TECHNICAL SPECIFICATIONS

DIVISION 01

SECTION 01060

REGULATORY REQUIREMENTS AND NOTIFICATION

PART 1 -- GENERAL

1.01 PERMITS REQUIRED

A. FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION: The Notice of Intent to use Generic Permit for Stormwater Discharge from Large or Small Construction Activities shall be obtained and the associated Stormwater Pollution Prevention Plan (SWPPP) shall be prepared and certified by the CONTRACTOR and both shall be filed with OWNER and CCEI by CONTRACTOR prior to commencing work. The CONTRACTOR shall be required to comply with all conditions of the Permit and approved SWPPP.

Should the CONTRACTOR elect to choose dewatering techniques that discharge groundwater off-site, the CONTRACTOR shall first conduct the necessary site investigations and obtain a FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION – “GENERIC PERMIT FOR THE DISCHARGE OF PRODUCED GROUND WATER FROM ANY NON-CONTAMINATED SITE ACTIVITY” The CONTRACTOR shall be required to comply with all conditions of the Permit.

B. ST. JOHN’S RIVER WATER MANAGEMENT DISTRICT: The St. John’s River Water Management District Environmental Resource Permit for construction/modification of a stormwater management system has been obtained by the OWNER. The Contractor is responsible for obtaining any environmental or dewatering permit that may be required due to his means or methods. The CONTRACTOR shall be required to comply with all conditions of the Permit(s).

C. U.S. ARMY CORPS OF ENGINEERS: a Corps Nationwide permit has been obtained for environmental disturbances on the site during construction. The CONTRACTOR shall be required to comply with all conditions of the Permit.

D. INDIAN RIVER COUNTY (I.R.C.) R-O-W PERMIT: A permit has been obtained from I.R.C. to perform the specified work within the County R-O-W. The CONTRACTOR shall be required to comply with all conditions of the Permit. The CONTRACTOR shall be required to comply with all conditions of the Permit.

E. FELLSMERE WATER CONTROL DISTRICT (FWCD) PERMIT: A permit has been obtained from the FWCD to work within and connect to the District ditches as indicated on the Plans.
F. The above permits are the known standard permits for conducting the specified Work within the limits of the project area. The Contractor

shall be responsible for obtaining any other permit(s) that may be required due to his means or methods.

1.02 NOTIFICATION

A. Utility Companies: Contractor shall notify the following known utility companies in the area 48 hours prior to initiating construction:

Sunshine State One Call of Florida, Inc.: 1-800-432-4770
A.T.&T.: 1-800-288-2020
Florida Power and Light: (772) 489-6204
Fellsmere City Water Department: (772) 571-0127
Florida City Gas, Ron Muller: (321) 638-3424

B. The Contractor shall give the Engineer not less than seven (7) calendar days' notice of the time and place (or places) where he will start the work.

C. If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the Contractor shall cease all activities involving subsurface disturbance in the vicinity of the discovery. The Contractor shall notify the Engineer. The engineer shall contact the Florida Department of State, Division of Historical Resources, Compliance Review Section at (850)-245-6333. Project activities shall not resume without verbal and/or written authorization. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, Florida Statutes.

PART 2 - PRODUCTS

Not applicable

PART 3 - EXECUTION

Not applicable

*** * END OF SECTION * ***

SECTION 01152

APPLICATIONS FOR PAYMENT

PART 1 -- GENERAL

1.01 REQUIREMENTS INCLUDED

Submit Applications for Payment to Engineer in accordance with the schedule established by Conditions of the contract and Agreement between Owner and Contractor.

1.02 FORMAT AND DATA REQUIRED

A. Submit itemized applications typed on the form supplied in Section 00622 – Contractor's Application for Payment or in a format approved by Engineer. All applications for payment must be numbered, dated, and signed by the Contractor.

B. Provide itemized data on payment application (format, schedules, line items and values accepted by Engineer).

1.03 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form:

1. Fill in required information, including that for Change Orders executed prior to the date of submittal of application

2. Fill in summary of dollar values

3. Execute certification with the signature of a responsible officer of the contract firm

4. Have resident project representative review and sign application prior to submission to Engineer

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. When the Owner or the Engineer requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:

1. Project

2. Application number and date

3. Detailed list of enclosures

B. Submit one copy of data and cover letter for each copy of application.

1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Application for payment is required for progress payments

B. Only one application will be acceptable in any one month

1.07 SUBMITTAL PROCEDURE

A. Submit Applications for Payment to Engineer at the time stipulated in the

Agreement

B. Number: Four copies of each progress Application

C. When Engineer finds the Application properly completed and correct, he will transmit the applications for payment to the Owner

PART 2 -- PRODUCTS

Not applicable

PART 3 -- EXECUTION

Not applicable

*** * END OF SECTION * ***

SECTION 01153

CHANGE ORDER PROCEDURES

PART 1 -- GENERAL

1.01 REQUIREMENTS INCLUDE

A. Promptly implement Change Order Procedures

1. Provide full written data required to evaluate changes.

2. Maintain detailed records of work done on a time-and material/ force account basis.

3. Provide full documentation to Engineer on request.

B. Designate in writing the member of Contractor's organization:

1. Who is authorized to accept changes in the Work

2. Who is responsible for informing others in the contractor's employ of the authorization of changes in the Work.

C. Owner will designate in writing the person who is authorized to execute Change Orders.

1.02 RELATED REQUIREMENTS

A. The amount of established unit prices.

B. Conditions of the Contract:

1. Methods of determining cost or credit to Owner resulting from changes in Work made on a time-and-materials basis.

2. Contractor's claims for additional costs.

C. Exhibit A Schedule of Bid Prices

1.03 DEFINITIONS

A. Change Order: See General Conditions

1.04 PRELIMINARY PROCEDURES

A. Owner or Engineer may initiate changes by submitting a proposal Request to Contractor. Request will include the following:

1. Detailed description of the Change, Products, and location of the change in the Project.

2. Supplementary or revised Drawings and Specifications.

3. The projected time span for making the change, and a specific statement as to whether overtime work is, or is not, authorized.

4. A specific period of time during which the requested price will be considered valid.

5. Such request is for information only, and is not an instruction to execute the changes, nor to stop work in progress.

B. Contractor may initiate changes by submitting a written notice to Engineer, containing:

1. Description of the proposed changes

2. Statement of the reason for making the changes.

3. Statement of the effect on the Contract Sum and the Contract Time.

4. Statement of the effect on the work of separate contractors.

5. Documentation supporting any changes in Contract Sum or Contract Time, as appropriate.

1.05 CONSTRUCTION CHANGE AUTHORIZATION

A. In lieu of Proposal Request, Engineer may issue a “Work Directive Change” for Contractor to proceed with a change for subsequent inclusion in a Change Order.

B. Authorization will describe changes in the work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.

C. Owner and Engineer will sign and date the Work Directive Change as authorization for the Contractor to proceed with the Changes.

1.06 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each quotation for a lump sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data to allow Engineer to evaluate the quotation.

B. On request, provide additional data to support time and cost computation including the following:

1. Labor required.

2. Equipment required.

3. Products required:

a. Recommended source of purchase and unit cost.
b. Quantities required.

4. Taxes, insurance bonds.

5. Credit for work deleted from Contract, similarly documented.

6. Overhead and profit.

7. Justification for any change in Contract Time.

C. Support each claim for additional costs, and for work done on a time-and-material / force account basis, with documentation as required for a lump sum proposal, plus the following additional information:

1. Name of the Owner's authorization agent who ordered the work, and date of the order.

2. Dates and time work performed, and by whom.

3. Time record, summary of hours worked, and hourly rates paid.

4. Receipts and invoices for:

a. Equipment used, listing dates and times of use.
b. Products used, listing quantities.
c. Subcontracts.

D. Document requests for substitutions for Products as specified in Section 01600.

1.07 PREPARATION OF CHANGE ORDERS

A. Engineer will prepare each Change Order.

B. Form: Change Order format provided in the Contract Documents.

C. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of change.

D. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.08 LUMP SUM / FIXED PRICE CHANGE ORDER

A. Content of Change Orders will be based on either:

1. Engineer's Proposal Request and Contractor's responsible Proposal as mutually agreed upon between Owner and Contractor.

2. Contractor's Proposal for a change, as recommended by Engineer.

B. Owner and Engineer will sign and date the Change Order as authorization for the contractor to proceed with the changes.

C. Contractor shall sign and date the Change Order to indicate agreement with the terms therein.

1.09 UNIT PRICE CHANGE ORDER

A. Content of Change Orders will be based on, either:

1. Engineer definition of the scope of the required changes.

2. Contractor's Proposal for a change, as recommended by Engineer.

3. Survey of completed work

B. The amount of the unit prices shall be:

1. Those stated in the Agreement.

2. Those mutually agreed upon between Owner and Contractor.

C. When quantities of each of the items affected by the Change Order can be determined prior to start of the work:

1. Owner and Engineer will sign and date the Change Order as authorization for Contractor to proceed with the changes.

2. Contractor shall sign and date the Change Order to indicate agreement with the terms therein.

D. When quantities of the items cannot be determined prior to start of the work:

1. Engineer or Owner will issue a Change Order directing Contractor to proceed with the change on the basis of unit prices, and will cite the applicable unit prices.

2. At completion of the change, Engineer will determine the cost of such work based on the unit prices and quantities used.

a. Contractor shall submit documentation to establish the number of units of each item and any claims for a change in Contract Time.

3. Engineer will sign and date a second Change Order to establish the change in Contract Sum and in Contract Time.

4. Owner and Contractor will sign and date the second Change Order to indicate their agreement with the terms therein.

1.10 TIME AND MATERIAL / FORCE ACCOUNT CHANGE ORDER / CONSTRUCTION AUTHORIZATION

A. Engineer and owner will issue a Work Directive Change directing Contractor to Proceed with the changes on a time-and-material / force account basis.

B. At completion of the change, Contractor shall submit itemized accounting and supporting data as provided in the Article "Documentation of Proposals and Claims" of this section.

C. Engineer will determine the allowable cost of such work, as provided in General Conditions and Supplementary Condition.

D. Engineer will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.

E. Owner and Contractor will sign and date the Change Order to indicate their agreement therein.

1.11 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Contractor shall periodically revise Schedule of Values and Request for Payment forms to record each change as a separate item of Work, and to record the adjusted Contract Sum.

B. Contractor shall periodically revise the Construction Schedule to reflect each change in Contract Time.

1. Revise sub-schedules to show changes for other items of work affected by the changes.

C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2 -- PRODUCTS

Not Applicable

PART 3 -- EXECUTION

Not Applicable

*** * END OF SECTION * ***

SECTION 01201

PRE-CONSTRUCTION CONFERENCE

PART 1 -- GENERAL

1.01 REQUIREMENTS INCLUDED

A. Engineer shall schedule and administer the preconstruction conference and shall perform the following duties:

1. Prepare agenda for meeting.

2. Give notice of meeting three days in advance of meeting date.

3. Make physical arrangements for meeting.

4. Preside at meeting.

5. Record the minutes which shall include all significant proceedings and decisions.

6. Reproduce and distribute copies of minutes within fifteen (15) working days after meeting. Minutes shall be distributed to all participants in the meeting and to all parties affected by decisions made at the meeting.

1.02 RELATED REQUIREMENTS

A. Section 01340: Shop Drawings, Product Data and Samples.

B. Section 01720: Project Record Documents.

1.03 PRECONSTRUCTION CONFERENCE

A. Engineer will schedule meeting with Contractor, Owner and other affected parties.

B. Location of the preconstruction meeting: The project site or a nearby office to be selected by Owner/Engineer.

C. Attendance:

1. Owner/Owner’s representative.

2. Engineer/Engineer’s representative.

3. Contractor/Contractor’s superintendent.

4. Local utilities representatives.

5. Local government agencies representative.

D. Agenda:

1. Record of Attendance.

2. Project Summary Description.

3. Local Utilities to be affected.

a. Water lines
b. Sewer lines
c. Gas lines
d. Telephone lines
e. Cable TV lines
f. Electric lines
g. Highways
h. Railroads
4. Contractor Responsibilities:
a. Start date
b. Completion date
c. Liquidated damages
d. Contract amount
e. Work schedule
f. Space utilization
g. Rights-of-Way occupancy
h. Progress Payment Application
i. As-builts (Records/Drawings)
j. Photographs
k. Shop drawings
l. Subcontractors
m. Project coordination
n. Guarantee, Warranties, Maintenance Manuals

5. Owner Responsibilities:

a. Property and right-of-way purchase
b. Monthly meetings
c. Special meetings
d. Partial and final payment
e. Change Orders
f. Periodic site visits
g. Public announcements and public relations
h. Project acceptance

6. Engineer Responsibilities:

a. Technical representative of Owner
b. Interpreter of contract documents
c. Periodic inspections of job progress

d. Reviews partial and final payment applications
e. Prepares Change Orders
f. Checks and approves shop drawings
g. Reviews record drawings
h. Performs final inspection and issues certificate of completion

7. Resident Inspector Responsibilities:

a. Engineer's and Owner's representative on site
b. Review materials and work and reports any deficiencies to Engineer
c. Reviews applications for payment
d. Works with Contractor on public notification of work items
e. Attends progress meetings
f. Observes testing work
g. Maintains daily diary of work tasks
h. Furnishes reports to Engineer as deemed advisable

PART 2 -- PRODUCTS

Not Applicable

PART 3 -- EXECUTION

Not Applicable

*** * END OF SECTION * ***

SECTION 01220

PROGRESS MEETINGS

1.1 SCOPE

A. Date and Time:

1. Regular Meetings: As mutually agreed upon by CCEI and CONTRACTOR.

2. Other Meetings: On call.

B. Place: CONTRACTOR'S office at Project site or other mutually agreed upon location.

C. ENGINEER shall prepare agenda, preside at meetings, and prepare and distribute a transcript of proceedings to all parties.

