavement replacement shall be as specified in the "Specific Provisions."

Pavement surfaces shall be temporarily restored by placing thereon, to proper line, grade and transverse profile, a layer or layers of compacted limerock conforming to all requirements regarding configuration, thickness, and density as detailed in the Plans, specified, and directed by the Engineer. When the compacted thickness of the limerock layer is greater than 6 inches, the base shall be constructed in multiple courses. Each course shall not exceed 6 inches in compacted thickness. Where the existing pavement has a permanent wearing surface, the temporary pavement shall be finished with a suitable grade of asphalt and sand to provide a temporary wearing course and to eliminate dust nuisance.

Curbs, where possible, shall be temporarily reset in place, as part of the work of temporary restoration of pavement.

Damaged or destroyed sidewalks shall be temporarily restored, immediately upon placing of the backfill, by placing a compacted layer of fine crushed limestone, choked with limestone screenings, which shall have a minimum thickness of three inches below the existing finished sidewalk grade.

The temporary pavement shall be maintained by the Contractor and all holes and depressions filled until the permanent pavement is placed.

Limerock or shell placed in areas where the existing pavement is shell, limerock, crushed stone, or other similar material and is classed as nonpermanent pavement, will not be measured for separate payment. Placement of limerock or shell as nonpermanent pavement replacement will be included for payment under the various classified Unit Price Contract Items for pipelines.

Temporary sand and asphalt wearing courses placed on limerock base on which a permanent pavement surface will be constructed shall be incidental to the permanent pavement base work, and no separate payment will be made therefor.

Limestone screenings for temporary sidewalk surface shall be incidental to sidewalk replacement, and no separate payment will be made therefor.

Limerock base placed in areas to receive a permanent pavement surface will be measured for payment under the appropriate Contract Item for permanent pavement base.

W-16.04 Preparation of Temporary Pavement for Permanent Pavement Replacement

After due notice and within the time specified, the temporary limerock pavement shall be prepared as the base to receive the new permanent pavement surface.

Prior to construction of the pavement base, the City will furnish the Contractor with the preconstruction survey notes for the streets disturbed by construction. The Contractor shall use these notes in bringing the base installed to grade allowing for the permanent pavement surface to be constructed.

The preparation of the base shall consist of bringing the area to be replaced to a grade conforming to the required grade and cross section, of uniform density, ready to receive the permanent pavement. This is to be accomplished by excavating or backfilling as needed, shaping, watering as required, or permitting to dry to proper consistency, and rolling the entire area with an approved self-propelled roller weighing not less than eight tons. Shaping and rolling shall be continued until the base has been properly prepared and shows that no further compaction of any practical benefit would result from continued rolling. The base shall be tested as to cross section, crown, and elevation. After being properly prepared, it shall be so maintained until the permanent pavement is constructed. Any part of the base area not accessible to the roller shall be thoroughly compacted by hand or by mechanical compaction in a manner acceptable to the Engineer. Preparation shall include sawing, cutting and trimming edges of existing pavements to provide a neat, uniform edge to abut the new pavement.

After completion of the base, the Contractor shall furnish the Engineer with survey notes verifying the base has been constructed to grade. Upon approval, payment will be made for permanent pavement base.

W-16.05 Certification for Limerock for Pavement Base

The Contractor shall furnish notarized certifications from all suppliers of limerock stating that all limerock supplied for use as pavement base conforms to the requirements of the applicable sections of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

W-16.06 Permanent Pavement Base Densities

Permanent base material shall be installed and compacted to the required densities (98% modified proctor) in layers not exceeding six inches.

W-16.07 Permanent Pavement Surface Restoration

Permanent restoration of pavement shall be pavement of the type and thickness detailed in the Plans, Specific Provisions, or as directed by the Engineer.

If the existing type of pavement is classified as nonpermanent pavement, the temporary restoration shall be reworked and completed and left in a condition at least equivalent to the existing nonpermanent pavement.

W-16.08 Replacement of Curb, Curb and Gutter, Sidewalk and Driveways

All permanent restoration of street curb or curb and gutter shall be of the same type and thickness as the curb or curb gutter which abuts. The grade of the restored curb and curb and gutter shall conform with the grade of the existing adjacent curb or curb and gutter.

Except as otherwise specified herein or detailed in the Plans, all permanent restoration of driveways and sidewalks shall conform to the manner of construction as originally placed and to the lines and grades as given by the Engineer. No patching of concrete driveway areas will be allowed between joints or dummy joints.

Where sidewalks are replaced, the replacement shall be the full width of the walk and minimum lengths shall be 60 inches. Restoration of adjacent lawn is incidental to sidewalk replacement, and no separate payment will be made therefor.

W-16.09 Replacement of Traffic Markings and Signalization Loops

The Contractor shall furnish all labor, equipment and materials to replace, test and maintain all traffic markings (temporary and permanent) and signalization loops removed or damaged by pipeline construction and appurtenance work as shown on the Plans, specified and directed by the Engineer.

The replacement of traffic markings (temporary and permanent), signalization loops and all appurtenant work shall be replaced by the Contractor in kind.

It shall be the Contractor's responsibility to field verify before construction begins all markings and signalization loops to be replaced.

All traffic markings and signalization loops shall conform to the Workmanship and Materials standards set forth in the latest edition of the Florida Department of Transportation Standard and Supplemental Specifications.

Payment for the replacement of temporary and permanent traffic markings, signalization loops and all appurtenant work shall be included in the unit bid price for Permanent Pavement Surface Replacement, Asphaltic Concrete, and no separate payment shall be made therefor.

W-16.10 Hot Bituminous Mixtures (Section 330) Type S Asphaltic Concrete (Section 331)

This Subsection shall Replace and/or Modify Portions of F.D.O.T. Standard Specifications for Road and Bridge Construction (1991) Sections 330 and 331.

330-10.3 Density Control

330-10.3.1 Density Control Nuclear Method:

The inplace density of each course of asphalt mix construction, with the exceptions of patching courses, leveling and intermediate courses less than 1 inch thick or a specified spread rate less than 100 pounds per square yard, overbuild courses where the minimum thickness is less than 1 inch, and open-graded friction courses, shall be determined by the use of the Nuclear Density Backscatter Method as specified by FM 1-T238 (Method B). The required density of a completed course shall be at least 95% of the job mix design laboratory density submitted by the Contractor and approved by the construction engineer or 96% of the laboratory density which results from a sample of the same day's productions and determined by the City laboratory performing all acceptance testing.

330-10.3.2 Control Strips:

Control strips may be constructed by the Contractor for the purpose of determining the necessary pattern of compacting procedures to achieve the density requirements specified. However, control strips are not used for the validity of acceptance testing.

330-10.3.3 Lots:

For the purpose of acceptance and partial payments, each day's production will be divided into lots. The standard lot size shall be 500 linear feet and consist of one sublot with its appropriate test per every 100 linear feet of any pass made by the paving train, regardless of

the width or thickness of the course being laid. Any partial lot will be redefined as a whole lot and the evaluation of it will be based on its sublot test determinations.

For the standard lot (500 linear feet), five density determinations - one for each sublot - will be made at random locations within the lot, but not to be taken within one foot of any unsupported edge.

For the Contractor to receive full payment for density, the average density of a lot will be a minimum of 95% of the submitted and approved job mix design laboratory density or 96% of the same day sampled laboratory density performed by the City laboratory performing acceptance testing. To calculate the average density of a lot, the lowest sublot test will be discarded and the remaining four sublots will be averaged. Once the average density of a lot has been determined, the Contractor will not be permitted to provide additional compaction to raise the average. The average density will be rounded off according to City standards.

330-10.3.4 Acceptance:

The completed pavement will be accepted with respect to density on a lot basis. Partial payment will be made for those lots that have an average density less than the specified 95% of the approved job mix design laboratory density or 96% of the same day sampled laboratory density based on the following table:

Revised Table 330-3
Payment Schedule for Density

Percent of Control Strip Density	Percent of Payment
95.0 (job mix design)1 or 96.0	
(lab density sample)2 & above	100
94.0 to < 95.01 or 96.02	95
Percent of Control Strip Density	Percent of Payment
93.0 to < 94.0 (Applies to both 1 & 2)	90
< 93.0 (Applies to both 1 & 2)	75

330-10.3.5 Density Requirements for Small Projects:

For projects less than 500 linear feet in length including intersections, turnouts, patches, crossings, etc., the requirements for specified densities are the same as a standard lot. For the purpose of acceptance and partial payment determination, the project less than 500 linear feet will be considered as a lot in its entirety and payment will apply accordingly with Table 330-3. The Contractor will use standard rolling procedures in 330-10.

331-5 Acceptance of the Mixture

331-5.1 General:

The bituminous mixture will be accepted at the site with respects to a gradation and asphalt content on a lot to lot basis. The material will be tested for acceptance in accordance with the provisions of 6-8.2 and the following requirements. However, any load or loads of mixture which, in the opinion of the City representative, are found unacceptable for reasons of being excessively segregated, aggregates improperly coated, or of excessively high or low temperature shall be rejected for use in the work. The composition and physical test properties for all mixes must meet the specification ranges provided in Tables 331-1 and 331-2.

A standard size lot at the site shall consist of one day's placement or equivalent to a standard quantity of 1,000 tons. The number of samples required to evaluate the lot will be divided into one or two sublots as indicated below. Testing for acceptance of the lot will be performed by the City material testing laboratory or by a licensed private testing laboratory of the City's choice. Quantities between 500 tons and 1,000 tons shall have 2 sublots; quantities between 50 tons and 500 tons shall have 1 sublot; quantities up to 50 tons will be accepted by the City representative on the basis of visual inspection.

331-5.2 Acceptance Procedures:

Sample selection for acceptance tests will be by random sampling of loaded trucks on site at the discretion of the City testing technician in accordance with FM-T168. The use of a random sample chart may be used but it is not required. Sampling shall not be taken in any of the following circumstances:

1) First load produced that day.
2) Last load produced that day.
3) Near end of quantity reached because of an underrun.

The Contractor and/or the plant quality control technician (Q.C.T.) will be notified of the time of sampling and may:

1) Observe the sampling.
2) Take a sample at the same time and run the tests.
3) Ask for a split sample and run the tests.
4) Observe the City testing technician run the tests.

The five acceptance determinations made from the sample are:

1) The % bitumen content per F.M.I. - T164.
2) The % passing the No. 4 sieve per F.M.I. - T030.
3) The % passing the No. 10 sieve per F.M.I. - T030.

4) The % passing the No. 40 sieve per F.M.I. - T030.
5) The % passing the No. 200 sieve per F.M.I. - T030.

For each acceptance sample taken, the technician will box and keep two split portions for referee tests. If the lot receives 100% payment, the referee sample will be discarded. If the lot sample shows a pay reduction, then one or both of the referee samples will be submitted for a second analysis to determine the validity of the acceptance test results. Referee samples will be tested by a licensed private laboratory of the City's choice. This second analysis will only be done at the request of the Contractor and will be paid for by the Contractor in the event that the original analysis results requiring a pay reduction is confirmed.

In the event that the second analysis does not confirm the pay reduction, the City will pay for the second analysis.

Acceptance of the mixture shall be on the basis of test results on consecutive random samples from each lot. One random sample shall be taken from each sublot. (The bituminous mixture will be sampled at the site in accordance with FM 1-T168.) The percent bitumen content of the mixture will be determined in accordance with FM 1-T164 (as modified by DOT test procedures). The percents passing the No. 4, No. 10 and No. 200 sieves will be determined in accordance with FM 1-T030.

Calculations for the acceptance test results for bitumen content and gradation (percent pass No. 4, percent pass No. 10, percent pass No. 40 and percent pass No. 200) shall be shown to the nearest hundredth (0.01). Calculations for arithmetic averages shall be carried to the thousandths (0.001) and rounded to the nearest hundredth (0.01) in accordance with the Department's rules of rounding.

When the Contractor or producer chooses to use a storage bin for mix storage overnight or longer, the material processed in this manner will be sampled and tested for acceptance after the mix has been removed from the storage bin. The City representative may reject a mix at any time that is obviously defective due to asphalt content, insufficiency of mixing, inadequacy of coating, improper proportions of fine and coarse aggregates, temperature, contamination, etc. The Contractor and/or the L.Q.C.T. will be given the option of not placing the mix and sampling the following truck, or if it has been placed, sample it. The City reserves the right to test or have the mix tested by a licensed private testing laboratory of their choice. Payment will be made on the basis of the City's revised Table 331-6 "Acceptance Schedule of Payment."

Revised Table 331-6
Acceptance Schedule of Payment
(Asphalt Plant Mix Characteristics)

Deviation of the Arithmetic Average of the
Lot Acceptance Tests from Job Mix Formula

Characteristics	Factor	One Test	Two Tests
Asphalt Cement	1.00	0.00 - 0.55	0.00 - 0.43
Content (Extraction)	0.95	0.56 - 0.65	0.44 - 0.50
	0.90	0.66 - 0.75	0.51 - 0.57
	0.80*	Over 0.75	Over 0.57
No. 4 Sieve**	1.00	0.00 - 8.00	0.00 - 5.95
	0.95	8.01 - 9.00	5.96 - 6.66
	0.90	9.01 -10.00	6.67 - 7.36
	0.80	Over 10.00	Over 7.36
No. 10 Sieve**	1.00	0.00 - 6.50	0.00 - 5.04
	0.95	6.51 - 7.50	5.05 - 5.74
	0.90	7.51 - 8.50	5.75 - 6.45
	0.80*	Over 8.50	Over 6.45
No. 40 Sieve**	1.00	0.00 - 5.50	0.00 - 4.62
	0.95	5.51 - 6.50	4.63 - 5.33
	0.90	6.51 - 7.50	5.34 - 6.04
	0.80*	Over 7.50	Over 6.04
No. 200 Sieve**	1.00	0.00 - 2.00	0.00 - 1.71
	0.95	2.01 - 2.40	1.72 - 1.99
	0.90	2.41 - 2.80	2.00 - 2.04
	0.80*	Over 2.80	Over 2.04

* If approved by the City, the Contractor may accept the indicated partial pay. The City may require removal and replacement at no cost. The Contractor has the option to remove and replace at no cost to the City at any time.

** When there are two or more reduced payments for these items in one lot of material, only the greatest reduction in payment will be applied. CAUTION: This rule applies only to these four gradation test results.

Note:

1) The No. 40 sieve applies only to Types S-I, S-II, S-III, FC-1, and FC-4.

2) Deviations are absolute value with no plus or minus signs.

* * *

SECTION 17 - LAWN REPLACEMENT

W-17.01 General

The Contractor shall replace all lawn areas which have been removed or damaged due to construction. Lawn replacement includes fine grading the areas to be restored and furnishing and placing topsoil, fertilizer, sod, sprigs, seeding, and maintaining all areas. Grassing and mulching or sodding lawn areas will be required as directed. Grassing shall be accomplished by seeding.

Sod shall be Argentine Bahia, St. Augustine, or other approved native grass sod, and shall be well matted with grass roots. It shall be sufficiently thick to secure a dense stand of live grass, with a minimum thickness of 2 inches. The sod shall be live, fresh and uninjured, and shall contain sufficient moisture at the time of planting to induce growth. The type and quality of sod shall be approved by the Engineer before placing.

W-17.02 Topsoil

Where areas are to be restored by sodding, topsoil shall be placed to a minimum compacted depth of 2 inches over the subgrade. Where areas are to be restored by grassing, topsoil shall be placed to a minimum compacted depth of 4 inches over the subgrade. All topsoil shall be suitable excavated topsoil which has been segregated or other topsoil material approved by the Engineer. Topsoil shall be free from stones, roots, sticks, or other foreign substances.

W-17.03 Water

The Contractor shall furnish at his own expense all water required for lawn replacement and maintenance of the work until final acceptance.

W-17.04 Construction Methods

Prior to sodding or grassing, the Contractor shall fine grade the subgrade to 4 inches below finished grade. Topsoil shall be spread over the subgrade to a uniform depth and density. Topsoil shall be uniformly compacted by a light hand roller weighing between 250 and 750 pounds to the specified depths for sodding or grassing.

Immediately before sodding, 14-4-14 or 15-0-15 fertilizer shall be applied at the rate of approximately 600 pounds per acre, either in the furrows or by broadcasting and raking, into the planting area. After the surface has been properly prepared, the sod shall be placed and firmly embedded by light tamping. Additionally, dolomite (lime) shall be applied at a rate of 2 tons per acre.

Immediately after the sod has been planted, if the soil does not contain sufficient moisture to ensure growth, water shall be applied twice daily for the first week, once in the morning or late evening and once at approximately 2:00 P.M. Water shall then be applied once a day over the next 2 weeks and alternating days for an additional 2 weeks. If rooting has not taken place by the end of the third week, 1 daily watering shall continue until sod is firmly rooted.

One week after the sod has been planted, a complete fertilizer with minor elements shall be applied weekly at the rate of 1# nitrogen per 1,000 square foot in a 2-1-2 or 4-1-2 formula for a period of 4 weeks, and thereafter every 2 weeks for an additional 30 days. The ground shall not be wet when the fertilizer is applied but will be immediately watered after application of the fertilizer to remove it from the leaf area.

Prior to grassing, 14-4-14 or 15-0-15 fertilizer shall be applied to the soil at the rate of approximately 300 pounds per acre. Grass seed at the specified rate per acre shall then be raked into the soil and covered with mulching material. The area shall then be thoroughly rolled with approved equipment.

After the grass has been planted, if the soil does not contain sufficient moisture to ensure growth, water shall be applied as directed by the Engineer. After the grass has started growing, fertilizer shall be applied uniformly over the area weekly, at a rate of 0.5# nitrogen and potash per 1,000 square feet, until turf covers the area. The fertilizer shall not be applied unless the surface of the ground or sod is sufficiently moist to quickly dissolve the fertilizer.

W-17.05 Caretaking

The Contractor shall keep all replaced lawn areas in good, healthy, insect free, moist condition by watering, replanting or resodding, weeding, fertilizing, and cutting as specified, and directed by the Engineer.

* * *

SECTION 20 - MAINTAINING EXISTING SANITARY SEWER IN OPERATION

W-20.01 General

It shall be the Contractor's responsibility to preserve all existing sanitary sewer services without interruption while performing the work included in this project. The Contractor shall furnish all labor, materials, and equipment required to bypass wastewater flow around the working area to an acceptable point of discharge. Also, if deemed necessary by the engineer, the contractor will be responsible to provide necessary noise suppression devices to minimize bypass pump noise.

The Contractor shall not be permitted to pump or otherwise direct the flow of sanitary sewage into storm sewers, streams, or other open channels or onto streets or alleys at any time during the course of the work.

W-20.02 Bypass Pumping

The Contractor shall submit the proposed plan to the Engineer for approval prior to proceeding with the work. All required agency approvals and permits shall be the responsibility of the Contractor. The hydraulic design of the bypass pumping arrangement shall be the sole responsibility of the Contractor.

Pumping equipment shall be of a type suitable for pumping raw unscreened sewage over an indefinite period without clogging or requiring shutdown for routine maintenance. Bypass pumping shall be continuous during the entire length of time each portion of the work is being accomplished. The Contractor shall submit drawings and equipment specifications, detailing the proposed pumping equipment and the method of installation, to the Engineer for approval.

The Contractor shall possess at least one (1) backup pump, no smaller than the largest pump in use, on site for every 1 to 3 bypass pumps in operation. An additional backup pump shall be required on site for each increment of 3 pumps in operation as illustrated on the following table:

Operating Bypass Pumps	Required Backup Pumps On Site
1 - 3	1
4 - 6	2
7 - 9	3

W-20.03 Connections

All house laterals and connections to lateral sewers shall be maintained in operation without leakage or backup during the work.

W-20.04 Street Closures

The Contractor shall be responsible for coordination of maintenance of traffic and all street closures with the City, Hillsborough County, and the State of Florida, Department of Transportation.

* * *

SECTION 27 - DEMOLITION

W-27.01 General

Demolition includes all work necessary for the removal and disposal of masonry, steel, reinforced concrete, plain concrete, wastewater equipment, piping, electrical facilities, and any other material or equipment shown or specified to be removed. Dust control shall be provided and provision made for safety.

Demolition shall be carried out in such a manner that adjacent structures, which are to remain, shall not be endangered. The work shall be scheduled so as not to interfere with the day to day operation of the existing facilities. Doorways or passageways in existing facilities shall not be blocked.

Care shall be taken to assure that concrete shall be broken and removed in reasonably small masses. Where only parts of a structure are to be removed, the concrete shall be cut along limiting lines with a specially designed saw so that damage to the remaining structure is held to a minimum.

W-27.02 Requirements Prior to Demolition

The Contractor shall visit the site and inspect all existing structures. Special care shall be taken to observe and record any defects, which may exist in buildings or structures adjacent to but not directly affected by the demolition work. Prior to commencing the demolition, the Contractor shall provide the Engineer with a copy of this inspection.

Drawings of existing structures and equipment will be available for inspection by the Contractor at the office of the Engineer and Owner.

Warning signs, protection barriers and red warning lights shall be provided as necessary adjacent to the work as approved by the Engineer and shall be maintained during the demolition period.

Demolition work shall not be undertaken until all mechanical and electrical services affected by the work have been properly disconnected. Interconnecting piping or electrical services that are to remain in service either permanently or temporarily shall be capped, rerouted or reconnected in a manner that will not interfere with the operation of the remaining facilities.

Where the presence of hazardous chemicals, gases, flammable materials or other dangerous substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

W-27.03 Requirements During Demolition

The use of explosives will not be permitted.

All mechanical and electrical equipment shall be carefully protected against dust and debris.

All debris shall be removed from the structures during demolition and not allowed to accumulate in piles.

Safe access to and egress from all working areas shall be provided at all times with adequate protection from falling material.

Adequate scaffolding, shoring, bracing and protective covering shall be provided during demolition to protect personnel and equipment against injury or damage. Floor openings not used for material drops shall be covered with material substantial enough to support any loads placed on it. The covers shall be properly secured to prevent accidental movement.

Adequate lighting shall be provided at all times during demolition.

Areas below demolition work shall be closed to workmen while removal is in progress.

No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effectively protected.

No workmen shall stand on any wall to remove material except when adequate staging or scaffold protection is provided at a distance not exceeding 12 feet below the top of such walls and other reasonable precautions are taken. Whenever a workman is required to work at a height of more than 12 feet above a floor, platform, scaffold or the ground, he shall be equipped with a safety belt with a life line attached.

W-27.04 Disposal of Materials

All debris, rubbish, scrap pieces, equipment, and materials resulting from the demolition shall become the property of the Contractor and shall be removed from the site, except for the items designated by the Engineer to be salvaged.

* * *

SECTION 77 – EROSION AND SEDIMENTATION CONTROL

PART 1 – GENERAL

1.1 WORK INCLUDED

A. Take every reasonable precaution throughout construction to prevent the erosion of soil and the sedimentation of streams or other water impoundments, ground surfaces, or other property as required by State and Local regulations.

1.2 RELATED WORK

A. Provide protective covering for disturbed areas upon suspension or completion of land-disturbing activities. Permanent vegetation shall be established at the earliest practicable time. Temporary and permanent erosion control measures shall be coordinated to assure economical, effective, and continuous erosion and siltation control throughout the construction and post construction period.

1.3 REGULATORY REQUIREMENTS

A. Prevent damage to properties outside the construction limits from siltation due to construction of the project. Assume all responsibilities to the affected property owners for correction of damages which may occur. Erosion control measures shall be performed conforming to the requirements of, and in accordance with plans approved by applicable state and local agencies and as per the erosion control portion of the construction drawings and these specifications. The Contractor shall not allow mud and debris to accumulate in the streets. Should the Contractor pump water from trenches during construction, appropriate siltation preventative measures shall be taken prior to discharge of pumped water into any storm drain or stream.

PART 2 – PRODUCTS

2.1 GENERAL

A. Open mesh biodegradable mulching cloth.

B. Fertilizer shall be 10-10-10 grade or equivalent.

C. Lime shall be Dolomitic Agricultural Ground limestone, per FDOT Section 982.

D. Provide permanent grass seed in accordance with Section 17 Lawn Replacement and Sodding.

E. Provide temporary grass seed in accordance with Section 17 Lawn Replacement and Sodding.

F. Erosion Stone: FDOT Section 530

1. Sand-Cement Riprap

2. Concrete Block

3. Rubble 20 to 300 pounds each

G. Filter Fabric for placement under Riprap shall meet the requirements of FDOT Section 985.

H. Silt fence shall be constructed per “The Florida Stormwater Erosion and Sedimentation Control Inspector’s Manual”, Chapter 4, pages 4-20 through 4-29.

MATERIALS

1. Synthetic filter fabric shall be a pervious sheet of propylene, nylon, polyester, or polyethylene yarn. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0ºF to 120ºF (-17C to 49C).

2. Burlap shall be 10 ounces per square yard (340g/m2) fabric.

3. Posts for silt fences shall be either 4 inch (10 cm) diameter wood, or 1.33 pounds per linear foot (2 kg/m) steel with a minimum length of 5 feet (1.5 m). Steele posts shall have projections for fastening wire to them.

4. Stakes for filter barriers shall be 1” x 2” (2.5 x 5 cm) wood (preferred), or equivalent metal with a minimum length of 3 feet (90 cm).

5. Wire fence reinforcement for silt fences using standard strength filter cloth shall be a minimum of 36 inches (90 cm) in height, a minimum of 14 gauge and shall have a maximum mesh spacing of 6 inches (15 cm).

I. Floating Turbidity Barriers shall be constructed per “The Florida Stormwater Erosion and Sedimentation Control Inspector’s manual,” Chapter 4, pages 4-111 through 4-119.

MATERIALS

1. Barriers should be a bright color (yellow or “international” orange are recommended) that will attract the attention of nearby boaters.

2. The curtain fabric must meet the minimum requirements noted in Paragraph H.1 above.

3. Seams in the fabric shall be either vulcanized welded or sewn, and shall develop the full strength of the fabric.

4. Floatation devices shall be flexible, buoyant units contained in an individual floatation sleeve or collar attached to the curtain. Buoyancy provided by the floatation units shall be sufficient to support the weight of the curtain and maintain a freeboard of at least 2 inches (8 cm) above the water surface level.

5. Load lines must be fabricated into the bottom of all floating turbidity curtains. Type II and Type III must have load lines also fabricated into the top of the fabric. The top load line shall consist of woven webbing or vinyl-sheathed steel cable and shall have a break strength in excess of 10,000 pounds. The supplemental (bottom) load-line shall consist of a chain incorporated into the bottom hem of the curtain of sufficient weight to serve as ballast to hold the curtain in a vertical position. Additional anchorage shall be provided as necessary. The load lines shall have suitable connecting devices which develop the full breaking strength for connecting to load lines in adjacent sections.

6. External anchors may consist of 2 x 4 inch (5 x 10 cm) or 2-1/2 inch (6 cm) minimum diameter wooden stakes, or 1.33 pounds/linear foot (2 kg/m) steel posts when Type I installation is used; when Type II or Type III installations are used, bottom anchors should be used.

7. Bottom anchors must be sufficient to hold the curtain in the same position relative to the bottom of the watercourse without interfering with the action of the curtain. The anchor may dig into the bottom (grappling hook, plow or fluke-type) or may be weighted (mushroom type) and should be attached to a floating anchor buoy via an anchor line. The anchor line would then run from the buoy to the top load line of the curtain. When used with Type III installations, these lines must contain enough slack to allow the buoy and curtain to float freely with tidal changes without pulling the buoy or curtain down and must be checked regularly to make sure they do not become entangled with debris. Anchor spacing will vary with current velocity and expected wind and wave action; manufacturer’s recommendations should be followed.

PART 3 – EXECUTION

3.1 CLEARING

A. Clearing and grubbing shall be scheduled and performed in such a manner that subsequent grading operation and erosion control practices can follow immediately thereafter. Excavation, borrow, and embankment operations will be conducted as a continuous operation. All construction areas not otherwise protected shall be planted with permanent vegetative cover within 30 working days after completion of active construction.

3.2 STABILIZING

A. The angle for graded slopes and fills shall be no greater than the angle which can be retained by vegetative cover or other adequate erosion control devices or structures. All disturbed areas outside of embankment left exposed will, within 30 working days of completion of any phase of grading, be planted or otherwise provided with either temporary or permanent ground cover, devices, or structures sufficient to restrain erosion.

3.3 REGULATORY REQUIREMENTS

A. Whenever land disturbing activity is undertaken on a tract, a ground cover sufficient to restrain erosion must be planted or otherwise provided within 30 working days on that portion of the tract upon which further active construction is to be undertaken.

B. If any earthwork is to be suspended for any reason whatsoever for longer than 30 calendar days, the areas involved shall be seeded with vegetative cover or otherwise protected against excessive erosion during the suspension period. Suspension of work in any area of operation does not relieve the Contractor of the responsibility for the control of erosion in that area.