D. CONTRACTOR shall provide data required and be prepared to discuss all items on agenda.

1.2 MINIMUM ATTENDANCE

A. CONTRACTOR

B. SUBCONTRACTOR:

When needed for the discussion of a particular agenda item, CONTRACTOR shall require representatives of Subcontractors or suppliers to attend a meeting.

C. CONSTRUCTION COORDINATION ENGINEERING INSPECTOR (CCEI)

D. OWNER'S representative, if required.

E. Utility Representatives, when needed

F. Others as appropriate.

G. Representatives present for each party shall be authorized to act on their behalf.

1.3 AGENDA

A. Agenda will include, but will not necessarily be limited to, the following:

1. Transcript of previous meeting.

2. Progress since last meeting.

3. Planned progress for next period.

4. Problems, conflicts and observations.

5. Change Orders.

6. Status of Shop Drawings.

7. Quality standards and control.

8. Schedules, including off-site fabrication and delivery schedules. Corrective measures, if required.

9. Coordination between parties.

10. Safety concerns.

11. Other business.

**** END OF SECTION ****

SECTION 01310

CONSTRUCTION SCHEDULES

1.1 GENERAL REQUIREMENTS

A. No partial payments shall be approved by the ENGINEER until there is an approved construction progress schedule made available for distribution.

B. Designate an authorized representative who shall be responsible for development and maintenance of the schedule and of all progress and payment reports. This representative shall have direct project control and complete authority to act on behalf of the CONTRACTOR in fulfilling the commitments of the CONTRACTOR's schedules.

1.2 REVISIONS TO THE CONSTRUCTION SCHEDULES

When the ENGINEER requires the CONTRACTOR to submit revised (updated) progress schedules on a monthly basis the CONTRACTOR shall:

A. Indicate the progress of each activity to the date of submission.

B. Show changes occurring since the previous submission listing:

1. Major changes in scope.

2. Activities modified since the previous submission.

3. Revised projections of progress and completion.

4. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays, and the impact on the schedule.

2. Corrective action recommended and its effect.

3. The effect of changes on schedules of other prime contractors.

1.3 SUBMISSION OF THE CONSTRUCTION SCHEDULES

On or before the tenth day after the effective date of the Agreement, submit the initial schedules to the ENGINEER. The ENGINEER will review the schedules and return a review copy to the CONTRACTOR within 21 days after receipt. If required by the ENGINEER, resubmit revised schedules on or before the seventh day after receipt of the review copy. If required by the ENGINEER, submit revised monthly progress schedules with that month's application for payment.

1.4 DISTRIBUTION OF THE CONSTRUCTION SCHEDULES

A. After receiving approval by the ENGINEER, distribute copies of the approved initial schedule and all reviewed revisions (updated) to:

1. Job site file.

2. Subcontractors.

3. Other concerned parties.

4. OWNER (two copies).

5. ENGINEER

B. In the cover letter, instruct recipients to report promptly to the CONTRACTOR, in writing, any problems anticipated by the projections shown in the schedules.

**** END OF SECTION ****

SECTION 01340

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 -- GENERAL

1.01 REQUIREMENTS INCLUDED

A. Submit Shop Drawings, Product Data, Samples and Certificates required by the Contract Documents.

B. Review and approval by Contractor of submitted material.

1.02 RELATED REQUIREMENTS

A. In other parts of the Contract Documents:

1. Definitions and Additional Responsibilities of Parties:

a. General Conditions of the Contract
(1) Sections 6.23 – 6.28: Shop Drawings

B. Specified in other sections:

1. Section 01720: Record Documents

C. Designate in the construction schedule, or in separate coordinated schedule, the dates for the submission and the dates that reviewed Shop Drawings, Product Data and Samples will be needed.

1.03 SHOP DRAWINGS

A. Drawings shall be presented in a clear and thorough manner.

1. Details shall be identified by reference to sheet and detail of schedule shown on Contract Drawings.

B. Minimum sheet size: Manufacturer’s standard; adequate to clearly illustrate.

1.04 PRODUCT DATA

A. Preparation:

1. Clearly mark each copy to identify applicable products, models, options, and other data.

2. Show performance characteristics and capacities.

3. Show dimensions and clearances required.

4. Show wiring or piping diagrams and controls.

B. Manufacturer’s standard schematic drawings and diagrams:

1. Modify drawings and diagrams to delete information which is not applicable to the work.

2. Supplement standard information to provide information specifically applicable to the work.

3. Include manufacturer's installation instructions when required by the Specifications Section.

1.06 MANUFACTURER'S CERTIFICATES

A. Submit Certificates, in duplicate, in accordance with requirements of each specification section.

1.07 CONTRACTOR RESPONSIBILITIES

A. Review Shop Drawings, Product Data and samples prior to submission.

B. Determine and verify:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with specifications

C. Coordinate each submittal with requirements of the work and of the Contract Documents.

D. Notify the CCEI in writing at the time of submission of ANY AND ALL DEVIATIONS in the submittals from requirements of the Contract Documents. All of the Contractor's comments and notations shall be in red ink.

E. Begin no fabrication of work which requires submittals until return of submittals with CCEI's approval.

1.08 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the work of any other Contractor.

B. Number of submittals required:

1. Shop Drawings: Submit the number of opaque reproductions which the contractor requires, plus three (3) copies which will be retained by the CCEI and Owner.

2. Product Data: Submit the number of copies which the Contractor requires, plus three (3) which will be retained by the CCEI and Owner.

C. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.
2. The project title and number

3. Contract identification

4. The name of:

a. Contractor
b. Supplier
c. Manufacturer

5. Identification of the project, with specification section number.

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the Work or materials.

8. Applicable standards, such as ASTM or AWWA Specification numbers.

9. Identification of deviations from Contract Documents

10. Identification of revisions on resubmittals.

11. An 8” x 3” blank space for Contractor and CCEI stamps

12. Contractor’s stamp or review and approval, initialed or signed, certifying to review of initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.

1.09 RESUBMISSION REQUIREMENTS

A. Make any corrections or changes in the submittals required by the CCEI and resubmit until approved.

B. Shop Drawings and Product Data:

1. Revise initial drawings or data, and resubmit as specified for initial submittal.

2. Indicate any changes which have been made other than those requested by the CCEI.

C. Samples: Submit new samples as required for initial submittal.

1.10 DISTRIBUTION

A. Distribute reproductions of Shop Drawings and copies of Product Data which carry the CCEI's stamp or review to:

1. Job site file.

2. Record Documents file.

3. Other affected contractors

4. Subcontractors

5. Supplier or fabricator

B. Distribute samples which carry the CCEI's stamp of approval as directed by the CCEI.

1.11 CCEI'S DUTIES

A. Review submittals with reasonable promptness and in accordance with schedule.

B. Affix stamp and initials / signature, and indicate requirements for re-submittal, or review without comments of submittal. All of CCEI's comments shall be made in ink.

C. Return submittals to Contractor for distribution, or for resubmission.

PART 2 -- PRODUCTS

Not Applicable

PART 3 -- EXECUTION

Not Applicable

*** * END OF SECTION * ***

SECTION 01520

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1.1 SCOPE

A. Provide all construction equipment and facilities and temporary controls required to satisfactorily complete the work represented on the Drawings and described in the Specifications.

1.2 RESPONSIBILITY

A. All construction facilities and temporary controls remain the property of the Contractor establishing them and shall be maintained in a safe and useful condition until removed from the construction site.

B. All false work, scaffolding, ladders, hoistways, braces, pumps, roadways, sheeting, forms, barricades, drains, flumes, and the like, any of which may be needed in 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, who is responsible for the safety and efficiency of such work and for any damage that may result from their failure or from their improper construction, maintenance or operation.

C. In accepting the Contract, the CONTRACTOR assumes full responsibility for the sufficiency and safety of all hoists, cranes, 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 OWNER and CCEI from all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provision.

1.3 TEMPORARY UTILITIES AND SERVICES

A. TEMPORARY WATER

1. Provide a temporary water service as required for all construction purposes and pay for all water used. City water is not available to this site and all water required for construction must be provided by the Contractor.

2. Furnish potable drinking water in suitable dispensers and with cups for use of all employees at the job.

3. Provide all temporary piping, hoses, etc., required to transport water to the point of usage by all trades.

4. When temporary water service is no longer required, remove all temporary facilities.

B. TEMPORARY SANITARY FACILITIES

1. Provide temporary toilet facilities sufficient to provide for the entire job site. Maintain these during the entire period of construction under this Contract for the use of all construction personnel on the job. Provide enough chemical toilets to conveniently serve the needs of all personnel. Properly seclude toilet facilities from public observation.

2. Chemical toilets and their maintenance shall meet the requirements of State and local health regulations and ordinances. Immediately correct any facilities or maintenance methods failing to meet these requirements. Upon completion of work, remove the facilities from the premises.

1.4 SECURITY

Full time watchmen will not be specifically required as a part of the Contract, but the CONTRACTOR shall provide inspection of work area daily and shall take whatever measures are necessary to protect the safety of the public, workmen, and materials, and provide for the security of the site, both day and night.

1.5 TEMPORARY CONTROLS

Take all necessary precautions to control dust and mud associated with the work of this Contract. In dry weather, spray dusty areas daily with water in order to control dust. Take necessary steps to prevent the tracking of mud onto adjacent streets and highways.

1.6 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

Remove the various temporary facilities, services, and controls and legally dispose of them as soon as the work is complete. The areas of the site used for temporary facilities shall be properly reconditioned and restored to a condition acceptable to the OWNER.

**** END OF SECTION ****

SECTION 01525

FIELD SURVEYING AND LAYOUT

1.1 GENERAL

A. The CONTRACTOR will furnish all construction staking for the project. All staking of control points and from control to establish project working points will be under the supervision of a ***Florida Registered Land Surveyor.*** Subject to review and approval by the CCEI, the Contractor my establish his own grades and offsets between established working points.

B. Develop and make all detail surveys and measurements needed for construction including but not limited to, slope stakes, batter boards, piling layouts and all other working lines, elevations and cut sheets.

C. Keep a transit and leveling instrument on the site at all times and a skilled instrument man available whenever necessary for layout of the Work.

D. Provide all material required for benchmarks, control points, batter boards, grade stakes, and other items.

E. Be solely responsible for all locations, dimensions and levels. No data other than written orders of the CCEI shall justify departure from the dimensions and levels required by the Drawings.

F. Safeguard all points, stakes, grade marks, monuments and benchmarks made or established on the Work, and reestablish same, if disturbed. Rectify all Work improperly installed because of not maintaining, not protecting or removing without authorization such established points, stakes, marks and monuments.

G. When requested by the CCEI, provide such facilities and assistance as may be necessary for the CCEI to check line and grade points placed by the CONTRACTOR. Do no excavation or embankment work until all cross-sectioning necessary for determining pay quantities has been completed and checked by the CCEI.

H. The cost of performing Surveying and layout work described above shall be included in the Contract lump sum price for surveying and layout of work pay Item. No separate payment will be made for additional field surveying other than the specified “As-Built” Record Drawings required in Section 01720 of these Specifications.

1.2 SURVEY WORK AND QUALIFICATIONS OF SURVEYOR

A. Prior to commencing work, the CONTRACTOR shall satisfy himself as to the accuracy of all survey and existing site information as indicated in the Contract Documents. Immediately notify the CCEI upon discovery of any errors, inaccuracies or omissions in the survey data. The commencing of any of the work by the CONTRACTOR shall be held as the CONTRACTOR's acceptance that all

survey or existing site information is correct and accurate, without any reasonably inferable errors, inaccuracies or omissions.

B. The CONTRACTOR shall carefully preserve all control stakes, benchmarks, reference points and property corners and will be responsible for any mistake or loss of time caused by their unnecessary loss or disturbance. If the loss or disturbance of the stakes or marks cause a delay in the Work, the CONTRACTOR shall have no claim for damages or extension of time. Control stakes, benchmarks, reference points and property corners disturbed by the CONTRACTOR's work shall be replaced by a ***Florida Registered Land Surveyor***, at the CONTRACTOR's expense. In the event the Owner must provide the services of the Florida Registered Surveyor to perform this replacement work, the cost of the surveying services will be deducted from any sums due the CONTRACTOR for the work performed under this Contract.