PART 4 - CONSTRUCTION PHASE

4.1 PRACTICES

A. Avoid dumping soil or sediment into any stream bed or watercourse.

B. Maintain an undisturbed vegetative buffer where possible between a natural watercourse and trenching and grading operations.

C. Avoid equipment crossings of streams, creeks, and ditches where practicable.

PART 5 - SEDIMENT CONTROL FEATURES

5.1 GENERAL

A. All devices (silt fences, retention areas, etc.), for sediment control shall be constructed at the locations indicated prior to beginning excavation on the site. All devices shall be properly maintained in place until a structure or paving makes the device unnecessary or until directed to permanently remove the device.

5.2 DESIGN APPLICATIONS

A. Mulch shall be used for temporary stabilization of areas subject to excessive erosion, and for protection of seed beds after planting where required.

B. Silt fences shall be used as shown on the plans to restrict movement of sediment from the site. Silt fence shall be installed prior to commencement of grading.

C. Establish vegetative cover on all unpaved areas disturbed by the work.

1. Preparation of Seedbed. Areas to be seeded shall be scarified a depth of four inches until a firm, well pulverized, uniform seedbed is prepared. Fertilizer shall be applied during the scarification process in accordance with the following rates.

    a. Fertilizer - 10 to 15 pounds per 1,000 square feet

2. Seeding. Disturbed areas along embankments shall be permanently seeded with mix specified in Section 17 Lawn Replacement and Sodding.

3. Mulch all areas immediately after seeding. Mulch shall be applied and anchored as specified herein before.

5.3 MAINTENANCE

A. Maintain all temporary and permanent erosion control measures in functioning order. Temporary structures shall be maintained until such time as vegetation is firmly established and grassed areas shall be maintained until completion of the project. Areas which fail to show a suitable stand of grass or which are damaged by erosion shall be immediately repaired.

5.4 REMOVAL OF SEDIMENT CONTROL DEVICES

A. Near completion of the project, when directed by the Owner's agent, the Contractor shall dismantle and remove the temporary devices used for sediment control during construction. All erosion control devices in seeded areas shall be left in place until

the grass is established. Seed areas around devices and mulch after removing or filling temporary control devices.

***

SECTION 113 - DISPOSAL OF DEBRIS

W-113.01 General

The Contractor shall furnish all labor, materials, and equipment required to transport and dispose of debris removed from all pipelines and structures. Debris shall be defined as all material existing in the pipeline for which removal is required to provide a clean pipeline.

W-113.02 Scope of Work

Within 30 days after the completion of the work, the Contractor will be responsible for hauling the stored debris to an approved disposal site. Final payment will not be issued until the debris is entirely removed from the temporary storage area. The Contractor shall also be responsible for providing all equipment required for dumping and collecting debris at the temporary storage area. In addition, the Contractor will have the following responsibilities:

a. Be solely responsible to handle, transport, test, permit, and dispose of debris in accordance with all applicable regulatory requirements.

b. For transportation between project site and disposal site.

c. To apply for, pay fees, and obtain all required environmental or transportation permits prior to handling debris. Permitting agencies include, but are not limited to, EPA, DER, DOT, Hillsborough County, and City.

d. To perform all necessary tests as required by permit and all applicable regulatory requirements.

e. To select a disposal site and acquire approval from the disposal site owner for disposal of debris. The Contractor is responsible to pay all applicable disposal fees.

* * *

SECTION 116 - TREE REMOVAL

W-116.01 General

This section covers removal of diseased, dead, or dangerous trees, frequently requiring a crane or rope assistance in lowering of sections, in right-of-ways, alleyways, and other selected areas in order to allow access to facilities by maintenance personnel and provide safe working conditions.

A tree will be removed whenever it is suffering degradation from disease or damage which makes it dangerous or unsightly or when conditions exist which pose a present or probable danger to vehicles, homes and structures, or pedestrians. Trees will also be removed when they obstruct maintenance personnel access or operations. Protected tree species will only be removed when absolutely necessary and after approval from the Parks Director or his representative. Permit acquisition is mandatory.

Safety standards and work procedures shall be in accordance with ANSI Z133.1-1988.

W-116.02 Work Orders

The Contractor will remove trees at various locations within the City service area as identified by Work Orders. The work program is generally non-systematic.

The work must be performed in accordance with industry standard arboricultural practices in compliance with ANSI and will be inspected by appropriate City staff when completed, prior to payment.

The Work Orders will be initiated by DSS, DPW, or the Water Department, and trees earmarked for removal will be designated with a green, upward pointing arrow spray painted on the tree.

The Contractor is responsible for cost of damages caused by unauthorized tree removal. Authorization is only given by a combination of Work Order and an Upward Pointing Green Arrow spray painted on the trunk of the tree as a field designation. Cost of damages will be assessed according to International Society of Arboriculture standards (ISA), Guide for Establishing Value of Trees and Other Plants, 6th Edition.

W-116.03 Permits

The Contractor is responsible for obtaining all removal permits. Permit fees will be waived by the City. Permits must be obtained by the Contractor prior to conducting work.

Where trees are in proximity to power lines, the Contractor is responsible for coordinating work through TECO. The Contractor must comply with ANSI standards and maintain a minimum of ten (10) feet from electrical conductors.

W-116.04 Response Time

The Contractor must be available to service emergency calls (e.g., trees down in the street, etc.) seven (7) days a week, twenty-four (24) hours a day. Response time for emergencies must be within one (1) hour.

Mandatory Contractor responsibility and completion time will be seventy-two (72) hours per standard Work Order and twenty-four (24) hours (fully completed work) per emergency. A contact person and phone number must be identified at all times.

Liquidated damages will be imposed for work not completed or not completed on time.

The Contractor is responsible for all damage to other trees, homes and structures, utilities, sidewalks, streets, and any other damages caused as a result of the tree removal activity at the work site.

W-116.05 Equipment

The Contractor must own or have means to rent heavy equipment necessary in conducting described tree activities, e.g., crane, bucket trucks, dump trucks, etc. Proof of credit line or other financial means may be required.

W-116.06 Procedures

The Contractor shall be responsible to erect, place, and maintain barricades and warning signs, and clear the area of pedestrians and vehicles to ensure public safety and avoid property damage.

Small and medium sized branches shall be trimmed to thin the tree. Lower laterals shall then be trimmed and lowered. The main trunk shall be removed leaving a stump not more than six inches above grade. The work site shall then be cleaned of all debris.

* * *

SECTION 160 – STABILIZING

W-160.01 Description

The work specified in this Section consists of the stabilizing of designated portions of the roadbed to provide a firm and unyielding subgrade, having the required bearing value specified in the plans. When so called for in the plans this work shall also include the additional strengthening of the subbase, by additional stabilizing of the upper portion of the previously stabilized subgrade, within the limits called for. The work shall be constructed in accordance with these specifications and the lines, grades, thicknesses, and notes shown in the plans.

W-160.02 Stabilized Subgrade

For stabilized subgrade the type of materials, Commercial or Local, is at the Contractor's option and no separate payment for stabilizing materials will be made (other than as may be paid for as borrow).

When the stabilizing is designated as Type B, compliance with the bearing value requirements will be determined by the Limerock Bearing Ratio Method. When the stabilizing is designated as Type C, compliance will be determined by the Florida Soil Bearing Test.

It is the Contractor's responsibility that the finished roadbed section meets the bearing value requirements, regardless of the quantity of stabilizing materials necessary to be added. Also, full payment will be made for any areas where the existing subgrade materials meet the design bearing value requirements without the addition of stabilizing additives, as well as areas where the Contractor may elect to place select high-bearing materials from other sources, within the limits of the stabilizing.

After the roadbed grading operations have been substantially completed, the Contractor shall make his own determination as to the quantity (if any) of stabilizing material, of the type selected by him, necessary for compliance with the bearing value requirements. The Contractor shall notify the Engineer of the approximate quantity to be added, and the spreading and mixing-in of such quantity of materials shall meet the approval of the Engineer as to uniformity and effectiveness.

W-160.03 Stabilized Subbase

When Stabilized Subbase is called for, after the mixing operations for the stabilization of the entire subgrade limits, the upper portion of the subgrade, within the limits shown, shall be further strengthened by the adding and mixing-in of a loose depth of commercial stabilizing material as designated in the plans or as may be otherwise designated by the Engineer. The minimum depth of spread shall be three inches (loose measurement).

W-160.04 Materials

160.04-1 Commercial and Local Materials: The particular type of stabilizing material to be used shall meet the requirements of Section 914 of the D.O.T. Standard Specifications for Road and Bridge Construction.

160.04-2 Use of Materials from Existing Base: When the utilization of materials from an existing base is called for, (as all, or a portion, of the stabilizing additives) the Engineer will direct the locations, placing and distribution of such materials, and this work shall be done prior to the spreading of any additional commercial or local materials. Removal of any section of existing base will not be required until the need for it in maintaining traffic is fulfilled. No materials from an existing base will be eligible for payment as Commercial Materials.

The utilization of materials from an existing base may be called for in combination with either of the designated types of stabilizing.

W-160.05 Construction Methods

160.05-1 General: Prior to the beginning of stabilizing operations, the area to be stabilized shall have been constructed to an elevation such that upon completion of stabilizing operations the completed stabilized subgrade will conform to the lines, grades, and cross section shown in the plans. Prior to the spreading of any additive stabilizing material, the surface of the roadbed shall be brought to a plane approximately parallel to the place of the proposed finished surface.

The subgrade to be stabilized may be processed in one course, unless the equipment and methods being used do not provide the required uniformity, particle size limitation, compaction and other desired results, in which case, the Engineer will direct that the processing be done in more than one course.

160.05-2 Application of Stabilizing Material: When additive stabilizing materials are required, the designated quantity shall be spread uniformly over the area to be stabilized.

When materials from an existing base are to be utilized in the stabilizing at a particular location, all of such materials shall be placed and spread prior to the addition of other stabilizing additives.

Commercial stabilizing material shall be spread by the use of mechanical material spreaders except that where use of such equipment is not practicable other means of spreading may be used, but only upon written approval of the proposed alternate method.

160.05-3 Mixing: The mixing shall be done with rotary tillers, or other equipment meeting the approval of the Engineer. At the Contractor's election, the mixing of the materials may be accomplished in a plant of an approved type suitable for this work. The area to be

stabilized shall be thoroughly mixed throughout the entire depth and width of the stabilizing limits.

The mixing operations, as specified, (either in place or in a plant) will be required regardless of whether the existing soil, or any select soils placed within the limits of the stabilized sections, have the required bearing value without the addition of stabilizing materials.

As an exception to the above mixing requirements, where the subgrade is of rock, the Engineer may direct that the mixing operations (and the work of stabilizing) be waived and no payment for stabilization will be made for such sections of the roadway.

160.05-4 Maximum Particle Size of Mixed Materials: At the completion of mixing, all particles of material within the limits of the area to be stabilized shall pass a 3_-inch ring. Any particles not meeting this requirement shall be removed from the stabilized area or shall be broken down so as to meet this requirement.

160.05-5 Compaction: Except where a stabilized subbase is also to be constructed (as specified in W-160.06), after the mixing operations have been completed and requirements for bearing value, uniformity, and particle size have been satisfied, the stabilized area shall be compacted, in accordance with W-160.08. The materials shall be compacted at a moisture content permitting the specified compaction. If the moisture content of the material is improper for attaining the specified density, either water shall be added or the material shall be permitted to dry until the proper moisture content for the specified compaction is reached.

160.05-6 Finish Grading: The completed stabilized subgrade shall be shaped to conform with the finished lines, grades, and cross section indicated in the plans. The subgrade shall be checked by the use of elevation stakes, or other means approved by the Engineer.

160.05-7 Requirements for Condition of Completed Subgrade: After the stabilizing and compacting operations have been completed, the subgrade shall be firm and substantially unyielding, to the extent that it will support construction equipment and will have the bearing value required by the plans.

All soft and yielding material, and any other portions of the subgrade which will not compact readily, shall be removed and replaced with suitable material and the whole subgrade brought to line and grade, with proper allowance for subsequent compaction.

160.05-8 Maintenance of Completed Subgrade: After the subgrade has been completed as specified above, the Contractor shall maintain it free from ruts, depressions, and any damage resulting from the hauling or handling of materials, equipment, tools, etc. It shall be the Contractor's responsibility to maintain the required density until the subsequent base or pavement is in place. Such responsibility shall include any repairs, replacement, etc., of curb and gutter, sidewalk, etc, which might become necessary in order to recompact the subgrade in the event of underwash or other damage occurring to the previously compacted subgrade. Any

such work required for recompaction shall be at the Contractor's expense. Ditches and drains shall be constructed and maintained along the completed subgrade section.

W-160.06 Stabilized Subbase (Additional Strengthening of Upper Portion)

When a stabilized subbase is to be constructed in conjunction with the stabilization operations, after the mixing of the stabilization area as specified in 160.05-3, and determination that the bearing value requirements specified in 160.07 have been met, the area over which the stabilized subbase is to be constructed shall be shaped as provided in 160.05-1 and compacted sufficiently to provide a firm surface for the operations to follow. The amount of commercial stabilizing material specified in 160.03 for this operation shall be spread in accordance with 160.05-2 and mixed to the depth indicated in the plans, in accordance with 160.05-3. A tolerance of one inch in excess of the plan depth will be allowed in this mixing. No additional tests for bearing value will be made after the mixing of materials for the Stabilized Subbase.

The operations of compaction and of finish grading, as specified in 160.05-5 and 160.05-6, shall then be performed, and the provisions of 160.05-4, 160.05-7, and 160.05-8 shall apply to this work.

When commercial materials are used as the stabilizing additives for the initial subgrade stabilization, the work of Stabilized Subbase may be eliminated, at the direction of the Engineer, either entirely or in designated sections of the overall limits for this work as may be called for in the plans.

W-160.07 Bearing Value Requirements

160.07-1 General: Bearing value samples will be obtained and tested by the Engineer at completion of satisfactory mixing of the stabilized area. For any area where the bearing value obtained is deficient from the value indicated in the plans, in excess of the tolerances established herein, additional stabilizing material shall be spread and mixed in accordance with 160.05-3. This reprocessing shall be done for the full width of the roadway being stabilized and longitudinally for a distance of 50 feet beyond the limits of the area in which the bearing value is deficient.

The Contractor shall make his own determination of the quantity of additional stabilizing material to be used in reprocessing.