C. All survey work shall be performed under the guidance and direction of a ***Florida Registered Land Surveyor***.

D. All survey work for Record Drawings shall be performed by a ***Florida Registered Land Surveyor***.

1.3 LAYOUT OF STRIPING

Establish by instrument, and mark the finished surface, the points necessary for striping finished roadway in conformance with Section 5-7 of FDOT Standard Specifications.

+ + END OF SECTION + +

SECTION 01560

TEMPORARY CONTROLS

PART 1 -- GENERAL

1.01 REQUIREMENTS INCLUDED

A. Furnish, install, and maintain temporary control facilities required for construction; remove on completion of entire project any features not intended to remain on the project site.

B. Provide noise control, dust control, water control, debris control, pollution control and erosion control as specified in the appropriate sections of these documents.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with federal, state, and local codes and regulations and utility company requirements.

B. Comply with Department of Transportation requirements.

PART 2 -- PRODUCTS

2.01 MATERIALS (GENERAL)

A. All manufactured products shall be in new be new, in properly operating capacity and quality for the required usage, MUST NOT create unsafe conditions and MUST NOT violate requirements of applicable codes and standards.

2.02 TEMPORARY NOISE CONTROL

A. Mechanical equipment shall be fitted with mufflers to reduce noise from internal combustion type engines.

B. Bells, sirens, alarms, etc., shall be adjusted to provide adequate warnings to personnel on the project site; however, they shall be regulated to an intensity that is amenable to the neighboring communities.

C. Exterior construction work noises shall be kept to a minimum during evening, night, and early morning hours. In addition, weekend and holiday noises shall be limited to acceptable levels.

D. In addition to on-site control, noise considerations shall be made to off-site vehicles and equipment (mobilization, demobilization, deliveries, etc.).

2.03 TEMPORARY DUST CONTROL

Dust formed as a result of the construction shall be controlled by the Contractor. Cleaning of work areas and application of dust control materials are the most effective methods of dust control.

2.04 TEMPORARY WATER CONTROL

A. The flow of water through the construction site shall be controlled by the Contractor such that it does not damage any constructed items; however, it shall be diverted and channeled to effectively leave the site as soon as possible. Puddling and ponding on the site is not permitted.

B. Water shall be controlled such that it does not enter excavated areas, nor is deposited on or against constructed features.

C. F.W.C.D. sublateral ditch flows must be maintained during the course of construction.

2.05 TEMPORARY DEBRIS CONTROL

A. Provision shall be made by each Contractor to have available adequate containers to hold any and all debris that is to be generated from the project. Containers should be covered to prevent wind blowing paper, plastic, and lightweight products around and off the site.

B. Instructions shall be given to personnel to utilize the trash containers. Containers shall be placed in convenient places at the site.

C. At least once per week, a thorough cleaning of trash and debris shall be made at the construction site. An acceptable method of disposal shall be employed.

*** * END OF SECTION * ***

SECTION 01700

CONTRACT CLOSEOUT

PART 1 -- GENERAL

1.01 REQUIREMENTS INCLUDED

A. Comply with requirements stated in General and Special Conditions of the Contract and in Specifications for administrative procedures in closing out the work.

B. Related requirements in other parts of the Contract Documents:

1. Fiscal provisions, legal submittals, and additional administrative requirements;

General Conditions of the Documents:

a. Paragraph 6.19 – Record Documents
b. Paragraph 14.11 – Final Inspection
c. Paragraph 14.8 – Substantial Completion
d. Paragraph 14.12 – Application for Final Payment
e. Paragraph 14.13 – Final Payment and Acceptance
f. Paragraph 13.1 – Guarantee of Work

C. Related requirements specified in other sections:

1. Section 01710: Cleaning

2. Section 01720: Project Record Documents

1.02 SUBSTANTIAL COMPLETION

A. When Contractor considers his work is substantially complete, he shall submit to CCEI:

1. A written notice that the work, or designated portion thereof, is substantially complete.

2. A list of items to be completed or corrected.

B. Within a reasonable time after receipt of such notice, CCEI will make an inspection to determine the status of completion.

C. Should CCEI determine that the work is not substantially complete:

1. CCEI will promptly notify the Contractor, in writing, giving the reasons.

2. Contractor shall remedy the deficiencies in the work, and shall send a second written notice of substantial completion to CCEI

3. CCEI will re-inspect the work

D. When CCEI concurs that the work is substantially complete, he will:

1. Prepare a Certificate of Substantial Completion, accompanied by a list of items to be completed or corrected

2. Submit the Certificate to Owner and Contractor for their written acceptance of the responsibilities assigned to them in the certificate.

1.03 FINAL INSPECTION

A. When Contractor considers the work is complete, he shall submit written certification that:

1. Contract Documents have been reviewed

2. Work has been inspected for compliance with Contract Documents

3. Work has been completed in accordance with Contract Documents

4. Equipment and systems have been tested in the presence of the Owner's representative and are operational

5. Equipment and systems instructions to Owner's personnel have been completed in accordance with Contract Documents

6. Work is completed and ready for final inspection

B. CCEI will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.

C. Should CCEI consider that the work is incomplete or defective:

1. CCEI will promptly notify the Contractor, in writing, listing the incomplete or defective work.

2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to CCEI that the work is complete.

3. CCEI will re-inspect the work

D. When CCEI finds that the work is acceptable under the Contract

Documents, he shall request the Contractor to make closeout submittals.

1.04 RE-INSPECTION FEES

Should the CCEI perform re-inspection due to failure of the work to comply with the claims of status of completion made by the Contractor, Contractor will compensate CCEI/Owner for such additional services.

1.05 ADDITIONAL SERVICES

Should CCEI be required to provide representation at the site for the administration of the Contract for Construction, more than thirty days after the specified Date of Substantial Completion of the work, Contractor will compensate CCEI for such additional services.

1.06 CONTRACTOR'S CLOSEOUT SUBMITTALS TO CCEI

A. Evidence of compliance with requirements of governing authorities: Certificate of Occupancy (if applicable)

B. Project Record Documents: To requirements of Section 01720, including DWG file(s) for "As-Built" survey drawings.

C. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions

D. All Test Reports

E. One (1) Year Letter of Warranty

1.07 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to CCEI

B. Statement shall reflect all adjustments to the Contract Sum:

1. The original Contract Sum

2. Additions and deductions resulting from:

a. Previous change orders
b. Allowances
c. Unit prices
d. Deductions for uncorrected work
e. Deductions for liquidated damages
f. Deductions for re-inspection payments
g. Other adjustments

3. Total Contract sum, as adjusted

4. Previous payments

5. Sum remaining due

C. CCEI will prepare a final change order, reflecting approved adjustments to the Contract sum which were not previously made by change order.

1.08 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

PART 2 -- PRODUCTS

Not applicable

PART 3 -- EXECUTION

Not applicable

*** * END OF SECTION * ***

SECTION 01710

CLEANING

PART 1 -- GENERAL

1.01 REQUIREMENTS INCLUDED

Execute cleaning, during progress of the work, and at completion of the work, as required by General conditions.

1.02 DISPOSAL REQUIREMENTS

Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property and which will not damage finishes and surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 -- EXECUTION

3.01 DURING CONSTRUCTION

A. Execute periodic cleaning to keep the work, the site, and adjacent properties free from accumulation of waste materials, rubbish, and windblown debris resulting from construction operations.

B. Dispose of waste materials, cartons, crating, debris, and rubbish at designated waste receptacles.

C. Contractor shall maintain a broom-cleaned site during the entire construction phase.

D. For exterior utility work (such as underground pipelines, roadways, service areas, etc.), these shall be cleaned daily. Not less frequently than once weekly. Roadways shall be mechanically broomed.

3.02 DUST CONTROL

A. General Contractor shall broom-clean interior spaces prior to the start of completing painting and continue cleaning on an as-needed basis until painting is finished.

B. Schedule operations so that dust and other contaminants resulting from the cleaning process will not fall on wet or newly-coated surfaces.

3.03 FINAL CLEANING

A. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials.

B. Contractor shall broom-clean paved surface; rake-clean other surfaces of the grounds.

C. Prior to final completion, Contractor shall conduct an inspection of all work areas to verify that the entire work area is clean.

*** * END OF SECTION * ***

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 -- GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall maintain at the site for the Owner one record copy of the following:

1. Drawings

2. Specifications

3. Addenda

4. Change orders and other modifications to the Contract

5. Engineer field orders or written instructions

6. Approved shop drawings, product data, and samples

7. Field test records

B. Related requirements in the other parts of the Contract Documents: General Conditions of the Contract; Section 2 – Schedules, Reports and Records

C. Related requirements specified in other sections:

Section 01340: Shop Drawings, Product Data and Samples

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Contractor shall store documents and samples in the field office apart from documents used for construction.

1. Provide files and racks for storage of documents.

2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with Specifications – Table of Contents.

C. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all times for inspection by Engineer.

1.03 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color red.

1.04 RECORDING (SEE ALSO SPECIAL CONDITIONS)

A. Label each document “PROJECT RECORD” in neat large printed letters.

B. Record information concurrently with construction progress. DO NOT conceal or backfill any work until required information is recorded.

C. Drawings: Legibly mark to record actual construction:

1. Depths of various elements of construction in relation to N.A.V.D. 1988.

2. Horizontal and vertical locations of underground utility lines, fittings and appurtenances, referenced to permanent surface improvements.

3. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

4. Field changes of dimension and detail

5. Changes made by field order or by change order.

6. Details not on original contract drawings.

7. As-built elevations shall be provided for center line of drive (100 ft. on center), swales, pipe invents and structure grates.
D. Specifications and Addenda: Legibly mark each section to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.

2. Changes made by field order or by change order.

1.05 SUBMITTAL

A. At Contract close-out, deliver Record Documents to Engineer for the Owner

B. Accompany submittal with transmittal letter in duplicate, containing:

1. Date

2. Project title and number

3. Contractor's name and address

4. Title and number of each Record Document

5. Signature of Contractor or his authorized representative

1.06 AS-BUILT RECORD DRAWING SURVEYS

A. INFORMATION FOR AS-BUILT UTILITY SURVEY WORK

1. All as-built drawings shall state in 1" lettering "AS-BUILT RECORD SURVEY" located in the bottom right hand side of the drawing original and/or copies, along with the as-built date.

2. All as-built surveys shall meet the minimum requirements of the Chapter 61G17, Florida Administrative Code Pursuant to Section 472 of the Florida Statutes. All surveys shall be based on a minimum horizontal control Third Order, "Class 2."

3. All state plane coordinates shall be based on the Florida State Plane Horizontal Data (East Zone); Florida High Precision Geodetic Network (Superstation) and NAD 83/1990 – final adjustment.

4. State plane coordinates shall be physically tied to a minimum of two known state plane coordinate benchmarks that utilize number 3 above. State plane coordinates shall be shown on survey at benchmarks used.

5. All elevations shown shall be based on 1988 NAVD.

6. All incoming as-built survey(s) shall be DWG drawing files provided on blackline and on CD-ROM in state plane coordinates. (NOTE: Prior to submitting the final hard copies and DWG drawings, two (2) hard copies, signed and sealed by a Florida registered surveyor, of each survey shall be submitted for review and approval.

PART 2 -- PRODUCTS

Not applicable

PART 3 -- EXECUTION

Not applicable

*** * END OF SECTION * ***

TECHNICAL SPECIFICATIONS

DIVISION 02

SECTION 02110

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 SCOPE

The Contractor shall furnish all labor, materials, equipment, and all operations required to clear and grub the indicated portions of the site located within the Limits of Construction of the project.

PART 2 - PRODUCTS - None

PART 3 - EXECUTION

3.01 GENERAL

A. Clearing and grubbing shall consist of the complete removal and disposal of all trees, brush, logs, stumps, roots, weeds, rubbish, rocks, structures designated to be removed, concrete and other deleterious material and obstructions resting upon or protruding through the surface of the ground. Stumps, roots 3" and over and similar obstructions shall be removed to a minimum depth of 2 feet below the existing ground. All structural items shall be excavated to full depth, completely removed, and the excavation backfilled per these specifications.

B. The Contractor shall clear and grub limited areas along the canal banks needed to access the limits of the project.

3.02 DISPOSAL

A. Burning On Site

1. Burning of cleared and grubbed materials shall not be permitted on site.

B. Off Site Disposal

1. On site burning is not permitted, all unusable vegetative material not processed and incorporated into the Work shall be hauled off site by the Contractor for disposal in an approved manner.

2. The Contractor shall be responsible for obtaining and complying with the provisions of all necessary permits. All fees shall be paid by the Contractor.

3. No rejected materials shall be buried on site.

**** END OF SECTION ****

SECTION 02300

EARTHWORK

1. GENERAL

A. RELATED DOCUMENTS

1) Drawing and general provisions of Contract, including General and Supplementary Conditions and Division 1 General Requirements, apply to this Section.

B. SUMMARY

1) This Section includes the following:

a) Preparing of subgrade for building slabs, walks, pavements and landscaped areas.
b) Excavating and backfilling for underground sewers, mechanical and electrical appurtenances.
c) Excavating, backfilling, and grading for ditches, berms and swales.

2) Excavating and Backfilling for Mechanical/Electrical Work: Refer to utility specifications and details where applicable for excavating and backfill required in conjunction with underground mechanical and electrical utilities and buried mechanical and electrical appurtenances.

3) Final Grading, together with placement and preparation of topsoil for lawns and planting, is specified in Division 2 Section, “Sodding, Seeding & Mulching”.

C. DEFINITIONS

1) Excavation consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

2) Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Project Architect/CCEI. Unauthorized excavation, as well as remedial work directed by the Project Architect/CCEI, shall be at the Contractor’s expense.

a) Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to the Project Architect/CCEI.

3) In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations as same classification, unless otherwise directed by the Project Architect/CCEI.

4) Additional Excavation: When excavation has reached required subgrade elevations, notify the Project Architect/CCEI, who will make an inspection of conditions. If the Project Architect/CCEI determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by the Project Architect/CCEI. The Contract Sum may be adjusted by an appropriate

Contract Modification.

a) Removal of unsuitable material and its replacement as directed will be paid on a unit cost basis of Conditions of the Contract relative to changes in the work.

5) Subgrade: The undisturbed earth or the compacted soil layer immediately below granular sub-base (if required), base, drainage fill, or topsoil materials.

6) Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

D. SUBMITTALS

1) Test Reports: Submit the following reports directly to the Project Architect/CCEI from the testing services, with copy to Contractor, and Owner:

a) Test reports on borrow material.
b) Verification of suitability of each footing subgrade material, in accordance with specified requirements.
c) Field reports: in-place soil density tests.
d) One optimum moisture-maximum density curve for each type of soil encountered.
e) Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

E. QUALITY ASSURANCE

1) Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

2) Trenching to comply with OSHA Standard 29CFR, Section 1926-650 subpart P. Contractor to provide written assurance of compliance.

3) Testing and Inspection Service: The Contractor will employ and pay for a qualified independent geotechnical testing and inspection laboratory to perform soil testing and inspection service during earthwork operations.

4) Degree of Compaction: Required compaction is expressed as a percentage of maximum density by test procedures of AASHTO T-180 or AASHTO T-99 as specified on the plans.

F. PROJECT CONDITIONS

1) Bidders shall inform themselves of location and nature of work, character of equipment and facilities needed for performance of work, general and local conditions prevailing at site, and other matters which may in any way affect work under this contract in accordance with DIVISION 1, GENERAL REQUIREMENTS.

2) Site Information: Data in subsurface investigation reports was used for the basis of the design and are available to the Contractor for review and compliance with recommendations.

Conditions are not intended as representations or warranties of accuracy of continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by the Contractor.

a) Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.
b) The Soils Report shall be a part of these specifications and shall have the same force and effect as the specifications.

3) Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.

a) Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult Project Architect/CCEI and utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities immediately to satisfaction of utility owners.
b) Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by the Project Architect/CCEI and then only after acceptable temporary utility services have been provided.
i. Provide a minimum of 48-hour notice to the Project Architect/ CCEI, and receive written notice to proceed before interrupting any utility.
c) Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

4) Use of Explosives: Use of explosives is not permitted.

5) Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

a) Operate warning lights as recommended by authorities having jurisdiction.
b) Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
c) Perform excavation by hand within drip-line of large trees selected to remain. Protect root systems from damage or dry out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

6) Maintain existing bench marks, monuments and other reference points, if disturbed or destroyed, replace as directed by the project Architect/CCEI.

7) Condition of Premises: Accept site as found and excavate, fill and backfill site as indicated on the drawings and as specified in this Section.

2. PRODUCTS

A. SOIL MATERIALS

1) "Satisfactory Fill Materials" include materials classified in ASTM D2487 as GW, GP, SW and SP properly worked by Contractor to obtain optimum moisture and compaction. Within 2 feet of the surface of the indicated grade, limit rock size to 3 inches. Below 2 feet of the surface of indicated grade, limit rock size to 12 inches.

2) “Unsatisfactory Materials” include materials other than “Satisfactory Fill Materials”: however, materials of any classification that are determined by testing laboratory as too wet or too soft for providing a stable foundation for structure, paving and walks will be classified as “unsatisfactory”.

3) Sub-base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, and natural or crushed sand.

4) Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100 percent passing a 1-1/2 inch sieve and not more than 5 percent passing a No. 4 sieve.

5) Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2 inches in any dimension, debris, waste, muck, vegetation and other deleterious matter.

3. EXECUTION

A. INSPECTION

1) Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

B. GENERAL

1) Public Safety: Accomplish work in a manner that provides for safety of the public and workers and provides for the protection of property.

2) Construction: Do not close, obstruct or store material or equipment in streets, sidewalks, alleys or passageways without a permit in accordance with local ordinances, regulations, codes and Owner approval.

3) Interference: Conduct operations with minimum interference with roads and other facilities.

4) Debris Removal: Do not store or permit debris to accumulate on site.

a) If Contractor fails to remove excess debris promptly, Owner reserves the right to cause same to be removed at Contractor’s expense.

5) Erosion Repair: Take every precaution and temporary measure to prevent damage from erosion of freshly graded areas.

a) Repair and reestablish grades to required elevations and slopes where settlement/washing occurs prior to acceptance of work.

6) Temporary Structures: Remove temporary structures when no longer required.

C. LOCATIONS AND ELEVATIONS

1) Be responsible for surveys, measurements and layouts required for proper execution of work.

a) Lay out lines and grades from existing survey control system and as shown on Site Plan.

2) Locate by stake and mark, locations and elevations of the following:

a) Elevations of existing earth cut and fill.
b) Final grades for landscape contours.
c) Other items as required to execute work under this Section of the specifications.

D. CLEARING AND GRUBBING

1) Shall be in accordance with SECTION 02302 – EXCAVATION AND BACKFILL.

E. STRIPPING

1) Strip turf, organic material, muck surface litter, rubble, and overburden for entire depth of root system of grass or other vegetation and/or to bottom of muck layer within all areas of construction as indicated on Site Plan(s).

2) Stockpile clean topsoil on site to be used in the final grading work as an underlayment for sod and landscaping proposed for the site.

F. EXCAVATION

1) Shall be in accordance with SECTION 02302 – EXCAVATION AND BACKFILL.

2) Begin excavation after stripping, clearing and compaction where applicable, has been completed.

3) Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

4) Excavations for appurtenances and structures shall conform to dimensions and elevations and shall extend a sufficient distance from walls and footings to allow for placing and removal of forms and installation of services, except where the concrete for walls and footings is authorized to be deposited directly against excavation surfaces. All excavation below general machine excavation for footings and foundations shall be hand worked. Bottoms of all (footings and appurtenances) shall be on level planes.

5) Remove “unsatisfactory materials” encountered from the building areas.

6) Excavate in such a manner that quick and efficient drainage of storm water will be affected.

7) Classify excavated materials and stockpile separately suitable soils for use as backfill materials. If sufficient quantities of excavated materials meeting requirements for backfill are not available on site, provide materials meeting these requirements.

8) Stockpile excavated material suitable for use as fill and backfill.

G. STABILITY OF EXCAVATIONS

1) General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction. Comply with OSHA Standard 29CFR, Section 1926-650 subpart P.

2) Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

3) Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition for all trenches in excess of 5 feet deep. Maintain shoring and bracing in excavations regardless of time period that excavations will be open. Extend shoring and bracing as excavation progresses.

H. DEWATERING

1) Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

a) Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil
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changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
b) Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

2) Dewater excavations for inspection and for construction so that no concrete or fill is placed in water and so that concrete less than 8 hours of age is not subjected to ground water pressure.

3) Keep excavations free of water while backfilling and construction therein takes place.

4) Dispose of water, resulting from dewatering operations in accordance with city, county, state and federal regulations.

5) Conduct operations so that storm water runoff sediment is not discharged to the adjacent lakes, waterways, sewers, streets and adjacent properties.

I. STORAGE OF EXCAVATED MATERIALS

1) Stockpile excavated materials acceptable for backfill and fill where directed and as shown on the drawings. Place, grade, and shape stockpiles for proper drainage.

a) Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
b) Segregate materials useable as fill and those materials not suitable to be used as fill. Unsuitable fill material shall be used in construction of berms and other landscape features as directed by CCEI.

J. EXCAVATION FOR STRUCTURES

1) Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from the footings and foundations to permit placing and removal of concrete form work, installation of services, and other construction for inspection.

a) Excavations for footings and foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.
b) Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete form work, installation of services, and other construction for inspection. Do not disturb bottom of excavations intended for bearing surfaces.

K. EXCAVATION FOR PAVEMENTS

1) Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.

L. TRENCH EXCAVATION FOR PIPES AND CONDUIT

1) Excavate trenches per requirements of The Division 2 SECTION 02201, to uniform width, sufficiently wide to provide ample working room and a minimum of 9 to 12 inches of clearance on both sides of pipe or conduit.

2) Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil.

a) Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6-inch layer of tamped sand or gravel prior to installation of pipe.
b) For pipes or conduit less than 6 inches in nominal size, and for flatbottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
c) For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads and to ensure continuous bearing of pipe barrel on bearing surface.

M. FILLING, BACKFILLING AND COMPACTION

1) The work consists of compaction of existing earth surfaces, (excluding rock),

after excavation, filling and compaction of said area to levels required with suitable backfill material.

2) Materials: “Satisfactory Fill Materials” shall be used in fills and backfills.

3) Filling and Backfilling: Place “Satisfactory Fill Material” in horizontal layers not exceeding 12 inches in loose depth. Compact as specified herein. No material shall be placed on surfaces that are muddy.

4) Compaction: Compaction shall be with equipment suited to soil being compacted. Moisten or aerate material, as necessary to provide moisture content that will readily facilitate obtaining specified compaction with equipment used. Compact each layer to not less than percentage of maximum density specified below, determined in accordance with AASHTO T-180. Insure that the compaction of previously prepared fill areas has been maintained prior to placing new layers.

AREA PERCENTAGE

Under pavements and sidewalk areas, 98 top 12 inches, each layer.
Under pavements and sidewalk areas, 98 below 12 inches, each layer.
Under landscaped areas, each layer 95 including all physical education fields

5) Reconditioning of Subgrade: Where approved compacted subgrades are disturbed by the Contractor’s subsequent operations or adverse weather, subgrade shall be scarified and compacted as specified herein before to required density prior to further construction thereon. Recompaction over underground utilities shall be by power driven hand tampers.

6) Backfilling: Backfilling shall not begin until construction below finish grade has been accepted, underground utilities systems have been inspected, tested, and accepted, forms removed, and excavation cleaned of trash and debris. Backfill shall be brought to indicated finish subgrade. Backfill shall not be placed in wet areas. Backfill materials and compaction shall be as specified herein. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to height of backfill above top of footing; area remaining shall be compacted by power-driven hand tampers suitable for material being compacted. Backfill shall be placed carefully around pipes to avoid damage.

7) Protection: Settlement or washing that occurs in backfilled areas prior to acceptance of work shall be repaired and grades re-established to required elevations and slope.

8) Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.

9) Do not backfill trenches until tests and inspections have been made and backfilling is authorized by the Project Architect/CCEI. Use care in backfilling to avoid damage or displacement of pipe systems.

10) Backfill excavations as promptly as work permits, but not until completion of the following:

a) Inspection, testing and approval by UBC Inspectors, and recording locations of underground utilities have been performed and recorded.
b) Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure of utilities or leave in place if required.
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c) Removal of trash and debris from excavation.

N. GRADING

1) General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades. Grading between indicated elevations and/or contours to be uniform, continuous and sloped as indicated on the drawings.

2) Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes as follows:

a) Lawn or Unpaved Areas: Finish areas to receive stockpiled topsoil to within not more than 0.10 foot above or below required subgrade elevations.
b) Walks: Shape surface of areas under walks to line, grade, and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.
c) Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than ½ inch above or below required subgrade elevation.

3) Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of ½ inch when tested with a 10-foot straightedge.

4) Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each classification.

O. PAVEMENT SUB-BASE COURSE

1) General: Sub-base course consists of placing sub-base material, in layers of specified thickness, over subgrade surface to support a pavement base course.
a) Refer to Drawings and other Division 2 Paving and Sub-base Sections for paving specifications.

2) Grade Control: During construction, maintain lines and grades including crown and cross-slope of sub-base course.

3) Shoulders: Place shoulders along edges of sub-base course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each sub-base course layer. Compact and roll at least a 12-inch minimum width (or shoulder width per plan) of shoulder simultaneous with the compaction and rolling of each layer of sub-base course.

4) Placing: Place sub-base course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting sub-base material during placement operations.

a) When a compacted sub-base course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

P. FILL AND GRADING FOR GRASSED AREAS

1) Fill Material under Grassed Areas: Clean, satisfactory fill, free from rock and debris and of such quality to not interfere with future installation of grass.

2) Filling and Grading for Grassed Areas: Rough grade shall be 6 inches below finish grade.
a) Topping: 6 inches of compacted 80-20 topsoil mix as specified in SECTION 02302- EXCAVATION AND BACKFILL.
b) Grass and/or Hydroseeding: As specified in SECTION 02922 – SODDING, SECTION 02926 – HYDROSEEDING, or a related section within Division 2.