160.07-2 Tolerances in Bearing Value Requirements: The following undertolerances from the specified bearing value will be allowed as based on tests performed on samples obtained after mixing operations have been completed:

Specified Bearing Value	Undertolerance
FBV 75	5.0

For tests performed relative to work conducted in F.D.O.T. right-of-way, the bearing value shall be as specified in the F.D.O.T. Standard Specifications for road and Bridge construction, 1991 Edition.

W-160.08 Density Requirements

160.08-1 General: Within the entire limits of the width and depth of the areas to be stabilized (other than as provided in 160.08-2), the minimum density acceptable at any location will be 98 percent of the maximum density as determined by AASHTO T 180. When bearing value determinations are made by the Florida Soil Bearing Test, Test Method C of AASHTO T 180 will be used and when bearing value determinations are made by the Limerock Bearing Ratio Method, Test Method D of AASHTO T 180 (as modified by the Department's Research Bulletin 22-B, Revised April 1972) will be used.

160.08-2 Exceptions to Density Requirements: Attainment of the minimum density specified in 160.08-1 is not required under this Section within the following limits:

(a) The width and depth of areas which are to be subsequently incorporated into a base course under the same contract.

(b) The upper six inches of areas to be grassed under the same contract.

These areas shall be compacted to a reasonably firm condition as directed by the Engineer.

* * *

SECTION 345 - PORTLAND CEMENT CONCRETE

W-345.01 General

This section specifies the requirements for the materials for all classes of concrete, and includes methods and equipment for the handling and storing of the materials and the mixing and transporting of the concrete to the site.

The concrete shall be composed of a mixture of portland cement, fine aggregate, coarse aggregate and water and, where specified or allowed by the specifications, shall include approved admixtures.

Unless written permission is obtained, coarse aggregate of different types shall not be mixed; used alternately in sections of concrete pavement less than one mile in length; nor shall coarse aggregates of different types be used in any one continuous pour.

W-345.02 Types of Cement to be Used

Unless the particular type of cement is designated in the plans or special provisions, either Type I, Type I-S, or Type II portland cement may be used for any class of concrete. Type III cement may be used in all concrete (except for composite concrete and steel piles) provided that a retardant admixture is used in concrete for bridge decks and for cement concrete pavement.

Type I-P cement will be allowed as an alternate to Type I in all classes of concrete and soil-cement work subject to the following conditions:

(a) Type I-P Portland Pozzolan Cement shall meet the requirements of ASTM C 595 except that the pozzolan constituent (fly ash) shall not exceed 20 percent by weight.

(b) The pozzolan shall conform to ASTM C 618, Type C or Type F, except that the loss on ignition for Type F shall not exceed six percent.

(c) The Contractor shall assume full responsibility for obtaining concrete having the minimum strength requirements set forth in the specifications.

Fly ash may be used to replace up to 20 percent by weight of the cement content in all classes of concrete where Type I, Type II, or Type III cement is used, in accordance with the following conditions:

(a) The fly ash shall conform to ASTM C 618, Type C or Type F, except that the loss on ignition for Type F shall not exceed six percent.

(b) Fly ash will not be permitted with Type I-S cement.

(c) The Contractor shall assume full responsibility for obtaining concrete having the minimum strength requirements set forth in the specifications.

Fly ash may be used to replace not more than 20 percent by weight of the cement used in concrete pavement.

W-345.03 Classification of Concrete

The separate classifications of concrete prepared under these specifications are designated herein as Classes I through IV, in accordance with the intended use and the proportions, strength, and other requirements.

Locations of Use of Each Class

(a) Class I concrete shall be used for cement concrete pavement (both plain and reinforced) and for headwalls, curb and gutter, valley gutter, slope pavement, ditch pavement, pipe endwalls, and other miscellaneous concrete items which are not structurally reinforced.

(b) Class II concrete shall be used for bridge concrete and box culverts, except where Class III or Class IV is specifically required for such uses, as specified below. Class II shall also be used at other locations as may be specifically called for in the plans or in the special provisions.

(c) Class III concrete is required for the following uses:

(1) For prestressed members.
(2) For concrete piles of all types.
(3) For seal concrete in foundation areas where the concrete must be placed under water and the foundation cannot be dewatered before the concrete is placed.
(4) For bridge concrete and other work where specifically required by the plans.

(d) Class IV concrete shall be used for all concrete (except seal concrete) placed in a location which is in or over salt or brackish water, and elsewhere as may be specifically called for in the plans.

High Early Strength Concrete

High early strength concrete is determined under either of the two following criteria:

(a) Any class concrete may be converted to high early strength concrete by using Type III portland cement in accordance with the master proportion table subject to restrictions in use as outlined in 345.02.

(b) When approved, a higher class (greater strength) concrete may be substituted for a lower class (less strength) concrete, in which case the higher class concrete substituted will be considered high early strength concrete for that application as follows:

(1) Class IV (minimum required strength 5,500 psi) when substituted for Classes II and I.
(2) Class III when substituted for Classes II and I.
(3) Class II when substituted for Class I.
(4) Class IV concrete (minimum required strength 5,500 psi) when substituted as high early strength concrete for Class IV concrete (minimum required strength 3,400 psi).

W-345.04 Composition of Concrete

Master Proportion Table

Concrete Placing	Grade of Coarse Aggregate (*a)	Water Cement Ratio (lbs/lb) (*e)	Minimum Cement Factor Lbs per Cubic Yard of Concrete	Slump Range (inches) Non-Vibrated	Slump Range (inches) Vibrated Placing
I	(*b)357 or 57	0.55	508	0-6	(*d)0-3½
II	57	(*f)0.49	564	3-5	0-3½
III	(*g) 57	0.50	611	(*c)7-9	0-3½
IV	(*g) 57	0.41	658	Not Applicable	0-3½

(*a) When requested by the Contractor and approved by the Engineer, Grade 7 aggregate may be used as a substitute for Grade 57, in any mix design for the concrete which is heavily reinforced, when shrinkage does not cause cracking and is not a detrimental factor in the function of the concrete element. Grade 89 coarse aggregate may be substituted in the design mix for concrete which is to be slip formed when requested by the Contractor and approved.

(*b) Grade 357 aggregate shall be used only in Class I concrete for use in concrete pavement.

(*c) Slump range is applicable only when used as seal concrete.

(*d) When the slip-form paver is used, the consistency of the concrete shall be such that there will be no slumping at the edge of the concrete after the forms have passed. Extreme care shall be taken to assume uniformity of the batches, with respect to materials, moisture content, consistency, and mixing time.

(*e) When Type III cement is used in non-vibrated mixtures, an increase in the maximum water of 0.03 pound per pound of cement may be required. (Not applicable for Class IV concrete.) The water/cement ratio shall be 0.44 per pound for bridge deck construction.

(*f) For counterweight concrete and non-vibrated concrete mixes, the maximum water/cement ratio shall be increased to 0.56 pound per pound.

(*g) Grade 67 coarse aggregate may be used in Class III and Class IV at the Contractor's option.

Actual Proportions to be Used

The Contractor will be required to designate the actual proportions to be used, in order to produce a concrete of the strength required as specified in 345.08.

Prior to mixing any concrete, the Contractor shall submit his design mix for approval, and only mixes approved by the Engineer shall be incorporated into the work.

The City will exercise control over the concrete by rigid inspection of the consistency, yield and strength of the concrete, and of the air content, where applicable.

W-345.05 Certification (For Ready-Mixed Concrete)

The manufacturer of concrete shall furnish to the Engineer with each batch of concrete before unloading at the site, a delivery ticket on which is printed, stamped or written, the following information:

(1) Name of ready-mix batch plant.
(2) Serial number of ticket.
(3) Date and truck number.
(4) Name of contractor.
(5) Job number.
(6) Specific class or designation of concrete.
(7) Quantity of concrete (cubic Yards).
(8) Time loaded, or of first mixing of cement and aggregates.

(9) Water added by receiver of concrete (if any), and his initials.
(10) Type and name of admixture, and amount of same.
(11) Mixing time, or reading of revolution counter at beginning and end of mixing period.
(12) Signature or initials of ready-mix representative.
(13) Type and brand of cement.
(14) Amount of cement.
(15) Total water content by producer (or W/C ratio).
(16) Maximum size of aggregate.
(17) Weight of fine and of coarse aggregate.
(18) Indication that all ingredients and mix proportions are certified as being previously approved.

W-345.06 Chloride Content

Chloride content for all concrete to be used for the construction of prestressed members for coastal salt water crossings and corrosive environments shall not exceed 0.40 pound of chloride per cubic yard of concrete. The chloride content shall be determined as the average of three tests on samples taken from the concrete. The range of results of the three tests shall not exceed 0.15 pound of chloride per cubic yard of concrete for a valid determination of chloride content. When test results are outside the 0.15 pound of chloride per cubic yard allowable range, an additional three tests shall be run until the test results are within the required range. Samples may be obtained from representative concrete cylinders or cores tested for compressive strength. However, if the cylinders or cores have been exposed to a salt or corrosive environment, the outer one-inch surface shall be discarded.

Chloride content shall be determined by the Florida Department of Transportation Method for Determining Low-Levels of Chloride in Concrete and Raw Materials as outlined in FDOT Research Report No. 203 and FDOT Corrosion Report No. 78-1.

The frequency of chloride content determinations made in accordance with these specifications and approved procedures shall be as follows:

(a) When the chloride content is 0.20 pound of chloride per cubic yard or less, subsequent tests shall be made on a frequency of not less than one for every 4 weeks of pouring as long as the test values remain at or below 0.20 pound of chloride per cubic yard.

(b) When the chloride content is in the range from 0.20 to 0.30 pound of chloride per cubic yard, subsequent tests shall be made on a frequency of not less than one for every two weeks of pouring as long as test values remain at or below 0.30 pound of chloride per cubic yard.

(c) When the chloride content is greater than 0.30 pound per cubic yard, subsequent chloride content tests shall be made at the same frequency that concrete test cylinders are made for strength determination.

For any case listed above, when the source of any component material for the concrete is changed or when the design mix is altered, a chloride content determination test shall be made immediately when the change is made.

Test results taken at the frequency provided above shall represent the amount of chloride per cubic yard in all members cast, subsequent to the immediate preceding test for determination of chloride content.

Chloride determination shall be made by the Contractor, who will certify the chloride content for each structural member. The certification must show all pertinent data as required by the Engineer. Properly executed certificates showing the chloride content within the required limits will be required for acceptance of any prestressed member constructed under these specifications. The City reserves the right to monitor the chloride content through tests on samples obtained by its own personnel.

The Contractor shall determine the chloride content of the component concrete materials (excluding admixtures for concrete) and provide this information to the Engineer when he submits his mix design. Design mixes will not be approved when the sum of chloride content of component materials indicate that the concrete mix derived from those materials will have a chloride content exceeding 0.40 pound per cubic yard of concrete.

W-345.07 Admixtures

Air-entraining Admixtures

Air-entraining admixtures will be required in all paving concrete and in all structural concrete except counterweight concrete. The amount of air entrained shall be from three to six percent. Air entrainment shall be produced by the addition of the air-entraining admixture to the mixing water, during batching. Air-entraining cement will not be permitted. The amount of the admixture to be used per batch shall be determined in the field by trial.

Retardants

Unless specifically shown otherwise in the plans or in the special provisions, the use of retardants for the various classes of concrete shall be as follows:

(a) Classes I and II concrete may be used with or without a retardant.

(b) For Classes III and IV concrete, a retardant is required.

(c) A subaqueous retarding plasticizer shall be added to seal concrete. One-half pound per bag of cement shall be added for the concrete in the bottom one-half of the seal and one-quarter pound per bag of cement shall be added for the concrete in the top one-half of the seal. The type plasticizer shall be approved by the Engineer.

When retardant admixtures are used, they also shall be added with the mixing water.

High Range Water Reducer Admixtures

The Contractor may propose the use of approved High Range Water Reducer (HRWR) admixture either Type F or Type G. The proposal to use HRWR for precast items shall include a list of precast items for which it is proposed. The Contractor may also propose the use of HRWR for cast-in-place concrete. The proposal to use HRWR for cast-in-place concrete shall include a detailed listing of the uses (area, locations, elements, etc.) for which its use is proposed and the anticipated benefits to be derived from the use of HRWR in each instance.

Value Engineering credits or other price adjustments will not be considered for proposals to utilize HRWR in order to reduce the specified minimum cement requirements for the various classes of concrete.

The Contractor's proposal to use HRWR in concrete shall include the following:

(a) A certification from the HRWR supplier that the HRWR admixture proposed meets the requirements of ASTM C 494, Type F or G. The certificate shall state that the one-year tests representing the admixture to be supplied have been performed by an independent laboratory approved by the Cement and Concrete Reference Laboratory and records of such tests will be furnished to the Engineer on request. The certification shall also include an additional statement from the HRWR supplier or an approved independent testing laboratory that the proposed HRWR admixture is compatible with all other admixtures to be included in the concrete design mix.

(b) When HRWR admixture is proposed for use in the design mix, the Contractor shall propose for approval a target slump value with a target range value of ± 1½ inches. The target slump shall not exceed 6½ inches. All other control requirements and ranges, other than slump, contained in Section 345 shall remain unchanged.

(c) Design mix approval request for each class of concrete for which HRWR is proposed shall be submitted to the Engineer with all confirming data for approval. Confirming data shall include all details of the design mix ingredients, all required certificates from the supplier and independent testing laboratory and a certificate from the witnessing Engineer that the Contractor has demonstrated through production and placement of at least ten batches that concrete containing HRWR has been produced meeting all test requirements, that the HRWR concrete has been

satisfactorily mixed in accordance with the Contractor's proposed methods and sequences, and that the concrete was acceptably placed, consolidated, and cured.

Before any design mix is approved by the Engineer, the Contractor shall demonstrate through production of at least ten (three cubic yard minimum size) batches of concrete containing the HRWR that his concrete plant can produce concrete consistently meeting specified slump, air content, and compressive strength requirements. Disposal, and the cost therefore, of concrete produced for demonstration purposes is a Contractor's obligation. Subject to approval of the Engineer, this concrete may be incorporated into unreinforced concrete items such as curb and gutter, sidewalk, gravity retaining walls, roadway concrete barrier walls, etc. The Contractor shall also demonstrate to the witnessing Engineer that the concrete containing the HRWR admixture in accordance with his proposed design mixes can be placed, consolidated, and finished under conditions existing for the proposed uses.

The design mixes shall each include descriptions of methods, sequences, times, and places that HRWR will be introduced into the concrete mix for each proposed use. Methods, sequences, times, and places for introduction for HRWR shall be adjusted to suit the requirements for each proposed use and condition. Design mixes including HRWR may be transferable based on demonstrated ability of the mix to perform its intended function.