3) Filling and Grading for Landscaped Areas other than Grass: Similar, with variations per specific plant material, as defined, illustrated and specified on the Landscape Plans.

Q. FIELD QUALITY CONTROL

1) Specified Tests shall be performed by the Contractor's Testing Agency, at the Contractor's expense, with results forwarded to the Project Architect/CCEI for review.

2) Quality Control Testing during Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.

3) Tests of Materials shall be as follows:

a) Soil Classification:
1. One test from each type of material encountered and/or proposed to be used.
b) Laboratory Tests for Moisture Content and Density:
1. According to AASHTO T-180 one test for each material encountered and/or proposed.
2. Field Tests for Moisture Content and Density:
3. According to AASHTO T-180, one test per layer of fill per 10,000 square feet of area, plus one test per 10,000 square feet of subgrade in cut.
02300-11
c) Control: Fill and topsoil mixture may be inspected at any stage of operation to determine compaction characteristics, densities and freedom from organic and plastic materials.

4) Perform field density tests in accordance with methods listed in Item C.

a) Footing Subgrade: For each strata of soil on which footings will be placed, perform at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be used on a visual comparison of each subgrade with related tested strata when acceptable to the Project Architect/CCEI.
b) Paved Areas and Building Slab Subgrade: Perform at least one field density test of subgrade for every 2,000 sq. ft. of paved area or building slab, but in no case fewer than three tests. In each compacted fill layer, perform one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case fewer than three tests.
c) Foundation Wall Backfill: Perform at least two field density tests at locations and elevations as directed.
d) If in the opinion of the Project Architect/CCEI, and based on testing service reports and inspections, any subgrade or fills that have been placed which are below specified densities shall require additional compaction and testing until the specified density is obtained.

5) Notification:

a) Give sufficient notification of placing orders for fill and topsoil with supplier to permit full inspection including testing for compaction characteristics at source of supply.

b) Obtain approval from Project Architect/CCEI before placing topsoil mixture at project site, without exception.

R. EROSION CONTROL

1) Provide erosion control methods in accordance with requirements of the project, Section 02270 EROSION CONTROL, and the Stormwater Pollution Prevention Plan as prepared for the F.D.E.P., N.P.D.E.S. Permit. Repair and re-establish grades to required elevations and slopes where erosion has occurred prior to Owners acceptance of the work.

2) The Contractor shall install erosion control methods adjacent to any lakes, ditches and/or wetlands which are adjacent to the project site whereby the quality of such would be degraded by runoff, erosion and sedimentation in accordance with the plans, permits and the Stormwater Pollution Prevention Plan.

S. MAINTENANCE

1) Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

2) Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

3) Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

4) Settling: Where settling is measurable or observable at excavated areas during general project warranty period in the opinion of the Project Architect/CCEI, the Contractor shall remove surface (pavement, lawn, or other finish), add backfill

material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

T. DISPOSAL OF EXCESS AND WASTE MATERIALS

1) Removal from Owner's Property: Contractor shall remove waste materials, trash, and debris, and dispose of it off of Owner's property at a landfill or equivalent site, approved by the local Government Authorities.

*** * END OF SECTION * ***

SECTION 02302

EXCAVATION AND BACKFILL

1. GENERAL

A. References

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

a) ASTM C 33(1999; Rev. A) Concrete Aggregates
b) ASTM C 136(1996; Rev. A) Sieve Analysis of Fine and Coarse Aggregates
c) ASTM D 698(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft (600 kN-m/m))
d) ASTM D 1140(1997) Amount of Material in Soils Finer Than the No. 200 (75-Micrometer) Sieve
e) ASTM D 1556(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
f) AASHTO T-180(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft (2,700 kN-m/m))
g) ASTM D 2321(1989; R 1995) Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
h) ASTM D 2487(1998) Classification of Soils for CCEling Purposes (Unified Soil Classification System)
i) ASTM D 2922(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
j) ASTM D 3017(1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
k) ASTM D 4318(1998) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

2) AMERICAN WATER WORKS ASSOCIATION (AWWA)

a) AWWA C600(1999) Installation of Ductile-Iron Water Mains and Their Appurtenances

3) U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

a) EPA SW-8461986 Test Methods for Evaluating Solid Waste (Physical/Chemical Methods)

b) EPA 600/4-79/0201983 Methods for the Chemical Analysis of Water and Wastes

B. Definitions

1) Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

2) Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe mounted pneumatic hole punchers or rock breakers; also, large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

3) Cohesive Materials

Materials ASTM D 2487 classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when the fines have a plasticity index greater than zero.

4) Cohesionless Materials

Materials ASTM D 2487 classified as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.
02302-3

C. Submittals

1) Test Reports to be obtained and paid for by Contractor

Fill and backfill test where required
Select material test where required
Density tests where required
In-place soil tests where required

D. Delivery, Storage and Handling

Perform in a manner to prevent contamination or segregation of materials.

E. Criteria for Bidding

Base bids on the following criteria:

a. Surface elevations are as indicated on “Existing Conditions” sheet.
b. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.

c. Material character is indicated by the boring logs.
d. Blasting will not be permitted. Remove material in an approved manner.

2. PRODUCTS

A. Soil Materials

Free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and deleterious or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

1) Common Fill

Common shall consist of sandy-loam, sand, gravel, soft shale, or crushed stone. The CCEI shall be the sole judge of what constitutes suitable and unsuitable material for backfill from “on-site excavations.

2) Select Material

Select Fill shall consist of uniform, clean, free draining sand or sand and shell containing less than 5% fines passing a No. 200 sieve. Laboratory test results of this fill shall be submitted to the CCEI for his approval.
02302-4

3) Topsoil

Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

3. EXECUTION OF WORK

A. SURFACE PREPARATION

1) Clearing and Grubbing
Unless indicated otherwise, remove trees, stumps, logs, shrubs, and brush within the clearing limits. Remove stumps entirely. Grub out matted roots and roots over 3 inches in diameter to at least 24 inches below existing surface.

2) Stripping

Strip existing topsoil to a depth of 6 inches without contamination by subsoil material. Stockpile topsoil separately from other excavated material and locate convenient to finish grading area.

3) Unsuitable Material

All cleared, grubbed and demolished material deemed unsuitable shall be hauled off site by the Contractor for disposal in an approved manner. All material desired by the Owner but unsuitable for use on this project shall be stockpiled in a location by the owner, in an approved manner.

The Contractor shall be responsible for complying with the provisions of the City of Fellsmere Tree Removal permits as well as all pertinent General Conditions of the St. John's River Water Management District permit.

4) Disposal

In all areas where excavation is to be done, all earth, rock, muck and other materials shall be removed and separated as to suitable and unsuitable material for backfill as defined herein.
The Contractor may, for his own convenience, elect to temporarily stockpile any portion of the excavated material at the site, for later use or disposal. The stockpiled material shall be piled in an orderly manner so as not to endanger the work or obstruct roadways or drainage within the designated job site location. All excavated material that is not reused by the Contractor within the job site shall become the property of the Owner and shall be disposed of as directed above.

5) Removal of Muck, Rock and Other Unsuitable Material

All muck, rock , clay, marl, gravel, boulders, heterogeneous fill material and any other organic or unsuitable "materials of excavation" encountered under pavement areas, structures and utilities shall be excavated and removed. Also any "unforeseen obstacles" such as buried trees or timbers, abandoned utilities, metal objects, concrete masses, or any other type of debris encountered shall be removed.

All areas under proposed pavements or structures, which are indicated by testing to have more than trace amounts of silt and/or clay within the top several feet of existing grade shall be "proof rolled" using a vibratory compactor. Should the existing material continuously yield or "pump" during the proof rolling, the CCEI shall be notified and a determination made as to the amount of stripping needed to accomplish a stabilized foundation.

Stripping shall be accomplished to clean in-place sand or other suitable material as approved by the CCEI. Removal of unsuitable material within areas which are to receive footings, slabs or other foundations shall be completed for the full area under such structures and to ten feet minimum outside the maximum perimeter. Where pavement is to be placed, said removal shall include all area under the surface and extend to the outside of any shoulders, under any sidewalks and bike paths, or as directed by the CCEI.

All roots, stumps, logs, limbs, timbers, boulders, or any material which is not suitable for backfill material shall be removed from the site promptly and excavated and disposed of by the Contractor at his expense.
Removal of all "materials of excavation" and "unforeseen obstacles" will be paid for under the heading of "Excavation and Hauling".

B. PROTECTION

1) SHEETING AND BRACING

a) Where excavations may endanger workmen, existing structures,

utilities or other facilities, it shall be the Contractor's responsibility to immediately install and maintain adequate sheeting and bracing per OSHA specifications in order to protect said facility. No work shall proceed in such excavations until the sheeting and bracing has been properly and completely installed. The sheeting thus installed shall be removed as the work progresses or, at the discretion of the CCEI, be cut off below finished grade and left in place. Sheeting and bracing may be either steel or wood at the option of the Contractor.

b) Sheeting and bracing shall be installed in a manner that will allow for removal without injuring or endangering workmen, the work, adjacent structures, and the like. Voids caused by withdrawal of sheeting shall be promptly and completely filled with sand and compacted to a degree equal to the surrounding soil.

2) Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

a) Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. The Contractor shall establish/construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed.

b) Dewatering

All water encountered during excavation shall be promptly and completely removed to a depth below the exposed excavation surface sufficient to provide a dry working surface. The excavation shall be kept dry until the work to be built or placed therein has been completed as specified. Dewatering shall be done in a manner that will not cause sloughing or caving of the excavation walls. Water from said dewatering shall be disposed of in a manner as will not result in violations of State water quality standards in receiving waters, nor cause injury to public health nor to public or private property, nor to the work completed or in progress. Any and all damage caused by dewatering shall be promptly repaired by the Contractor at no cost to the Owner. The receiving point for water from said operation shall be approved by the applicable regulatory agency and the CCEI. The Contractor is

responsible for obtaining all required permits and any other approval necessary.

3) Underground Utilities

Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall contact Call Sunshine at 1-800-432-4770 48 hours prior to commencement of excavation for assistance in locating existing utilities.

4) Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

C. EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Refill with common fill and compact to 95 percent of AASHTO T-180 maximum density. Unless specified otherwise, refill excavations cut below indicated depth with common fill and compact to 95 percent of AASHTO T-180 maximum density.

1) Pipe Trenches

Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 9 to 12 inches of clearance on both sides of the pipe or conduit. Grade bottom of trenches to provide uniform support for each section of pipe after pipe bedding placement.

2) Excavate trenches to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil.

a) Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6-inch layer of tamped sand or gravel prior to installation of pipe.

b) For pipes or conduit less than 6 inches in nominal size, and for flat-bottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

c) For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads and to ensure continuous bearing of pipe barrel on bearing surface.

D. FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

1) UNSUITABLE MATERIAL REPLACEMENT

a) Fill material shall be placed and spread evenly in layers not to exceed twelve inches before compaction. All fill material shall be free from vegetable matter, wood, and other deleterious substances, and shall not contain rocks or clods having a diameter of more than three inches.

2) PRE-FILL COMPACTION

a) Should the pre-fill surface elevation be below that required for the base of proposed building foundations or paving subgrade, the areas within road rights-of-ways, under parking areas, and the areas under and within five feet of proposed buildings shall be precompacted. This precompaction shall be performed equally on existing ground and on surfaces which have been excavated to remove unsuitable material. The top one foot of said areas shall be compacted to a minimum density of 98% of maximum as determined by AASHTO T-180. The maximum spacing between density tests shall be 150 feet.

3) COMPACTION

a) Backfill material shall be compacted to 98% of maximum density per AASHTO T-180. Equipment suitable and adequate for uniform compaction to the specified density shall be used for backfill operations subject to the approval of the CCEI. All compaction equipment shall be in good working order and any worn or defective equipment shall be immediately replaced or repaired.

4) SOIL STABILITY AND COMPACTION CONTROL

a) The Contractor shall arrange to have sufficient soil tests made by an independent testing laboratory selected by the Contractor and approved by the CCEI to demonstrate conformance of his work with the stability and compaction levels required by these specifications. Compaction tests shall be taken at intervals listed herein or as deemed necessary by the CCEI.
b) Any proposed alternative test methods to those specified herein must be approved by the CCEI prior to testing. At the request of the CCEI, the Contractor shall provide such documentation of a proposed alternative test method as the CCEI may require to evaluate the method for approval.
02302-9
c) In no case shall the Contractor proceed with construction on compacted material until the tests prove satisfactory and approval is given by the CCEI.
d) In general, at least one test for maximum dry density/optimum moisture content shall be performed on a representative sample of each inherently different material to be used for compacted backfill

or embankment fill. For material of uniform composition and textural class, a minimum of one test per 200 cu. yd. of material shall be performed at the point of use.
e) Tests for in-place density (percent compaction) shall be taken at locations designated by the CCEI. The Contractor shall have density tests taken as required in other Sections of the Work. Each location shall be tested in lifts not to exceed 12-inches in thickness for the entire depth of burry.

5) Trench Backfilling

Backfill as rapidly as construction, testing, and acceptance of work permits. Place and compact backfill under structures and paved areas in 12-inch lifts to top of trench and in 6 inch lifts to one foot over pipe outside structures and paved areas.

a) Bedding Requirements

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Backfill to top of pipe shall be compacted to 98 percent of ASTM D 698 maximum density. Plastic piping shall have bedding to spring line of pipe. Provide ASTM D 2321 materials as follows:
Class I: Angular, 0.25 to 1.5 inches, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.
Class II: Coarse sands and gravels with maximum particle size of 1.5 inches, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D 2487.

E. EXISTING COMPACTION

Expressed as a percentage of maximum density. Determine in-place density of existing subgrade by testing a minimum of 6 locations where designated by the CCEI. If required density exists, no additional compaction of existing subgrade will be required.

1) General Site

Compact underneath areas designated for vegetation and areas outside the 5 foot line of the structure to 95 percent of AASHTO T-180.

F. FINISH OPERATIONS

1) Grading

Finish grades as indicated on the plans to within two inches. In areas where sodding is required, finished soil grade shall be set 3-inches below the plan elevation to compensate for sod thickness.. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.

2) Protection of Surfaces

Protect newly graded areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

G. DISPOSITION OF WASTE MATERIAL

Waste, brush, refuse, stumps, roots, and timber Shall be removed from site and disposed of in an approved manner.

***** END OF SECTION *****

SECTION 02318

SWALE CONSTRUCTION

1. GENERAL

A. Related Documents

Drawing and general provisions of Contract, including General and Supplementary Conditions and Division 1 General Requirements, apply to this Section, as well as Section 02300 Earthwork, and Section 02302 Excavation and Backfill, and Section 02922 Sodding.

2. PRODUCTS

N/A

3. EXECUTION OF WORK

A. Fine grading of swales shall be accomplished after the existing ground has been excavated and compacted to within 3-inches of the design elevations. Fine grading of the swale areas will be done by a motor grader unless otherwise approved or directed by the CCEI. Hand dressing will not be required except where shown on the Drawings or in confined areas where equipment operation is restricted.

B. The Contractor shall maintain and keep open and free from: rainfall runoff; leaves; sticks, rubble, and other debris, all graded swales shall be kept clean of debris and “fines” by the Contractor until final acceptance of the work. The swales should be constructed as late as possible in the work schedule to allow for immediate sodding. No sod shall be allowed to be placed on fines which have washed into the graded swale.

C. The finished grade shall be completed and shaped to a surface which varies no more than 2-inches above or below the Plan elevations except that, adjacent to pavement, catch basin, or sidewalk, the swale shall be graded to within 3-inches below the edge of the pavement, catch basin or sidewalk.

D. In areas where sodding is required, finished soil grade shall be set 3-inches below the plan elevation to compensate for sod thickness.

E. Compaction to a specific density will not be required unless so directed by the CCEI. However, swales shall be compacted to a firm, even surface true to grade and cross section. All swales must be rolled.

F. Fine grading of the swale areas shall preferably be done prior to paving the asphalt bearing course. If the Contractor chooses to fine grade the swale areas subsequent to paving, he must exercise extreme care when dressing areas adjacent to pavement areas to avoid damage to the pavement. No handling of swale material shall be permitted on the pavement surface.
02318-1
02318-2

G. Immediately before seeding or sodding, all fines deposited in the swales from rainfall runoff or other construction debris shall be removed and the swales fine dressed by breaking the soil surface and providing a loose soil texture to place the seed or sod onto.

H. After final dressing of the swales, the Contractor shall seed or sod them as required by the Plans in accordance with Section 02922 Sodding, Seeding & Mulching, of these Specifications.

***** END OF SECTION *****

SECTION 02630

STORM SEWERAGE

1. GENERAL

A. REFERENCES
The publications listed below form a part of this section to the extent referenced:

1) AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
a) AASHTO M 198(1994) - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets
b) AASHTO M 288(1992) - Standard Specification for Interim Geotextile Specification for Highway Applications
c) AASHTO M 306(1990) - Standard Specification for Drainage Structure Castings
2) AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)
a) ACPA O1-103(1988) - Concrete Pipe Installation Manual
3) ASTM INTERNATIONAL (ASTM)
a) ASTM A 760(1995) - Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
b) ASTM A 798(1994) - Standard Practice for Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications
c) ASTM B 745/B 745M(1993) - Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
d) ASTM C 139(1995; Rev A) - Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Structures
e) ASTM C 14(1994) - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe
f) ASTM C 270(2001a) - Standard Specification for Mortar for Unit Masonry
g) ASTM C 32(1993) - Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)

h) ASTM C 361(1990) - Standard Specification for Reinforced Concrete Low-Head Pressure Pipe
i) ASTM C 387(2000e1) - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete
j) ASTM C 443(1994) - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
k) ASTM C 506(1995) - Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
l) ASTM C 76(1995) - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
m) ASTM C 923(1994) - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
n) ASTM C 969(1994) - Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines
o) ASTM D 2321(1989) - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

p) ASTM D 3212(1992) - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
q) ASTM F 1417(1992) - Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low Pressure Air
r) ASTM F 477(1995) - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

4) FLORIDA DEPARTMENT OF TRANSPORTATION - STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (2002)

B. SUBMITTALS

1) Shop Drawings

Coordination Drawings in accordance with paragraph entitled, "Drawings," of this section.
02630-2

2) Product Data

Five (5) copies of Manufacturer's catalog data shall be submitted for the following:
Piping
Gaskets
Compression Joints
Frames, Covers and Gratings
Precast Concrete Structures
Precast Concrete Base Sections

A Work Plan shall be submitted in accordance with paragraph entitled, "Plans," of this section.
Proposed Schedules
Methods
Materials
Equipment

C. DRAWINGS

As-Built Drawings for the complete storm sewerage system shall be submitted showing complete detail with all dimensions, both above and below grade in accordance with SECTION 01720 – PROJECT RECORD DOCUMENTS

2. PRODUCTS

A. BONDING AND SEALING MATERIALS

1) Bituminous Coating and Sealing
Coating shall be in accordance with ASTM A 849.
Coating shall be in accordance with ASTM A 849, when using materials previously coal-tar coated and for each uncoated ferrous piece used underground.
Cold Bituminous Mastic Sealer shall be in accordance with ASTM A 849 trowel consistency.

2) Epoxy Bonding
Epoxy adhesive shall be in accordance with AWWA C210.

B. FILTER MATERIAL

1) Filter Fabric
Fabric shall be in accordance with AASHTO M 288, and be water pervious, made of polyester materials.
02630-3

2) Filter Aggregate
Aggregate shall be clean gravel free from organic materials, clay, or other deleterious materials.

C. MANHOLE AND CATCH-BASIN MATERIALS

Water, for use with concrete block and brick, shall be clean and potable.

1) Concrete Block and Mortar
Concrete block shall be in accordance with ASTM C 139.
Concrete Mortar shall be in accordance with ASTM C 387, Type M

2) Brick and Mortar
Brick shall conform to ASTM C 32, Grade MS
Brick Mortar shall conform to ASTM C 387

D. CONDUIT PIPING, JOINTS, FITTINGS AND GASKETS

1) Corrugated Steel Pipe

Where shown on the Drawings as "CMP", the drainage pipe and required coupling bands shall be corrugated galvanized steel and shall conform to the requirements of Section 943 of the FDOT Specifications.

2) Corrugated Aluminum Pipe

Where shown on the Drawings as "Aluminum CMP". or "CAP", the drainage pipe and required coupling bands shall be corrugated aluminum and shall conform to the requirements of Section 945 of the FDOT Specifications.

3) Concrete Pipe

Where shown on the Drawings as RCP, the drainage pipes shall meet the requirements of ASTM C76-70 (Class III) and Sections 941 and 942 of the FDOT Specifications, unless otherwise noted.

4) PVC PIPE

Where shown on the Drawings as PVC, the drainage pipe and fittings shall be Sch.40, Polyvinyl Chloride, and shall conform to the requirements of Section 948-4 of the FDOT Specifications, unless otherwise noted.

5) Bituminous Pipe Coating

Where shown on the Drawings as Asphalt Coated, metal pipe, "ACCMP", the pipe and fittings shall be bituminous coated inside and out in conformance with Section 943 of the FDOT Specifications.

6) Filter Cloth

Where required shall be Amoco Propex 4545, or equal, approved by CCEI prior to ordering.
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7) Mitered End Sections

Mitered end sections shall be constructed in accordance with the applicable D.O.T. Road Design Standard Index (No. 272, 273 or 274) called for on the Drawings.

8) Flared End Sections

Flared end sections shall be constructed in accordance with the applicable D.O.T. Road Design Standard Index (No. 270) called for on the Drawings.

E. FRAMES, COVERS AND GRATINGS

Manhole, catch-basin, and sump frames, covers, and gratings shall be in accordance with F.D.O.T. - STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (2000) - SECTION 425 - Inlets, Structures and Junction Boxes

Cast iron materials shall be provided. Cast iron shall conform to ASTM A 48, Class 30, minimum.

Gratings shall be as specified in the plans.

F. PRECAST CONCRETE STRUCTURES, RISERS AND PRECAST CONCRETE BASE SECTIONS

Concrete Structures, risers, base sections, and tops shall be pre-cast and conform to ASTM C 478.

Precast parts shall be as shown in the plans.

3. EXECUTION OF WORK

A. EXCAVATION AND BACKFILL

1) Type 2 material shall be used for initial backfill and subsequent backfill with the following conditions: Initial backfill shall be predominately sandy material free from rock or stone greater than 1 1/2 inches diameter. The maximum allowable dimension of a stone or rock fragment for subsequent backfill shall be 6 inches. If in the opinion of the CCEI the Type 2 material will not provide adequate and uniform support for load

distribution to the pipe, the Contractor shall obtain and place either Type 1 or Type 3 backfill as determined by the CCEI.

2) All excavated material not suitable for backfill shall be placed on site at a location acceptable to Owner, or hauled off the job at the price set forth in the accepted Bid Documents. All material that is brought in from other sources for backfill shall be at the price set forth in the Contract.

3) Excavated material to be used for backfill shall be neatly deposited at the sides of the trenches where space is available to protect against caving or sloughing into the trench. Where stockpiling of excavated material is required, the Contractor shall coordinate the site location with the CCEI and shall maintain his operations to provide for natural drainage and not present an unsightly appearance. No excavated material shall be placed on private property without the consent of the property owner.

B. GRADING

Grading shall be performed in accordance with Section 02302 - EXCAVATION AND BACKFILL.

C. PIPE INSTALLATION

All pipe and structures shall be installed on dry, firm bedding. The free-water surface shall be lowered to at least 12 inches below the bedding surface prior to placing pipe or structures and shall be maintained at that depth throughout bedding, haunching, and initial backfilling of the work. During subsequent backfilling, the water level shall be kept sufficiently below the working surface to allow compaction of backfill to the required density, and until required density tests have been performed.

1) Pipe Installation

Excavations shall be trimmed to required elevations. Objects which impair backfilling or compaction shall be removed. Over-excavation shall be corrected with fill material of coarse aggregate.

Pipe and fittings shall be inspected for defects before installing. Defective materials shall be removed from site.

Pipe interior shall be cleaned before installation. Pipe ends shall be sealed when work is not in progress.

Pipe shall be laid to line and grade, with bell end upstream. All pipe joints shall be wrapped with filter cloth; 3 feet wide centered on joint.

Maximum deviation from design elevation shall not exceed 0.1 feet at any point in the system.

a) Unless otherwise specified herein or directed by the CCEI, all pipe and fittings shall be laid and joined in accordance with the appropriate manufacturer's directions with regard to allowable barrel and joint deflection, spigot seating depth, gasket placement, lubrication, bolt torque, field cutting/trimming, and pushing/pulling methods for joint assembly.

b) Prior to placing in the trench, each pipe section, joint, and fitting shall be checked for damage or defects such as cracks, blisters, coating/lining separation, gouges, and the like. Any damage or defective materials found shall not be installed unless approved by the CCEI, and shall be marked "REJECTED" and immediately removed from the work site.

c) Prior to installation, the interior of all pipe and fittings shall be inspected for debris, sediment accumulation, sand, and the like, and shall be cleaned as required to remove such foreign matter. Joint surfaces such as gaskets, gasket grooves, spigots, and bells shall be cleaned of sand and grit prior to joining.

d) Gasket lubricants shall be stored and applied in a manner that will prevent significant contamination or pick-up of sand and grit.

e) The pipe spigot shall be centered in and aligned with its mating bell prior to insertion and forced evenly in a straight line to seating depth, taking care not to over-bell the joint. Where required, deflections shall be made after the joint is seated.

f) Joining shall generally be done by hand or by push-bar with a cushion block whenever pipe size and weight permit. When a mechanical pushing/pulling device such as chain-puller, comealong, and the like is required, the device shall be used in a manner that will not deform gouge, chip, or otherwise damage the pipe or cause significant disturbance of the prepared bedding. In no case shall joints be made by "popping-on" or swinging the spigot into the bell to seat the joint.

g) Fittings and appurtenances shall be fully, independently supported on the bedding or on a permanent foundation so as not to bear on the pipe upon completion of the installation.

h) The installed piping system shall be kept free of dirt, trench water, and other foreign matter during the progress of the work, and all open ends of the line shall be sealed with watertight plugs whenever work is not in progress.

i) Empty installed pipe shall be secured against flotation due to potential trench flooding by timely placement of sufficient backfill or approved anchoring devices sufficient to resist pipe buoyancy.