Consideration of submitted design mixes for approval will begin when the Engineer has received certification from the witnessing Engineer that the Contractor has demonstrated that he can produce concrete containing HRWR admixture in conformance with his proposed design mixes meeting minimum strength requirements within specified ranges for slump and air and placed, consolidated, and finished under conditions existing for the uses proposed. In addition, the certification shall include the test values of the slump, air, and 28-day strength tests for all demonstration batches of concrete and an evaluation and description of the Contractor's actual sequences, methods, and time required for the placement and consolidation of each batch of concrete. The certification shall also include the witnessing Engineer's evaluation of the appearance, apparent consolidation, and finish texture after form removal of each item cast.

Except for casting unreinforced concrete items approved by the Engineer for demonstration, no concrete containing HRWR admixture shall be produced and placed for payment under contract pay items until design mixes containing HRWR have been approved. To qualify for payment under contract pay items, unreinforced demonstration concrete, cast with the approval of the Engineer, shall meet minimum strength and entrained air requirements contained in these specifications and the slump shall be within 1½ inches of the target slump proposed by the Contractor.

Types of Admixtures to be Used

The Contractor shall designate in advance the particular type and product of admixtures he proposed to use and only such admixtures as are approved by the Engineer shall be

incorporated into the concrete. Admixtures designated by the Contractor shall be compatible to all other components of the concrete.

W-345.08 Required Strength of Concrete

Except as may be modified in the plans or special provisions, the required minimum 28-day compressive strength for the various classes of concrete shall be as follows:

Class I . . . . . (*a) 2,500 psi
Class II. . . . . 3,400 psi
Class III . . . . . (*c) 5,000 psi
Class IV. . . . . (*b) 3,400 psi

(*a) When used for cement concrete sidewalks and pavement, for curb and gutter, valley or special gutter, median or other type curb, and for culvert headwalls and outfall structures, inlets, manholes, junction boxes or other minor drainage structures, Class I concrete shall have a minimum strength of 3,000 psi. This does not apply to concrete used for pipe encasement, collars, fill or ballast concrete or other concrete items where the plans specify or conditions justify a 2,500 psi mixture.

(*b) When used for prestressed members, Class IV concrete shall have a minimum strength of 5,500 psi.

(*c) No minimum strength is required when Class III concrete is used as seal concrete.

In the event that the proportions of the concrete mixture designated by the Contractor, in accordance with 345.04 above, do not produce concrete of the desired strength, the Contractor shall adjust the mix accordingly in order to obtain the required strength, and at no additional cost to the City.

W-345.09 Concrete Failing to Meet Strength Requirements

For concrete which has been mixed and placed in accordance with these specifications, and which fails to meet the minimum 28-day strength requirements applicable to the particular class, the conditions under which such concrete may be accepted shall be determined as shown below.

(a) Class I Concrete: Class I concrete having 28-day strength of less than the minimum required strength shall be removed and disposed of by the Contractor, at his expense, unless specifically authorized by the Engineer, in writing, to remain in place. The removal shall be in such manner as will not cause damage to the remaining concrete or to other structural units or other facilities and property. The Engineer may, at his discretion, allow concrete which fails to meet the minimum

strength requirement to remain in place. Payment for this concrete will be at a reduced price to compensate the City for loss of durability. The amount of the reduction shall be determined by negotiation and shall be based on the particular circumstances.

(b) Classes II, III, and IV Concrete: Classes II, III, and IV concrete which fails to meet the minimum strength requirements may be accepted at the discretion of the Engineer, subject to the following provisions:

(1) Generally these classes of concrete are used for structural applications where compressive strength is critical and is anticipated in the design. Where these classes of concrete are used in such installations, all such concrete failing to meet the minimum strength requirements shall be removed and disposed of by the Contractor at his expense, and removal shall be in the manner as specified for Class I concrete above.

(2) Where these classes of concrete are used in structural elements for which the strength of the concrete is not critical and the structural integrity is not affected, the Engineer may, at his discretion, allow the concrete to remain in place. Payment for this concrete will be at a reduced price to compensate the City for loss of durability. The amount of reduction shall be determined by negotiation and shall be based on the particular circumstances.

W-345.10 Test Requirements

The Contractor shall furnish to the City sufficient concrete of the design mix as may be required to verify specification compliance. The City will sample the fresh concrete and perform tests as required by these specifications at frequencies established in the Florida Department of Transportation's "Sampling, Testing and Reporting Guide" or as otherwise required. The Contractor shall furnish and maintain facilities suitable for curing concrete test specimens in compliance with the requirements of AASHTO T 23. The Contractor shall furnish and maintain power supplies and all equipment and materials necessary for proper operation and shall maintain the curing facilities throughout the curing periods.

A set of cylinders for determination of compressive strength shall consist of two individual cylinders. Additional cylinders may be made at the option of the Engineer for determination of concrete compressive strength at various ages. Specific requirements for sampling frequency for the purpose of determining strength of concrete shall be in accordance with the following:

(a) A set of three (3) test cylinders shall be made for each class of concrete for each 50 cubic yards or fraction thereof placed each day, provided no extra cylinders will normally be required for less than 10 cubic yards of additional concrete.

TWO exceptions to the above requirement are:

(1) When High Early Strength concrete is used or early form stripping is desired, a set of cylinders shall be four instead of three.

(2) Only one set of test cylinders will normally be required for each pour of seal cement.

(b) One set of cylinders shall be made for each 4,000 square yards of paving concrete, or fraction thereof, placed each day.

Suitable field curing of test specimens may be accomplished by, but not limited to, tightly enclosing each specimen in a suitable polyethylene plastic bag, or by covering the surface with an approved waterproofing spray material.

Tests for Strength of Concrete

The method of determining the strength of the concrete shall be in accordance with the following procedures:

Unless specifically stated to the contrary, compressive strength shall be based upon 28-day results. The compressive strength of the quantity of concrete placed and represented by one set of cylinders shall be determined as the average of the two cylinders comprising the set. If either of the test cylinders of a set of two shows evidence of improper sampling, molding, handling, curing or testing, the test result of the defective cylinder shall be discarded and the compressive strength of the concrete represented shall be determined from the test result of the remaining cylinder. Low strength shall not be a basis for discarding a cylinder test result.

If the 28-day cylinder test results indicate low strength concrete, the Contractor may elect to drill core samples from the actual concrete placed. If the Contractor elects to drill core samples from the hardened concrete, the costs of obtaining the cores and repairing the core holes shall be borne by him. The cores shall be drilled, as directed by the Engineer, at the same approximate locations from which the test cylinder was obtained. The location of the drilled cores shall be selected so that the remaining structure will not be impaired or sustain permanent damage after the core holes are repaired by the Contractor. When the Contractor elects to supply drilled core samples, two undamaged samples will be required. If the Contractor obtains cores following notification of failing strength in sufficient time for such cores to be tested by the City prior to the lapse of a 42-day time limit, the 28-day strength of the concrete placed and represented by the drilled core samples shall be determined as the average of the test results of the two drilled cores. If, however, the Contractor delays in obtaining core samples for strength determination, they shall be acceptable to the City for testing only when the Contractor submits a correlation curve developed by an approved independent testing laboratory to relate strength at the actual test age to 28-day strength for the particular class and design mix represented by the cores. When the Contractor elects to supply drilled cores and submits acceptable drilled

cores to the City for testing, both the Contractor and the City shall accept the results of the tests of drilled cores in lieu of the results of the tests on the test cylinders.

Methods of Sampling and Testing

Test cylinders cast to determine acceptability for minimum strength requirements shall be made and cured in accordance with AASHTO T 23 and tested in accordance with AASHTO T 22. Test cylinders cast to determine when a precast unit or a structure may be put into service or to determine when a tensioning load may be transferred shall be cured by methods identical to those used in curing the concrete member, and tested in accordance with AASHTO T 22.

Drilled core samples shall be taken and tested in accordance with AASHTO T 24.

Test beams shall be made and cured in accordance with AASHTO T 23 and tested in accordance with AASHTO T 97.

Slump shall be determined in accordance with AASHTO T 119.

The amount of air entrained shall be determined by pressure or volumetric meters of approved design and in accordance with AASHTO Method T 152 or AASHTO Method T 196, except that AASHTO T 199 may be used as an indicator only. The Chase Air Indicator shall not be used for acceptance testing.

Concrete Cylinder Curing Box

The Contractor, at his option, may furnish a concrete cylinder curing box meeting the following requirements:

(a) The curing box shall have suitable internal dimensions. The top of the curing box shall be a lid with hinges at the back and two securing latches capable of locking the curing box on the front of the lid. The free movements of the lid shall be restricted to no more than 100 degrees of rotation from the closed position by a chain attached between the lid and the body of the curing box.

(b) All interior surfaces of the curing box shall be constructed of noncorroding materials. A moisture proof seal shall be provided between the lid and the body of the curing box.

(c) Heat requirements of the curing box shall be supplied by an immersible electric heater (minimum 1,500 watts) located near the bottom of the curing box. Heater elements shall be located to provide free access to cleaning and adequate circulation of the surrounding water. A combination hose connection and drain shall be provided at the lower front edge of the curing box so that it may be drained or water may be circulated. A drain shall be provided on the rear face of the curing box in such a

position that when open, it will allow water to drain to within one inch over the top of the cylinders.

(d) A rack, constructed of noncorroding metallic material, set approximately four inches above the bottom of the curing box shall be provided to support the cylinders in an upright position. This rack shall be positioned to allow free circulation of water around the cylinders. Access for cleaning shall be provided to all parts of the curing box. The electrical utility connection shall be made in a lockable switch box that is securely attached to the side of the curing box.

(e) A bimetallic thermometer shall be installed so that it will measure the internal temperature of the curing box, and can be read from the outside without opening the curing box. This thermometer shall have minimum graduations of 2°F and shall be protected from physical damage by suitable shielding.

(f) The curing box shall be capable of maintaining an internal water temperature of 63.4°F, through an ambient air temperature range of -10°F to +100°F. When filled with water, the curing box shall not leak.

(g) The curing box will be accepted for use based on the above criteria.

W-345.11 Care and Storage of Aggregates

Prevention of Contamination and Segregation

The handling and storage of concrete aggregates shall be in such manner as to minimize any segregation and to prevent contamination by foreign materials. When fine and coarse aggregates cannot be stored sufficiently remote from each other to prevent mixing, suitable baffles shall be provided which will prevent intermingling of the different aggregates.

Stockpiles

Whichever of the allowable methods of stockpiling aggregates, as specified below, is used by the Contractor or the concrete supplier, it shall be their responsibility to handle the aggregates in such manner as will minimize segregation and to recover material from the stockpile for use in the mix in such manner that it will fall within the limits of the specifications. The Contractor shall make available to the City's personnel, for sampling, the necessary quantities of aggregate on the recovery side of the stockpile where feasible, for their testing at a frequency necessary to ensure compliance with the specifications.
Stockpiles, of either coarse or fine aggregates, shall be built up in layers not to exceed three feet in height, and each layer shall be completely in place before the next layer is started. Coning of stockpiles will not be permitted.

When trucks and bulldozers are used to form a ramp-type stockpile, such stockpiles shall be constructed in lifts not exceeding three feet in height and shall have a slope not to exceed thirty degrees. Generally, only rubber-tired equipment will be permitted on the stockpile. Equipment other than rubber-tired equipment may be permitted by the Engineer when the Contractor can show that the equipment produces no detrimental effect.

When the stockpile is formed by a belt conveyor system, the discharge end of the conveyor shall be adjustable in height and capable of moving circularly, or the Contractor shall provide means of preventing high coned piles which promote segregation.

When aggregates are stored in silos, the overhead discharge shall be so arranged that segregation of the aggregates does not occur. The silos shall be maintained in a reasonably full condition, as far as practicable.

Coarse aggregate stockpiles shall be maintained in a continuously wet condition during patching operation, such as to assume uniformity of concrete consistency.

W-345.12 Plant and Equipment

Equipment used for handling elements, mixing concrete, handling the mixed concrete, transporting concrete, and depositing concrete shall be constructed of materials which have no detrimental effects on the completed structure. These limitations refer only to the surfaces of equipment which are at any time in physical contact with the elements of concrete or the mixed product, up until the depositing of the concrete. Equipment surfaces which are in physical contact with the elements of concrete or the mixed product shall not be made of aluminum. These restrictions do not apply to equipment used in finishing the concrete or to handling equipment used to transport the element of concrete from source to the batch plant. In the event the Engineer determines that the completed structure has suffered damage growing out of the use of equipment chosen by the Contractor, the repair or the replacement of the damaged portions of the structures shall be made at the Contractor's expense.

Safe and suitable facilities shall be provided for sampling cement and fly ash with a sampling tube or scoop from the storage silo, from the weighing hopper or from the feedline immediately before entering the hopper. The sampling port of plate shall be of size to accommodate a 1½-inch diameter sampling tube or a scoop and shall be equipped, where necessary, with a valve or flap which will prevent blow-back or spillage.

Measuring Devices

All materials shall be measured by approved measuring devices. Batch plants may include manual equipment, in which the operator sets batch weights and discharges materials manually; may be semi-automatic plants, in which batch weights are set manually and materials are discharged automatically; or may be fully automatic, electronically controlled plants, in which mixes are controlled by means of selectors or punch cards.

Where beam type scales are used, suitable means shall be provided to hold poises securely in position after they are set. Frequent inspection of the scale poises shall be made to ensure that they are properly set and secured. The batch plant shall be constructed in such a manner that wind will not affect the accuracy of the weighing of materials.

The batch plant shall be equipped with adequate hoppers to provide separate weighing of all aggregates and of cement.

Measuring Water

Water may be measured by volume or by weight. Whichever method is used, the equipment shall be so arranged that the accuracy of measurement will not be affected by variations in pressure in the water supply line. The weighing device shall be capable of being set to deliver the required quantity and to automatically cut off the flow when the quantity has been discharged. It shall have an accuracy, under all operating conditions, within one percent of the quantity of water required for the batch. Tests for accuracy of the device shall be performed by a commercial laboratory or other qualified testing agency as approved by the Engineer, and such tests shall be made prior to the beginning of the work and at least once each three months thereafter.

Devices for Measuring Admixtures

The batching equipment shall be provided with a sufficient number of approved measuring devices which will automatically dispense the required amounts of admixtures for each batch. The measuring devices shall be so arranged as to add each admixture separately in individual sequence during the time mixing water is added.

Dry admixtures shall be measured by weight and paste or liquid admixtures by weight or volume, within a limit of accuracy of three percent.

Measuring Bulk Cement

Bulk cement shall be batched by weight and shall be weighted separately from other materials. The scales may be of either the beam type or the springless-dial type, and shall be the product of a recognized scales manufacturer. The weigh beams, or dials, shall be graduated to permit reading to one tenth of one percent of the capacity of the scales. A device such as a springless-dial indicator or tare beam shall be provided to indicate to the operator that the required load in the hopper or container is being approached. The device shall indicate at least the last 50 pounds of load. After the cement is weighed, it shall be protected from loss in handling or in transit.

Measuring Fine and Coarse Aggregates

The weighing equipment for aggregates shall comply with the following requirements:

(a) At least that part of the total load weighed which is a fraction of 100 pounds shall be indicated on a graduated beam or dial. The final reading shall be taken only when the scale beam is balanced.

(b) The weighing equipment shall be so arranged that, when batching, the weighing beam or dial is in full view of the operator.

(c) There shall be enough clearance at the top of the weighing hopper to permit the scales operator to shovel material from the weighing hopper.

(d) Weighing hoppers on platform scales shall be mounted with the center of gravity of the loaded hopper vertically over the center of the scale platform.

(e) Accurate and efficient operation of the scales shall be assured by frequent cleaning of such parts of the weighing equipment as may be required.

Accuracy of Scales

Prior to beginning any work, all scales and other measuring devices used in batching shall be checked for accuracy by a qualified representative of a scale company registered with the Bureau of Weights and Measures of the Florida Department of Agriculture.

Scales shall be rechecked once every three months or more often if deemed necessary. Scales shall be checked up to at least the maximum load normally handled on that scale.

Maintenance tolerances for cement scales, fly ash scales, or coarse and fine aggregate scales shall be checked up to at least the maximum load normally handled on that scale.

A certificate of inspection bearing the date of the certification and signed by the scale company representative shall be affixed to each measuring device. A copy of the scale company's report corresponding with the current certificate of inspection, showing the date of inspection; signature of the scale company representative; the observed scale deviations for the loads checked, and a statement that the scale conforms to Department of Transportation specifications and Chapter 531 of Florida Statutes shall be available at the plant.

W-345.13 Mixers

All mixers shall be of an approved type and shall be capable of combining the components of the concrete into a thoroughly mixed and uniform mass and of discharging the concrete with a satisfactory degree of uniformity.

Mixers may be of the rotary type or the turbine type and may be mobile (truck mixers) or stationary (central mix), except that mixers for concrete paving when the concrete is mixed on the roadway shall be dual-drum type, equipped with a fully power-controlled boom-and-bucket which shall be so operated that the batches will be uniformly distributed on the subgrade.

A copy of the manufacturer's design, showing dimensions and arrangement of blades shall be available at the plant at all times. The use of mixers that have been altered from such design in respect to blade design and arrangement, or to drum volume, may be permitted when recommended by the manufacturer and approved by the Engineer.

Each mixer shall have attached by the manufacturer, a metal plate, or plates, on which are plainly marked the various uses for which the unit is designed. The data shall include the agitating and mixing capacity of the unit, the speed of rotation of the drum, and the serial number of the unit.

When mixers are equipped with skips, the skip shall be provided with a barrier to prevent dirt, mud, and other extraneous material entering the mix from truck tires.

Special Requirements for Central Mixing

When central-plant mixing is used for the entire mixing of concrete which is to be transported as wet batches, the mixing time shall be not less than 60 seconds.

If necessary in order to produce a homogeneous mixture, the minimum allowable mixing time specified above may be increased.

The mixer shall be operated at the drum speed stipulated on the manufacturer's nameplate on the mixer.

Truck Mixers

The drum of truck mixers may be actuated by a power source independent of the truck engine or by a suitable power take-off. Either system used shall provide control of the rotation of the drum within the limits specified on the manufacturer's nameplate, regardless of the speed of the truck. Truck mixers of the revolving-drum type shall be equipped with a hatch in the periphery of the drum shall which permits ready access to the inside of the drum for inspection, cleaning, and repair of blades.

Truck mixers shall be equipped with revolution counters of approved type and mounting, by which the number of revolutions of the drum may be readily verified. (The counters shall be actuated only after the mixing speed has been reached.) The water supply system mounted on truck mixers shall be equipped with a volumetric water gauge, in operating condition.

Timing Devices and Batch Meters

Both stationary and boom-and-bucket type mixers shall be equipped with an approved timing device which will automatically lock the discharge lever when the drum is charged and release it at the end of the mixing period. In the event of failure of the timing device, the Engineer may allow operations to continue, under his direct supervision, as may be necessary to avoid critical or uneconomical conditions, but not to extend beyond the end of that working day.

A batch meter or other satisfactory device for accurately recording the number of revolutions for each batch shall be attached.

Volume of Material Mixed

For boom-and-bucket type mixers, the volume of the material in a batch shall not exceed by more than ten percent, the mixer's capacity in cubic feet as shown on the standard rating plate on the machine. For all other types of mixers, the volume of material mixed per batch shall not exceed the manufacturer's rated capacity of the drum.

Maintenance of Mixers

All mixers shall be examined by the Contractor or supplier at least once each week for changes due to accumulation of hardened concrete or to wear of blades. The blades shall be replaced when any part or section is worn as much as one inch below the manufacturer's original design height and any appreciable accumulation of hardened concrete shall be removed before any mixer may be used under these specifications.

W-345.14 Mixing Concrete

No concrete shall be mixed when the atmospheric temperature is below 40ºF except as provided herein.

The Contractor shall assume all risk when placing concrete under extreme weather conditions, and permission to place concrete will in no way relieve the Contractor of the responsibility for satisfactory results.

Only the amount of concrete required for immediate use shall be mixed, and any concrete which has developed initial set shall be discarded. Retempering of concrete will not be permitted.

Adjustment to mix consistency, within the allowable limit for the addition of water at the job site, shall be made upon initial arrival at the job site and not thereafter. The consistency of concrete and adjustments thereto, shall be a Contractor's responsibility; however, the specified

water/cementitious ratio on the approved mix design for each class of concrete shall not be exceeded.

When water is added at the job site, the concrete shall be mixed 30 additional mixing revolutions. All mixing shall be completed before the total revolutions at mixing speed exceed 150.

All concrete shall be mixed a minimum of sixty seconds after all materials are in the drum, unless a reduced mixing time is authorized by written permission, except that when truck mixers are used, each batch shall be mixed not less than 75 nor more than 100 revolutions of the drum, at a rate of not less than 8 r.p.m. nor more than the maximum r.p.m. specified by the manufacturer. Any further mixing shall be at agitator speed unless it is necessary either to adjust the consistency of the mix or in order to achieve uniform mixing, which in either case the Engineer may require a longer mixing period. The mixing drum speed of all type mixers shall be that recommended on the manufacturer's nameplate and any further agitation required prior to discharge shall be at the agitator speed recommended on the manufacturer's nameplate.

Cleaning Mixer

The entire contents of the mixer shall be removed from the drum before the materials for the succeeding batch are placed therein. The skip and throat of the drum shall be kept free of accumulations. Upon the cessation of mixing for a considerable length of time, the mixer shall be flushed with water and thoroughly cleaned.

Charging the Mixer

Each batch shall be so charged into the drum that some water will enter both in advance and after the cement and aggregates, as well as during the charging of the cement and aggregates. If fly ash is used in the mix, it shall be charged into the drum over approximately the same interval as the cement.

Mixing at the Site

Concrete mixing at the job site shall be by a mixer of sufficient capacity to prevent delays that may be detrimental to the quality of the work. The batching equipment shall be in accordance with the requirements of this section.

Mixing for Concreting in Cold Weather

When the atmospheric temperature is such that concreting in cold weather procedures are required, the temperature of the concrete shall be controlled by heating the aggregates and water to a temperature of at least 70°F but not more than 150°F. The aggregates may be heated by either steam or dry heat. The Contractor shall supply such heating apparatus as stoves, salamanders, or steam equipment and the necessary fuel. The apparatus used to heat

the aggregate shall be capable of heating the materials uniformly. When dry heat is used, a means of maintaining atmospheric moisture shall be provided. The aggregate shall not be heated directly by gas or oil flame or on sheet metal over a fire. When approved, the torch method of heating mixed concrete may be used provided the heating apparatus is capable of heating the mass uniformly and no hot spots will occur which will burn the materials. The use of steam on or through binned aggregates will not be permitted.

Mixing for Concreting in Hot Weather

When hot weather concreting procedures are required to control the concrete temperature at the point of placement, the Contractor shall submit for review and approval his proposed methods of control which will be applied at the concrete batch plant.

W-345.15 Transportation Equipment

Wheelbarrows will be permitted for transporting aggregates to the mixer only when a two-bag or other small type mixer is used.

When dry batches are transported to the mixer, the truck bodies shall be divided into compartments of sufficient size to contain all materials and prevent spilling from compartment to compartment and shall carry suitable covers for protection against inclement weather when necessary. The cement container shall be of a box type that will prevent loss, keep out moisture, dump clean and hold its shape. It shall be of sufficient size to hold the required amount of cement without spilling and shall have a waterproof cover. Truck compartmentation shall be approved prior to use.

Wet batches of concrete may be transported in either agitating or nonagitating trucks. Bodies of nonagitating trucks shall be smooth, mortartight metal containers with round internal corners and shall be capable of discharging the concrete at a satisfactory controlled rate without segregation. Covers shall be provided when needed for protection.

When nonagitator trucks are used, the elapsed time between the addition of water to the mix and depositing the concrete in place shall not exceed 45 minutes, except that when a retardant admixture is used, such elapsed time shall not exceed 75 minutes. When the hauling is done in truck agitators, such elapsed time shall not exceed 60 minutes, except that when a retardant admixture is used, a maximum elapsed time of 90 minutes will be permitted.

* * *

SECTION 425 - STORMWATER INLETS, MANHOLES AND JUNCTION BOXES

W-425.01 General

The work specified in this section consists of the construction of inlets, manholes, junction boxes, shoulder gutter inlets, and yard drains. These structures shall be of reinforced concrete, or may be of brick masonry if circular and constructed in place, and shall include the necessary metal frames and gratings. The work under this section shall also include the adjustment of those structures shown in the plans to be adjusted or which are required to be adjusted for the satisfactory completion of the work. The new structures shall be constructed in conformity with the plans and in accordance with these specifications.

W-425.02 Composition and Proportioning

Concrete: Unless otherwise shown in the plans, all concrete for these structures shall be Class II as specified in Section 345.

Mortar: The mortar for brick masonry shall be of portland cement and sand, mixed in the proportions of one part cement to two parts of sand. Miami Oolitic rock screenings may be substituted for the sand upon prior approval of the Engineer. All the materials shall pass the No. 8 Sieve, and be uniformly graded from coarse to fine. At the option of the Contractor, hydrated lime, in an amount not to exceed ten percent of the amount of cement used, may be added to the mortar.

As an alternate to the above, masonry cement may be used in lieu of the above-specified mortar provided that it is delivered in packages properly identified by brand name of manufacturer, net weight of package, and whether it is Type 1 or Type 2, and further provided that it has not been in storage for a period greater than six months. Hydrated lime shall not be used with masonry cement.

The sand and cement shall be thoroughly mixed dry in proper boxes or mortar mixers and such quantity of clean fresh water added as will provide a stiff mortar of the proper consistency. The whole mass shall be thoroughly mixed until used. Any mortar that has set shall not be retempered in any way, and no mortar shall be used more than one and one-half (1-1/2) hours after mixing.

W-425.03 Gratings

Gratings and frames fabricated from structural steel shall be galvanized in accordance with the requirements of ASTM A123 or shall be painted with two coats of prime meeting the requirements of Section 971-8 of the Standard F.D.O.T. Specifications for Road and Bridge Construction, followed by one coat of material meeting the requirements of Federal Specification TT-E-489, Class A Black. All paint may be applied in the shop, by dipping,

provided that each coat is thoroughly dry before the succeeding coat is applied. These requirements do not apply when A- 588 steel is used.

When Alternate "G" grates are specified, the chain, bolt, nuts, and cold shuts shall be galvanized after fabrication in accordance with the requirements of ASTM A 123.

W-425.04 Forms

Forms shall be of wood or metal, so designed and constructed that they may be removed without injury to the concrete. They shall be built true to line and grade and braced in a substantial and unyielding manner, and shall be approved by the Engineer before being filled with concrete.

W-425.05 Precast Inlets, Manholes, and Junction Boxes

Careful attention shall be given to the proper construction or reconstruction of the pavement adjacent to the gutters and at street intersections to obtain satisfactory drainage to the inlets from the intersecting streets.

The Contractor may request to substitute precast inlets, manholes, and junction boxes in lieu of cast-in-place units unless otherwise shown in the plans or directed by the Engineer. At locations not so restricted, the Contractor shall carefully examine the plan details at each structure to determine if use of a precast unit is feasible. The design and fabrication of precast units shall be in accordance with the standard index drawings, which may allow use of designs other than those detailed in the standard index drawings.

Smooth welded wire fabric may be substituted for deformed re-bar or welded deformed wire reinforcement in non-circular precast drainage structures provided the following requirements are met:

1. The smooth welded wire fabric shall comply with ASTM A-185.

2. Substitution of equal areas of smooth wire fabric for the reinforcing steel and provided the width and length of the unit is four times the width of the spacing of the cross wires.

3. Wire shall be continuous around the box and spliced at a quarter point of one side with an overlap of not less than the spacing of the cross wires plus two inches.

W-425.06 Construction Methods

Excavation: Excavation shall comply with the requirements specified in Section 1.

Placing and Curing Concrete: The concrete shall be placed in the forms, to the depth shown in the plans and thoroughly vibrated. After the concrete has hardened sufficiently, it shall be covered with suitable material approved by the Engineer, and kept moist for a period of three days.

Setting Manhole Castings: After the concrete has been cured as specified above, the frame of the casting shall be set in a full mortar bed composed of one part portland cement to two parts of fine aggregate.

Reinforcing Steel: The construction methods for the steel reinforcement shall be as specified in Section 6.

Laying Brick: All brick shall be saturated with water before being laid. The brick shall be laid by the shove joint method so as to bond them thoroughly into the mortar. Headers and stretchers shall be so arranged as to bond the mass thoroughly. Joints shall be finished properly as the work progresses and shall be not less than 1/4 inch or more than 3/4 inch in thickness. No spalls or bats shall be used except for shaping around irregular openings or when unavoidable at corners. The inside of the brick masonry walls shall be plastered uniformly with cement mortar one half (1/2) inch in thickness mixed in proportions of one part of cement and two parts of clean, sharp sand.