2) Corrugated Metal Pipe Installation
Corrugated pipe with fittings shall be installed in accordance with manufacturer's instructions, and in accordance with ASTM A 798.

3) Reinforced Concrete Pipe Installation
Reinforced concrete pipe and fittings shall be installed in accordance with manufacturer's instructions, and ACPA O1-103.

D. PIPE BEDDING

1) CLASS A (CONCRETE CRADLE OR CONCRETE ARCH BEDDING)

a) This class of bedding shall be used only where specifically shown in the Drawings or directed by the CCEI. If the use of a concrete cradle is required the pipe shall be bedded in a monolithic cradle of a 1,500 PSI concrete with a minimum thickness equal to 1/4 the outside pipe diameter or to a minimum of four inches under the barrel, whichever is greatest, and extending up to the sides of the pipe to a height equal to 1/2 of the outside pipe diameter. The cradle shall have an overall width equal to 1-1/4 of the outside diameter of the pipe or a minimum width equal to the outside diameter of the pipe plus eight inches, whichever is greater.

b) If a concrete arch is required, the pipe shall be embedded in carefully compacted Type 1 material having a minimum thickness equal to 1/4 the outside pipe diameter or to a minimum of four inches under the barrel, whichever is greater, and extending up the sides for a height equal to 1/2 of the outside pipe diameter. The top half of the pipe shall be covered with a monolithic Class C concrete arch having a minimum thickness equal to 1/4 the outside diameter of the pipe or a minimum of four inches over the crown of the pipe, whichever is greater, and extending down the sides for a depth equal to 1/2 of the outside pipe diameter. The arch shall have an overall width equal to 1 1/4 of the outside diameter of the pipe or a minimum width equal to the outside diameter of the pipe plus eight inches, whichever is greater.

2) CLASS B (FIRST-CLASS BEDDING)

a) Where Class B Bedding is required, the trench shall be excavated below the planned bottom of the pipe to a depth equal to 1/4 the nominal diameter of the pipe, or 6 inches, whichever is greater. The over excavated depth shall be backfilled using either Type 1 or Type 3 materials carefully compacted and shaped using hand tools so as to provide a uniform support for the lower portion of the pipe barrel. Shaping under the pipe bells shall be so that the bell does not support the pipe and joints can be made without bedding material interference.

b) At the option of the Contractor, Class B Bedding may be used in place of Class C (Ordinary Bedding) provided that the exercise of this option shall create no additional expense to the Owner. The Contractor shall notify the CCEI in writing of those portions of the project on which he proposes to exercise this option.

3) CLASS C (ORDINARY BEDDING)

a) The bottom of the trench shall be hand shaped to provide a firm bedding for the utility pipe. The utility shall be firmly bedded in undisturbed firm soil. The bedding shall be shaped so that the pipe will be in continuous contact therewith for its full length and shall provide a minimum bottom segment for the pipe equal to 0.6 of the outside diameter of the barrel. Excavation under the bell shall be sufficient so that the bell does not support the pipe and the joint can be made without interference.

4) UNSUITABLE BEDDING MATERIAL

a) Class C Bedding shall be used for all pipeline construction unless otherwise shown on the Drawings or unless unsuitable material is encountered at the bedding surface. In the event that the materials encountered at normal bottom of trench excavation are, in the judgment of the CCEI, unsuitable to act as foundation for the pipe, such material shall be excavated for the full width of the trench to the depth necessary to obtain a suitable foundation. The CCEI will notify the Contractor, in writing, of the necessity for and extent of the material to be removed and the Contractor shall remove such unsuitable material as soon as possible and backfill in accordance with the requirements for Class B Bedding. All unsuitable material shall be disposed of by the Contractor.

E. PIPE TRENCH BACKFILL

1) INITIAL BACKFILL

a) Initial backfill shall be placed as soon as possible after laying the pipe and shall maintain a pace with the pipe laying so that no more than five pipe joints separate laying and backfilling operations. Initial back fill shall include all haunching and backfill from the top of the bedding to a compacted depth of twelve inches over the pipe. All haunching and backfilling shall be done in the dry.
Initial backfill shall be done as specified below:

1. Haunching of the pipe shall be by hand placement and compaction of material in maximum 4-inch layers from the bottom of the trench to the springline of the pipe, taking care to fill all voids below and around the pipe. Backfilling shall be carefully continued in layers not exceeding 6 inches in thickness for the full trench width until the compacted fill is 12 inches above the top of the pipe.

2. During initial backfilling the fill shall be deposited evenly along both sides of the pipe from a height not to exceed 2 feet above the top of pipe, and fill shall not be dropped directly on the unprotected pipe surface.

3. Where thrust blocks, encasement, or other cast-in-place concrete items are below grade, no backfilling shall start until the specific items have been inspected and approved by the CCEI or his authorized representative.

4. The backfill to one foot above the top of the utility shall be thoroughly compacted with curved end tamping bars under and on each side of the pipe and flat tamped between the pipe and trench wall and shall be completed before the remainder of the trench is backfilled. Initial backfill shall be compacted to 100 percent of maximum density as determined by AASHTO T-180. No subsequent backfill will be permitted until the initial backfill has been accepted by the CCEI or his authorized representative.

2) SUBSEQUENT BACKFILL

1. Subsequent backfill is that backfill between the initial backfill and the finished ground level or bottom of subbase.

2. Subsequent backfill material shall be placed full trench width in horizontal layers not exceeding 12 inches loose depth and compacted by power-operated tampers, rollers, or vibratory equipment to a density equal to 98 percent of the maximum density as determined by AASHTO T-180 for pipe placed under and adjacent to roadways or paved surfaces, and 95 percent under areas where no pavement is to be constructed and vehicular traffic is not to pass over the pipe. Each layer shall be compacted to the specified density prior to placing subsequent layers. The thickness of the loose layer may be increased when in-place density tests show that the specified density can be obtained.

G. BACKFILL MATERIAL

1. Type 2 material shall be used for initial backfill and subsequent backfill with the following conditions: Initial backfill shall be predominately sandy material free from rock or stone greater than 1 1/2 inches diameter, and the maximum allowable dimension of a stone or rock fragment for subsequent backfill shall be 6 inches. If in the opinion of the CCEI the Type 2 material will not provide adequate and uniform support for load distribution to the pipe, the Contractor shall obtain and place either Type 1 or Type 3 backfill as determined by the CCEI.

2. All excavated material not suitable for backfill shall be placed on site at an acceptable location, by Owner, or hauled off the job at the price set forth in the accepted Bid Documents. All material that is brought in from other sources for backfill shall be at the price set forth in the Contract.

3. Excavated material to be used for backfill shall be neatly deposited at the sides of the trenches where space is available to protect against caving or sloughing into the trench. Where stockpiling of excavated material is required, the Contractor shall coordinate the site location with the CCEI and shall maintain his operations to provide for natural drainage and not present an unsightly appearance. No excavated material shall be placed on private property without the consent of the property owner.

H. COMPACTION

Puddling or jetting shall not be permitted when compacting bedding materials.

I. DENSITY TESTS

1) The Contractor shall arrange to have sufficient soil tests made by an independent testing laboratory selected by the CCEI to demonstrate conformance of his work with the stability and compaction levels required by these specifications. Compaction tests shall be taken at intervals listed herein or as deemed necessary by the CCEI.

2) Any proposed alternative test methods to those specified herein must be

approved by the CCEI prior to testing. At the request of the CCEI, the Contractor shall provide such documentation of a proposed alternative test method as the CCEI may require to evaluate the method for approval.

3) In no case shall the Contractor proceed with construction on compacted material until the tests prove satisfactory and approval is given by the CCEI.

4) In general, at least one test for maximum dry density/optimum moisture content shall be performed on a representative sample of each inherently different material to be used for compacted backfill or embankment fill. For material of uniform composition and textural class, a minimum of one test per 200 cu. yd. of material shall be performed at the point of use.

5) Generally, in-place density tests shall be performed at each structure and at approximately 50-foot intervals for pipe; one on each side of pipe for each 12-inch lift. Additional density tests may be required by the CCEI. If any tests results are unsatisfactory, the Contractor shall re-excavate and recompact the backfill at his expense until the required compaction is obtained.

J. UNDERGROUND STRUCTURES

1) Excavation for drainage structures shall be of sufficient size to permit construction of the structure to progress without hindrance from the walls of the excavation or from sloughed materials. No less than 12 inches clearance shall be provided between excavation walls and walls of the structure. If soil conditions encountered at the bottom of the excavation would in the sole opinion of the CCEI be unsuitable for foundation, the Contractor shall remove and dispose of the unsuitable material to the depth where suitable bearing can be obtained. The determination of the necessity for and the extent of additional excavation shall be made by the CCEI, who shall inform the Contractor in writing regarding such necessity and the extent. This excavation shall then be backfilled to the appropriate grade with Type 1 or Type 3 backfill material, placed in 8-inch layers and compacted to a density equal to 100 percent of the maximum density as determined by AASHTO T-180.

2) Installation of drainage structures shall conform to the details as shown on the Drawings and, unless otherwise specified, shall conform with Section 425 of the 2000 Edition of the Florida D.O.T. Standard Specifications for Road and Bridge Construction. Backfill shall be placed in lifts not to exceed 12 inches loose depth and compacted to 95 percent of maximum density per AASHTO T-180 in unpaved areas and to required subgrade density in areas of paving or curbing.

3) Backfill shall not be placed against cast-in-place concrete structures until the concrete has attained sufficient strength to resist the load without damage, and in no case, less than seven days after the concrete was placed.

K. FIELD QUALITY CONTROL

Installed pipe shall be inspected by CCEI. Displaced or misaligned pipe,

infiltration, accumulation of debris, or other defects shall be corrected by the Contractor at no additional cost to the Owner.

L. AS-BUILT DRAWINGS

During the installation of Drainage Pipe and Structures the Contractor shall keep accurate records of the As-Built construction showing the location of all changes in alignment, services, utility crossings, and similar data. Items shall be located from permanent objects such as centerline of street, manholes, valves, etc. Upon completion of the project the Contractor shall deliver to the CCEI As-Built Drawings for the complete stormwater system shall be submitted showing complete detail with all dimensions, both above and below grade in accordance with SECTION 01720 – PROJECT RECORD DOCUMENTS

***** END OF SECTION *****

SECTION 02714

STABILIZED SUBGRADE

1. GENERAL

A. SCOPE

Under this item, the Contractor shall furnish all equipment, labor, materials, and transportation necessary to construct a stabilized subgrade course upon the completed stabilized subgrade.

B. REFERENCES

Standards applicable in this Specification shall be:

1) Florida Department of Transportation - Standard Specifications for Road and Bridge Construction (Newest Edition)
2) American Association of State Highway and Transportation Officials (AASHTO)
    a) AASHTO T-180 - Test for Moisture-Density Relations of Soils using a 10 lb. Rammer and an 18-inch Drop.
3) ASTM INTERNATIONAL (ASTM)
    a) ASTM D 1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
    b) ASTM D 2167 - Density and unit weight of soil in place by the rubber balloon method
    c) ASTM D 2922 (2001) - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

C. DESCRIPTION

The subgrade will be constructed such that after being compacted it will conform to the lines and grades as shown on the Drawings. The subgrade shall be Type-B (LBR 40), stabilized and constructed in accordance with the newest edition of the Florida D.O.T. Specifications, Section 160.

2. MATERIALS

A. The subgrade shall have a minimum Limerock Bearing Value of 40 as determined by the Limerock Bearing Ratio Test. In an area where the bearing value is less than 40, stabilizing material approved by the CCEI shall be furnished by the Contractor, spread and mixed in accordance with Section 160-5.3 "Mixing" of the Newest Edition of the Florida D.O.T. Specifications.

3. EXECUTION OF WORK

A. The subgrade shall be shaped, graded, and rolled to conform to the lines and grades as shown on the Drawings. Fine grading of the subgrade to its final profile shall be accomplished after the existing ground has been excavated as close as possible to the design elevations. In fill areas, fine grading of the subgrade shall be accomplished after fill is spread and compacted in accordance with Section 5 of these Specifications.

B. Record Drawing elevations shall be confirmed to meet design drawing grades prior to placement of base material.

C. The top of the subgrade in both cuts and fills shall be compacted to a minimum of 98 percent of the maximum dry density to the depth specified on the Plans. The required density shall be maintained until the base course has been constructed. The subgrade shall be compacted with an approved self-propelled steel drum or pneumatic tired roller weighing not less than 8 tons. All hollows and depressions which develop under rolling shall be filled in with suitable material. The process of grading and rolling shall be repeated until no depressions develop. After compaction, the top surface of the fine grade shall be true to line and grade at all locations. If the fine grade becomes rutted or displaced due to any cause whatsoever, the Contractor shall regrade it and recompact it. Ditches, drains, and swales shall be maintained along the completed subgrade section after their construction.