Placing Pipe: Inlet and outlet pipes shall be of the same size and kind as the connecting pipe shown in the plans. They shall extend through the walls for a distance beyond the outside surface sufficient for the intended connections, and the concrete shall be constructed around them neatly so as to prevent leakage along their outer surface. The inlet and outlet pipes shall be flush with the inside of the wall.

Backfilling: Backfilling shall conform with the requirements specified in Section 2.

Adjusting Existing Structures: Existing manholes, catch basins, inlets, valve boxes, monument boxes, etc., within the limits of the proposed work, that do not conform to the finished grade of the proposed pavement, or to the finished grade designated on the plans for such structures, shall be cut down or extended, and made to conform to the grade of the new pavement, or to the designated grade of the structure if outside of the proposed pavement area. The materials and construction methods for this work shall conform to the requirements specified above.

Where manholes are to be raised, the adjustment may, at the Contractor's option, be made by the use of adjustable extension rings of the type which do not require the removal of the existing manhole frame. The extension device shall provide positive locking action and shall permit adjustment in height as well as diameter. The particular type of device used shall meet the approval of the Engineer.

Adjusting Structures: When an item of payment for adjusting manholes, valve boxes, inlets, or monument boxes is provided in the proposal, the number of such structures designated to be paid for under separate items, and which are satisfactorily adjusted, shall be paid for at the contract units prices each for Adjusting Inlets, Adjusting Manholes, Adjusting Valve Boxes, and Adjusting Monument Boxes.

For any of such types of these structures required to be adjusted but for which no separate item of payment is shown in the proposal for the specific type, payment shall be made under the item of Adjusting Miscellaneous Structures.

W-425.07 Drainage Structures

1. All inlets, manholes, and junction boxes shall, unless otherwise directed by the Engineer, be constructed as per design plans and applicable design standards. All manholes shall be Traffic Bearing type. It shall be the responsibility of the Contractor to assure that the designated sizes of the drainage structures meet the following criteria:

    a. The minimum distance from the top of the opening for the highest pipe to the bottom of the top slab shall be ten inches (10"); 12 inches from top of pipe to bottom of top slab, before "stack" is used.

    b. The minimum diameter for stack heights shall be thirty-six (36) inches.

    c. The minimum distance between pipe openings shall be nine (9) inches.

    d. For four-sided structures having openings in more than one corner, individual shop drawings must be submitted for prior approval.

2. If warranted by field conditions and directed by the Engineer, the Contractor shall, at such locations, construct brick drainage structures (in place of concrete drainage structures), according to the standards specified below:

    Brick construction shall be as follows:

    a. Wall thickness minimum eight inches (8") up to eight feet (8') height, unless specified otherwise.

    b. Wall thickness minimum twelve inches (12") up to twelve feet (12') height, unless specified otherwise.

    c. Brick shall be laid in 1:2 (Portland cement-sand) mortar.

d. Before laying the bricks in mortar, the bricks shall be thoroughly sprinkled with clean water (not to saturation extent).

e. Brick for manhole and inlet structures shall be laid in stretcher courses, with every sixth course a header course.

f. All brick structures shall be plastered smooth inside also with 1/2-inch thick, 1:2 (Portland cement-sand) mortar.

g. No "unsound" brick shall be used. As a test, if a light hammer blow, with the brick held lightly in hand, does not produce a uniform crisp ringing sound, the brick shall be construed to have crack(s), or otherwise unsound and shall be rejected.

h. All bricks shall be solid.

3. No additional compensation shall be paid for brick structures. Brick and concrete shall not be used simultaneously in drainage structure walls. Walls of round structures shall be constructed of concrete only.

4. For all types of manholes, the top and bottom slab shall be as per applicable D.O.T. standards, even if brick is allowed to be used in the manhole walls. The following criteria shall apply to slab thicknesses and steel reinforcements:

   a. Top and bottom slabs shall have same thicknesses and reinforcements in any manhole structure.

   b. The minimum slab thickness and reinforcement shall be 8 inches thick and #6 bars at 6-inch centers both ways.

   c. 4-foot by 6-foot (4' x 6') or larger manholes, including circular manholes with inside diameter of 5-feet (5.0') or larger, shall have 10-inch thick slabs with #7 bars at 6- inch centers both ways.

   d. Unless specified on the Plans, four-sided structures with both inside dimensions in excess of eight feet (8.0') and circular structures with inside diameter in excess of eight feet (8.0') shall not be covered by D.O.T. and the above criteria.

5. All grate inlets shall conform to the City design standards.

6. Grates on inlets, as well as all other structures, shall be Traffic Bearing Type, unless specified otherwise, and subject to approval of the Engineer. All grate inlets shall be fitted with an approved metal frame at the top to seat the grates.

7. All Type-P manholes shall be bid at one average unit price regardless of size and shape. Similarly, all Type-J manholes will be bid at one average unit price regardless of size and shape unless indicated otherwise in the proposal.

8. The reinforcements and shapes for all drainage structures, unless directed by the Engineer otherwise, shall conform to the Plans and applicable design standards.

9. Vertical support columns (one in case of Type 5 inlet) shall be constructed by the Contractor, as a part of the D.O.T. Type 5 and 6 curb inlets, where and as directed by the Engineer.

10. The Contractor, if so directed by the Engineer in order to better meet site requirements, shall construct B-S-1, B-R-2, B-V-1, or B-R-1 type curb inlets in lieu D.O.T. Type 5 and 6 inlets and vice-versa without additional cost to the City. P-5 and P-6 inlets shall have 3-1/2-foot by 3-1/2-foot substructures unless oversize pipe is to be accommodated or otherwise directed by the Engineer. Legible, detailed plans of each inlet type shall be provided to the Contractor.

    Side openings in curb and grate type inlets may be specified in the Plans or by the Construction Engineer to meet site conditions. The Contractor shall provide such openings without any additional cost.

11. When precast drainage structures are requested as substitutions for poured in place concrete structures, the Contractor shall meet the following additional requirements:

    a. Minimum height of the base structure (manhole or inlet barrel), unless restricted by design, shall be 5 feet 0 inches before extending the structure height by another precast "barrel." The minimum height of the top (extension) precast "barrel" shall be 1 foot 6 inches. "Barrel" extensions of less than 1-foot 6-inch height shall be cast in place with continuous reinforcement.

    b. Four-sided structures may be considered as an alternate to circular structures, but not the reverse.

    c. For substructures for the City-type curb inlets, unless specified otherwise, directed by the Engineer, or to accommodate larger pipes, the Contractor may use a 3-foot by 4-foot (inside dimensions) structure. This structure shall have same slab and wall thicknesses and steel reinforcing as specified for "Type E" grate inlet.

    d. When circular structures are precast in accordance with ASTM C-478, minimum wall thickness shall be six inches (6") thick or as specified in ASTM C-478 for larger diameter structures.

e. The location of the pipe holes and adequate basic substructures height, unless directed otherwise by the Engineer, shall be the responsibility of the Contractor.

f. The Contractor shall submit shop drawings only as specified below:

(1) One each-typical for different type of structures.

(2) For structures directed by the Engineer, and/or requiring change with respect to design plans, or as otherwise required by these specifications.

g. Provide schedule of manufacture of the structures. No compensation shall be paid to the Contractor for unusable precast drainage structures.

h. Provide material testing acceptance reports by a licensed private laboratory verifying:

(1) that the structures were constructed in accordance with details shown on the Plans and/or Shop Drawings;

(2) the exact design criteria adhered to; if more than one, identify which criteria applies to which structures;

(3) the project title, project number, file number, date cast, structure, plan sheet number and station;

(4) reinforcement size, spacing and amount;

(5) concrete placement, curing and strength, and verification of concrete cover on reinforcement; and

(6) that the testing laboratory stamp is placed on each structure prior to shipment.

i. Cooperate with Department personnel regarding periodic inspection of the precast units and the precast operations.

12. All manhole and inlet structures shall be set on a minimum 6-inch thick layer of compacted number 57 size coarse aggregate unless noted otherwise in the Plans or Specifications, or unless the Engineer determines a thicker layer is required due to soil and/or water conditions. All such coarse aggregate shall be completely enveloped in non-woven filter fabric as directed by the Engineer.

Payment for the 6-inch thick layer of stone shall be included in the price of the structure. Payment for thicker layers of stone shall be made from the select bedding material (stone) pay item, if available, or as extra work.

13. All casting covers, such as for inlets and manholes, shall bear the appropriate City identification for storm sewers and for sanitary sewers, as shown on the Plans and directed by the Engineer.

* * *

SECTION 901 - COARSE AGGREGATE

W-901.01 General

Coarse aggregate shall consist of naturally occurring materials such as gravel, or resulting from the crushing of parent rock, to include natural rock, slags, expanded clays and shales (lightweight aggregates), and other approved inert materials with similar characteristics, having hard, strong, durable particles, conforming to the specific requirements of the section.

Coarse aggregate for use in a hot bituminous mixture may also consist of reclaimed Portland cement concrete pavement meeting the requirements of 901.08. Washing of this material will not be required if the requirements of 901.02 for maximum percent of material passing the No. 200 sieve can be met without washing.

Materials substantially retained on the No. 4 (4.75 mm) sieve shall be classified as coarse aggregate.

Sources of supply shall be approved by the Engineer, and aggregates shall be produced under the requirements of the Standard Operating Procedure for Evaluation, Approval and Control of Mineral Aggregate Sources (Coarse Aggregates).

W-901.02 Deleterious Substances

All coarse aggregate shall be reasonably free of clay lumps, soft and friable particles, salt, alkali, organic matter, adherent coatings, and other substances not defined which may possess undesirable characteristics. The weight of deleterious substances shall not exceed the following percentages:

Coal and Lignite (AASHTO T-113)	1.00
Soft and friable particles (AASHTO T-112)	2.00*
Clay lumps (AASHTO T-112)	2.00*
Cinders and clinkers	0.50
Free shell	1.00**
Material passing the No. 200 Sieve (FM 1-T 011)	1.75***
Organic Matter (wet)	0.03
Chert (less than 2.40 Sp. Gr. SSD)(AASHTO T-113)	3.00****

The sum of the percentages of all deleterious substances shall not exceed ten.

* The maximum percent by weight of soft and friable particles and clay lumps together shall not exceed 3.00.

** Aggregates to be used in asphaltic concrete may contain up to five percent free shell. Free shell is defined as that portion of the coarse aggregate retained on the No. 4 sieve

consisting of loose, whole, or broken shell, or the external skeletal remains of other marine life, having a ratio of the maximum length of the particle to the shell wall thickness exceeding five to one. Coral, molds, or casts of other shells, and crushed clam and oyster shell indigenous to the formation will not be considered as free shell.

*** The requirement for maximum percent of material passing the No. 200 sieve for a lot or stockpile of any coarse aggregate component shall be as follows:

(a) For any samples obtained by the City for acceptance purposes or assurances purposes at the source of production, the average percent of material passing the No. 200 sieve of two composite samples shall not exceed 1.75 percent. No individual test shall exceed 2.0 percent.

(b) For assurance samples or acceptance samples, as designated by the Engineer. Obtained at the point of use, the average percent of material passing the No. 200 sieve for two composite samples shall not exceed 3.75 percent. No individual test shall exceed 4.0 percent.

****This limitation applies only to coarse aggregates in which chert appears as an impurity. It is not applicable to aggregates which are predominantly chert.

W-901.03 Physical Properties

Coarse aggregate shall meet the following physical property requirements, except as noted herein:

Los Angeles Abrasion (FM 1-T 096)	Maximum loss 45 percent
Soundness (Sodium Sulphate)(FM 1-T 104)	Maximum loss 12 percent*
Flat or elongated pieces	Maximum 10 percent**

* For source approval - Aggregates exceeding soundness loss limitations will be rejected unless performance history shows that the material will not be detrimental for Portland Cement Concrete or other intended usages.

** A flat or elongated particle is defined as one having a ratio between the maximum and the minimum dimensions of a circumscribing prism exceeding five to one.

W-901.04 Gradation

Coarse aggregates shall conform to the gradation requirements of Table 1 (see Pages W901-5 and 6), when the stone size is specified. However, Table 1 is waived for those aggregates intended for usage in bituminous mixtures, provided the material is graded on sieves specified in the Standard Operating Procedure, and meets uniformity and bituminous design requirements.

W-901.05 Natural Stones

Coarse aggregate may be processed from gravels, granites, limestones, dolomites, sandstones, or other naturally occurring hard, sound, durable materials meeting the requirements of this section.

Gravel shall be composed of naturally occurring quartz, free from injurious coatings of any kind. The Los Angeles Abrasion requirement of 901-1.3 is modified to permit a maximum loss up to 45 (FM 1-T 096). The minimum dry-rodded weight (FM 1-T 019) shall be 95 pounds per cubic foot.

Crushed gravel shall consist of 85 percent, by weight, of the material retained on the No. 4 sieve, having three crushed faces.

Coarse aggregate produced from the crushing of granites shall be sound and durable. For granites to be used in bituminous mixtures and surface treatments, the Los Angeles Abrasion requirement of 901-1.3 is modified to permit a maximum loss up to 50 (FM 1-T 096). Maximum amount of mica schist permitted is five percent (AASHTO T 189).

Limestones, Dolomites, and Sandstone

Coarse aggregates may be produced from limestone, dolomites, sandstones, or other naturally occurring hard, sound, durable materials meeting the requirements of this section.

Pre-Denozoic limestones and dolomites shall not be used as crushed stone aggregates either coarse or fine for Asphaltic Concrete Friction Courses, or any other asphaltic concrete mixture or surface treatment serving as the final wearing course. This specifically includes materials from the Ketona Dolomite (Cambrian) Newala Limestone (Mississippian) and Northern Alabama and Georgia.

As an exception to the above, up to 20 percent fine aggregate from these materials may be used in asphaltic concrete mixtures other than Friction Courses which serve as the final wearing course.

W-901.06 Manufactured Stones

Coarse aggregate may be produced from molten nonmetallic by-products consisting essentially of silicates and aluminosilicates of calcium and other bases, such as air-cooled blastfurnace slag or phosphate slag, provided it is reasonably uniform in density and quality, and reasonably free from deleterious substances as specified in 901.02. in addition, it must meet the following specific requirements:

Sulphur content	Not more than 1.5 percent
Dry rodded weight (FM 1-T 019)	Minimum 70 pounds per cubic foot

Glassy particles	Not more than 10 percent

Slag shall not be used as an aggregate for portland cement concrete.

W-901.07 Lightweight Aggregates

Lightweight coarse aggregate may be produced from naturally occurring materials such as pumice, scoria, and tuff or from expanded clay, shale, or slate fired in a rotary kiln. It shall be reasonably uniform in quality and density, and free of deleterious substances as specified in 901.02, except that the term cinders and clinkers shall apply to those particles clearly foreign to the extended aggregate in question.

In addition, it must meet the following specific requirements:

Material passing the No. 200 Sieve	Maximum 3.00 percent (FM 1-T 011)
Dry loose weight (FM 1-T 019)	33-55 pounds per cubic foot*
Los Angeles Abrasion (FM 1-T 096)	Maximum 35 percent
Ferric Oxide (ASTM C 641)	Maximum 1.5 milligrams (Option of Engineer)

* Source shall maintain dry-loose unit weight with ± 6 percent of Quality Control average.
Point of use dry-loose unit weight shall be within ± 10 percent of Source Quality Control average.

W-901.08 Reclaimed Portland Cement Concrete Pavement

The reclaimed portland cement concrete pavement shall be crushed and processed to provide a clean, hard, durable aggregate having a uniform gradation free from adherent coatings, steel reinforcement, vegetable matter, base material, joint fillers, or bituminous materials. The processing shall be controlled in accordance with the Department's Standard Operating Procedure for Evaluation Approval and Control of Mineral Aggregate Sources.

W-901.09 Exceptions, Additions, and Restrictions

Pertinent specifications modifications, based on material usage, will be found in other sections of the specifications package.

* * *

SECTION 902 - FINE AGGREGATE

W-902.01 General

Fine aggregate shall consist of natural silica sand, screening, local materials, or subject to approval, other inert materials with similar characteristics, or combination thereof, having hard, strong, durable particles, conforming to the specific requirements of this section.

Sources of supply shall be approved by the Engineer, with materials produced under the requirements of the Standard Operating Procedure for Evaluation, Approval and Control of Mineral Aggregate Sources (Silica Sand and Screenings), except as noted herein.

All fine aggregate shall be reasonably free of lumps of clay, soft or flaky particles, salt, alkali, organic matter, loam, or other extraneous substances. The weight of deleterious substances shall not exceed the following percentages:

Shale.....1.0

Coal and lignite.....1.0

Cinders and clinkers.....0.5

Clay Lumps.....1.0

W-902.02 Silica Sand

Silica sand shall be composed only of naturally occurring hard, strong, durable, uncoated grains of quartz, reasonably graded from coarse to fine, meeting the following requirements, in percent total weight.

Sieve	Percent Retained	Percent Passing
No. 4	0 to 5	95-100
No. 8	0 to 15	85-100
No. 16	3 to 35	65-97
No. 30	30 to 75	25-70
No. 50	65 to 95	5-35
No. 100	93 to 100	0-7
No. 200	Minimum 96	Maximum 4

Silica sand from any one source, having a variation in Fineness Modulus greater than 0.20 either way from the Fineness Modulus of target gradations established by the producer, may be rejected.

Silica sand shall be subject to the colorimetric test for organic impurities. If the color produced is darker than the standard solution, the aggregate shall be rejected unless it can be shown by appropriate tests that the impurities causing the color are not of a type that would be detrimental to Portland Cement Concrete. Such tests shall be in accordance with Florida Methods FM 1-T-21 and T-71. When tested for the effect of organic impurities on strength of mortar, the strength ratio at 7 and 28 days, calculated in accordance with Section 8 of FM 1-T-71, shall not be less than 95 percent.

W-902.03 Sands for Miscellaneous Uses

Sand for setting anchor bolts, pipe joints, or other similar uses shall meet the quality requirements of W-902.02 except that gradation requirements are waived.

Sand for brick masonry shall meet the quality requirements of W-902.02 except for gradation requirements. All the materials shall pass the no. 8 Sieve, and be uniformly graded from coarse to fine.

Sand for sand-cement riprap shall meet the quality requirements of W-902.02 except for gradation requirements. The material shall meet the following gradation limits:

Passing	Percent
No. 4 Sieve	Minimum 97
No. 100 Sieve	Maximum 20
No. 200 Sieve	Maximum 5

W902.04 Filter Material for Underdrains

Silica sand for use as filter material for Types I through IV Underdrains shall meet the requirements of W-902.02 except that the requirements regarding gradation and organic impurities shall not apply. The aggregate shall be reasonably free of organic matter and other deleterious materials. The gradation requirements of W-902.02 shall apply except no more than two percent shall pass the No. 200 Sieve.

Filter material for Type V Underdrains shall meet the above requirements except that there shall be no more than one percent of silt, clay, and organic matter, that the aggregate shall have a Uniformity Coefficient of 1.5 or greater, and that ten percent diameter shall be 0.212 (No. 70 Sieve) to 0.50 (No. 35 Sieve) millimeters. The Uniformity Coefficient shall be determined by the ratio D60 divided by D10, where D60 and D10 refer to the particle diameter corresponding to 60 and 10 percent of the material which is finer by dry weight.

W-902.05 Screenings

Screenings shall be composed of hard, durable particles, either naturally occurring, such as gravel screenings, or resulting from the crushing or processing of the parent rock, to include

natural rock, slags, expended clays or shales (lightweight aggregates), or other approved inert materials with similar characteristics.

Aggregates classified as screening shall conform to the following gradation requirements:

Sieve Size	Passing Percent
3/8 inch	100
No. 4	85 to 100
No. 200	Maximum 15

When permitted by specifications, a screening component may contain up to 18 percent material passing the No. 200 Sieve.

W-902.06 Specific Requirements

Screenings from F.D.O.T. Approved Sources of Coarse Aggregate: Processed screenings from fully Approved Sources of Coarse Aggregate are subject to gradation and maximum percent passing the No. 200 Sieve tests. Should Coarse Aggregate Source Approval status change, or unsatisfactory in-service history develop, additional control requirements may be implemented.

Screenings for use in hot bituminous mixture may consist of screenings from the processing of reclaimed portland cement pavement to produce coarse aggregate.

* * *

SECTION 921 - PORTLAND CEMENT

W-921.01 General

Except where a particular type of cement might be specifically called for, and except as restricted in Section 345, the cement used in the work may be of any one of the following AASHTO designated types:

Type I, II, or III (AASHTO M 85) or Type IS (AASHTO M 240).

For all types specified, the cement shall be subject to either the compressive or the tensile strength test. The air content test will be made at the option of the Engineer. (Testing will not be required for portland cement used in sand cement riprap and in mortar for pipe joints, provided the cement is from an approved source and is the product of a reputable manufacturer.)

The cement used shall conform to the requirements of the AASHTO Designations shown therefor, with additional requirements as described herein.

The term, "Purchaser," as contained in the AASHTO Specifications shall be taken as the Florida Department of Transportation.

Mixing Different Cements

Different brands of cement, cement of the same brand from different mills, or different types of cement shall not be mixed during any continuous pour. Different brands or types of cement shall be stored separately.

Alkali Content

Only portland cements containing less than 0.6 percent, calculated as Na2O (percent Na2O plus 0.658 percent K2O), shall be used in combination with coarse or fine aggregates from the Montgomery, Alabama area, the Tuscaloosa formation, or any other alkali reactive aggregate.

Packing, Handling, and Storing

The cement may be delivered in bags or in bulk. The storage building, bin, or silo shall be weatherproof and shall be located convenient to the work to be performed. On small jobs, storage in the open may be permitted by the Engineer, in which case a raised platform and adequate waterproof covering shall be provided.

If conditions warrant, the Contractor may be required to employ a competent storekeeper, who shall have charge of the cement storehouse and shall keep suitable records of

the delivery and use of all cement. Copies of such records shall be delivered to the Engineer at the close of each day's work or eight-hour run, showing in such details as he may reasonably require, the quantity used during the day or run at each part of the work.

W-921.02 Rejection

Cement varying more than five percent from designated weights (94 pounds per sack) shall be rejected (1) in carload lots, if the average of 50 sacks taken at random is less than the designated weights, and (2) in individual sacks, if tests disclose that sacks vary more than five percent from designated weights and still the average of 50 sacks is within the specified requirements. In the second instance, the cement may be used provided the proper adjustment per sack is made; such adjustment to be made by weight only.

Cement which has been damaged, which is partially set, or which is lumpy or caked shall not be used, and the entire contents of the sack of cement or the container of bulk cement, which contains damaged, partially set, or lumps of caked cement, will be rejected for use. Cement salvaged from discarded or used sacks shall not be used.

W-921.03 Transportation of Loose Cement

When, under the provisions of these specifications, it becomes necessary to transport loose cement, it shall be kept in a weatherproof compartment, separate from other aggregates; otherwise, the cement shall be deposited directly from the container, as shipped, into the mixer skip, in conjunction with the placing of other aggregates into the skip, or dumped directly on the batch of aggregates just previous to the batch being deposited into the mixer skip. As an exception to the above, loose cement may be transported between the fine and coarse aggregates when permitted by the specifications for the particular item to be constructed.

* * *

SECTION 923 - WATER FOR CONCRETE

W-923.01 General

Water for use with cement shall be clean and practically free of oil, acid, alkali, chlorides, organic matter, and other deleterious substances.

Water from City water supplies which are approved by a public health department may be accepted without being tested. Water from all other sources shall be tested and approved before use and shall not contain impurities in excess of the following limits:

Acidity or alkalinity calculated in terms of calcium carbonate.....0.05%

Total organic solids.....0.05%

Total inorganic solids.....0.08%

Total chlorides as sodium chloride.....0.05%

A period of ten days shall be allowed for tests on water after the sample has been received in the laboratory.

The City may require additional compliance testing at any time, of any water source, at the discretion of the Engineer.

W-923.02 Mortar Tests

Mortar, composed of the water to be used on the project and standard sand and cement, when subjected to standard soundness, time of setting, and 1:3 mortar tests, shall show no unsoundness and, when compared with a similar test of mortar consisting of distilled water and the same sand and cement, it shall show no marked change in time of setting, and its strength shall not be less than 90 percent of that using distilled water.

* * *

SECTION 924 - ADMIXTURES FOR CONCRETE

W924.01 List of Previously Approved Admixtures

The Florida Department of Transportation (F.D.O.T.) maintains listings of approved admixtures for air-entraining, water-reducing, and retarding, which have previously been determined as meeting the requirements for use with this work. Admixtures included in such listing (current at the time of use) will be permitted without further testing at the time. Such listings are on file with the Office of Value Engineering at Tallahassee.

The including of any specific product on the Qualified Products List indicates that the product has been given contingent approval, as evidenced by previous tests and apparent effectiveness under field conditions.

For any particular admixture product contained in such approved lists no further testing will be required at the time of use unless, despite such tentative approval, there is indication in actual field use of inadequate or unreliable results, or that for other reasons a re-test is considered necessary.

W-924.02 Admixtures not Included in F.D.O.T.'S Listings

For Air-Entraining

Air-entraining admixtures not on the F.D.O.T. current listing (as described above) may be tentatively approved for use provided they meet the requirements of AASHTO M 154.

For Water-Reducing and Retarding

Water-reducing and retarding admixtures not on the F.D.O.T. current listing shall meet the requirements of AASHTO M 194, for Type D, except that in lieu of the physical requirement specified in Table 1 (of AASHTO M 194) the physical requirements for those admixtures shall be as follows:

(a) The control mix shall be the F.D.O.T.'s Standard Class III Concrete mix, using the F.D.O.T.'S adopted Type D water-reducing and retarding admixture.

(b) The initial time of setting shall not vary more than 45 minutes from that of the control mix.

(c) The compressive strengths at 3, 7, and 28 days shall not be less than 98 percent of those in the control mix.

(d) The length change shall be as specified in Table 1 (of AASHTO M 194); however, the test for length change will be made only at the Engineer's option.

Contingency of Continued Approval

The continued approval of admixtures allowed for use, as based on the above specification requirements, will also be subject to the contingencies specified in 924.01.

W-924.03 Performance Tests on Air-Entraining Admixtures for Effect on Strength of Concrete

Conditions under which Testing is Required

For any air-entraining admixture selected for use, the Engineer may call for a performance test (either prior to or at any time during construction), for determining its effect on the strength of the concrete. In general, this check-test will be required only when there is indication that such admixture is giving erratic results or is unduly reducing the strength of the concrete. Testing shall be in accordance with the following subsections (a) and (b):

(a) Permissible Reduction in Strength of the Concrete

For concrete composed of the same cement and aggregates (and in the same proportions) to be used in the work, and containing the admixture under test, in an amount sufficient to produce between four and seven percent entrained air in the plastic concrete, the compressive strength at seven days shall be at least 88 percent of the strength of the same concrete without the admixture.

(b) Method of Test for Strength Reduction

The percentage reduction in strength shall be calculated from the average strength of at least five standard 6-inch by 12-inch cylinders of each type of concrete. Specimens shall be made and cured in the laboratory in accordance with AASHTO T 126, and shall be tested in accordance with AASHTO T 22. The percentage of entrained air shall be determined in accordance with AASHTO T 152 or by the use of the Chace Air Indicator.

W-924.04 Water-Reducing and Retarding Admixtures for Class III Concrete

Water-reducing and retarding admixtures for Class III concrete shall be of a type approved specifically for such use.

For approved water-reducing and retarding admixtures which, due to indication of giving erratic results, are required to be re-tested, as specified in 924.01, such re-testing shall be in accordance with the following procedure: The admixture shall be checked for comparison between infrared spectrophotometry, pH valve and solids content. Any marked variation from the original curve, pH value or solids content will be considered sufficient evidence that the

chemistry of the original material has been changed and, therefore, the use of this material will be rejected and the material removed from the F.D.O.T. Qualified Products List.

* * *

SECTION 9600 – VIDEO RECORDING

W-9600.01 Video Recording

Prior to commencing work, the Contractor shall submit to the Engineer for approval, a DVD containing a continuous color video recording including complete coverage of pre-construction conditions of all surface features within the construction's zone of influence, (including detour routes) simultaneously produced audio commentary and electronic display of time and date. The video recording shall be sufficient to fulfill the technical and forensic requirements of the project and provide continuous unedited coverage, establishing locations and viewer orientation with clear, bright, steady and sharp video images with accurate colors free of distortion or other imperfections. The DVD must be accompanied by a detailed log of its contents including date, locations, video counter numbers and features. No work shall be allowed until the completed DVD and log are approved by the Engineer.

* * *