D. In no case shall the Contractor proceed to construct the base course on the subgrade until the subgrade has been tested for Florida Bearing Values, compaction, checked for line and grade, and approval given by the CCEI.

E. MATERIAL AND COMPACTION TESTING

1) Limerock Bearing Ratio tests on the subgrade shall be taken at a minimum of four (4) test locations for the parking lot and four (4) test locations for the driveway, at locations designated by the CCEI.

2) The maximum density and optimum moisture shall be determined in accordance with the Modified Proctor Test procedures of AASHTO T180 (Method D as modified by the F.D.O.T.). The percentage compaction and in place density shall be determined according to procedures of ASTM D2167 "Test for Density of Soil In Place by the Rubber Balloon Method" or the nuclear method ASTM D2922.

3) Each material which is inherently different in composition from other subgrade material and which is used over a widespread area of the project will necessitate an additional Modified Proctor Test.

****END OF SECTION****

SECTION 02722

CEMENTED COQUINA SHELL BASE COURSE

1. GENERAL

A. SCOPE

Under this item, the Contractor shall furnish all equipment, labor, materials, and transportation necessary to construct a Coquina shell base course upon the completed stabilized subgrade.

B. REFERENCES

Standards applicable in this Specification shall be:

1) Florida Department of Transportation - Standard Specifications for Road and Bridge Construction (Newest Edition)
   a) Section 250 – Shell
   b) Section 915 - Cemented Coquina Shell Material
   c) Section 300 – Prime and Tack Coats for Base Courses
   d) Section 916 – Bituminous Materials
2) American Association of State Highway and Transportation Officials (AASHTO)
   a) AASHTO T-180 - Test for Moisture-Density Relations of Soils using a 10 lb. Rammer and an 18-inch Drop.
3) ASTM INTERNATIONAL (ASTM)
   a) ASTM D 1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
   b) ASTM D 2167 - Density and unit weight of soil in place by the rubber balloon method
   c) ASTM D 2922 (2001) - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

2. MATERIALS

A. Coquina shell shall conform to the requirements of Florida D.O.T. Standard Specifications, Newest Edition, Section 915, and shall be from a source acceptable to Florida D.O.T. The material shall have a minimum LBR value of 100. Prior to placement, the material shall be crushed or broken to such a size that no less than 97 percent by weight will pass a 3 1/2-inch sieve and no more than 20 percent dry weight shall wash through a No. 200 sieve. No visible clay or organic matter will be permitted.
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B. Prior to the delivery of the material, the CONTRACTOR shall submit QA documentation that the source of the material is an approved F.D.O.T. mine with the LBR and Modified Proctor Test results.

3. EXECUTION OF WORK

A. PLACEMENT OF MATERIAL

The base course shall be constructed in accordance with the lines, grades, and typical section as shown on the Drawings. Unless otherwise noted construction shall

conform to the provisions of Florida D.O.T. Standard Specifications for Road and Bridge Construction, Section 250, 2000 Edition.

After the subgrade is completed and approved, the Contractor shall furnish and spread the coquina shell in a uniform distribution. Spread thickness shall be a minimum of 9 inches. Segregated areas of fine or course rock will not be permitted. Such areas shall be removed and replaced with properly graded rock.

After the spreading is completed, the entire surface shall be scarified and shaped so as to produce the required grade and cross section after compaction.

B. COMPACTION

The required compaction of the coquina shell base course shall be a minimum of 98 percent of the maximum dry density.

No less than 8-10 ton steel drum or pneumatic tired roller shall be used to compact the base course. All depressions shall be filled and the process of rolling and filling shall continue until a thoroughly compacted uniform surface is produced. During final compaction operations if blading of any area is necessary to obtain the true grade and cross section, the compaction operations for such areas shall be completed prior to making the field density-compaction test on the finished base. Should the subgrade material become mixed with the base course material at any time, the Contractor shall remove the mixture, reshape and recompact the subgrade, replace the materials removed with additional coquina shell and reshape and recompact the coquina shell base at no cost to the Owner.

If cracks or checks appear in the base which would impair the structural integrity of the base in the opinion of the CCEI, the Contractor shall remove the cracks or checks by rescarifying, reshaping, refilling with coquina shell where necessary, and recompacting at no cost to the Owner.

The finished coquina shell base shall be checked for thickness at intervals of not more than 300 feet. Any areas which are less than 5 1/2 inches in thickness shall be corrected by scarifying and adding rock. The scarifying shall extend for 50 feet either side of the deficient area. Areas which are less than 1/2 inch deficient in thickness shall be corrected if the CCEI determines that the area is extensive or may adversely affect the quality of the finished work.

C. PRIME COAT

The prime coat shall be a rapid curing liquid cut back asphalt equal or equivalent to RC-70 or RC-250 at the Contractor's option, and conforming to Sections 300 and 916-2 of the 2000 Edition of the Florida D.O.T. Standard Specifications for Road and Bridge Construction.

The surface of the base material shall be cleaned after final compaction and the moisture content of the base shall not exceed 90 percent of the optimum moisture before the prime coat is applied. The prime coat shall be applied uniformly with a pressure distributor. The entire length of the spray bar shall be set at the height above the surface recommended by the Manufacturer for even distribution. The prime coat shall be applied to the finished base course at the rate of 0.15 gallons per square yard at a temperature between 100°F to 150°F. The prime coat shall be applied such that a period of no longer than two (2) hours lapse prior to application of the asphaltic concrete wearing course, unless the prime coat is covered with sand

or screenings as outlined in Section 300-6.5 of the 2000 Edition of the Florida D.O.T. Specifications.

D. TESTING

The maximum density and optimum moisture shall be determined in accordance with the Modified Proctor Test procedures of ASTM-D1557 or AASHTO-T180 (Method D). The percentage compaction and in-place density shall be determined according to procedures of ASTM-D2167 "Test for Density of Soil In-Place by the Rubber Balloon Method" or the nuclear method ASTM-D2922. In general, one Modified Proctor Test per 300 lineal feet of roadwork or 1000 square yards of parking lot improvements shall be performed on a representative sample of base material from location(s) designated by the CCEI. In-place density testing shall be performed at the rate of one test per 300 lineal feet of roadwork at comparable locations or 500 square yards of parking lot improvements unless otherwise specified by the CCEI.

***** END OF SECTION *****

SECTION 02741

ASPHALTIC CONCRETE SURFACE COURSES

PART 1 - GENERAL

1.01 SCOPE

The work to be performed under this item shall include the selling, delivering and installing of asphalt concrete surface courses as herein specified. Final asphalt concrete surface course shall be completed within 30 days after placement of any temporary asphalt surface course.

1.02 REFERENCES

Standards applicable in this Specification shall be:

A. Florida Department of Transportation - Standard Specifications for Road and Bridge Construction (2013)

1. Section 300 - Prime and Tack Coats
2. Section 320 - Hot Bituminous Mixtures - Plant, Methods and Equipment.
3. Section 330 - Hot Bituminous Mixtures - General Construction Requirements.
4. Section 334 – Superpave Asphalt Concrete.

1.03 SUBMITTALS

A. Manufacturer’s Data - Prior to fabrication or installation of the final asphalt concrete surface course, the Contractor shall furnish to the CCEI, for review and approval the following:

1. Certification from the asphalt supplier that their plant meets or exceeds the requirements of Section 320 above.
2. Asphalt mix design with supporting test data indicating compliance with all mix design criteria.

PART 2 - MATERIALS

2.01 PRIME AND TACK COAT

A. Prime Coat shall be applied on all prepared bases. Prime coat material shall be Cut-back Asphalt Grade RC-70 or RC-250, conforming to the Florida D.O.T. Standard Specifications for Road and Bridge Construction, 2013 Edition, Section 300-2.1.

B. Prime Coat Cover Material shall consist of sand or screenings, conforming to the Florida D.O.T. Standard Specifications for Road and Bridge Construction, 2013 Edition, Section 300-2.2.

C. Tack Coat shall be applied on all prepared bases and existing pavement immediately prior to surfacing. Tack coat material shall be Asphalt Grade RA-500 or Emulsified Asphalt Grades Rs-1 or RS-2, conforming to the Florida D.O.T. Standard Specifications for Road and Bridge Construction, 2013 Edition, Section 300-2.3.

2.02 SUPERPAVE ASPHALT CONCRETE

A. Asphalt used for structural, leveling or patching courses shall be Type SP-12.5, conforming to the Florida D.O.T. Standard Specifications for Road and Bridge Construction, 2013 Edition, Section 334. Asphalt gradation shall be fine or course depending on planned thickness.

B. Asphalt used for final surface course shall be Type SP-9.5, conforming to the Florida D.O.T. Standard Specifications for Road and Bridge Construction, 2013 Edition, Section 334. Asphalt gradation shall be fine or course depending on planned thickness.

PART 3 - EXECUTION OF WORK

3.01 CLEANING SURFACES

Prior to the laying of any surface courses, the surface of the pavement or base to be covered shall be cleaned of all loose and deleterious material by the use of power or hand brooming where necessary. All such material shall be collected and disposed of by the Contractor.

3.02 APPLICATION OF PRIME AND TACK COATS

A. Prime Coat material shall be heated to a suitable temperature and applied to the base in a thin, uniform layer at a rate of between 0.1 and 0.15 gallons per square yard, as determined by the CCEI. The prime coat shall be applied using a pressure distributor. Uniformly cover the primed surface with a light application of cover material. Roll the covered prime coat with a traffic roller to provide a dense mat.

B. Where primed base courses have become dirty or lost their bonding effect and on all underlying asphalt courses, a tack coat shall be required. Tack coat material shall be heated to a suitable temperature and applied in a thin, uniform layer at a rate of between 0.02 and 0.08 gallons per square yard. The tack coat shall be applied sufficiently in advance of the surface course installation to permit drying but not so far in advance as to lose its adhesiveness as a result of being covered with dust. The tack coat shall be kept free from traffic until the surface course has been laid.

3.03 PREPARATION OF ASPHALT CONCRETE

The batching of aggregates, fillers and asphalt binder as well as the mixing and heating of the mixture shall conform to the Florida D.O.T. Standard Specifications for Road and Bridge Construction, 2006 Edition, Section 330. The “Master Temperature Range” for all mix designs shall be the accepted mix design temperature ± 30 degrees Fahrenheit (°F). Any load or portion of a load measured by the CCEI’s Representative which is outside the “Master Temperature Range” shall be rejected prior to installation.

3.04 TRANSPORTATION OF ASPHALT CONCRETE

The surface course shall be transported in tight sealing vehicles previously cleaned of all foreign material. The inside surface of the truck bodies shall be thinly coated with soapy water or an acceptable asphalt release agent prior to receiving asphalt concrete.. Diesel, kerosene, gasoline or any other hazardous or environmentally

detrimental material shall not be used to lubricate the truck bed. Cover each load during cool and cloudy weather when there is a possibility of rain.

3.05 PATCHING AND LEVELING COURSES

Where asphalt concrete is to be installed on an existing paved surface or old base which is irregular, or where indicated on the Plans, the existing surface shall be brought to proper grade and cross section by the application of patching or leveling courses.

3.06 PLACING ASPHALT CONCRETE

The placement of asphalt concrete for patching, leveling and subsequent courses shall conform to the Florida D.O.T. Standard Specifications for Road and Bridge Construction, 2013 Edition, Section 330-6.

3.07 COMPACTING ASPHALT CONCRETE

The Contractor shall provide a separate set of rollers, with their operators, for each paving or leveling train crew working at the job. All coverage requirements for rolling shall be conducted before the surface temperature of the asphalt concrete drops to the extent that effective compaction cannot be achieved or the rollers begin to damage the pavement course. Compaction and joints for as freshly laid asphalt concrete courses shall be installed in compliance with the Florida D.O.T. Standard Specifications for Road and Bridge Construction, 2013 Edition, Section 330-7.

3.08 FIELD QUALITY CONTROL

A. The final surface requirements, including: field quality control; testing methods; cross slopes; smoothness; and acceptance or rejection of all asphalt courses shall be in compliance with the Florida D.O.T. Standard Specifications for Road and Bridge Construction, 2013 Edition, Section 330-9.1 through 9-4.

3.09 CORRECTING UNACCEPTABLE ASPHALT CONCRETE

The Contractor shall be required to correct rejected pavement sections by; removing and replacing; overlaying; or other method in compliance with the Florida D.O.T. Standard Specifications for Road and Bridge Construction, 2013 Edition, Section 330-9.5.

**** END OF SECTION ****

SECTION 02761

PAVEMENT MARKINGS

1. GENERAL

A. DESCRIPTION

1) This work shall consist of furnishing and placing reflectorized, two reactive component, thermoplastic for edge stripes, center stripes, lane stripes, and plastic reflective pavement markers upon the roadway surface in accordance with the plans and specifications.

B. REFERENCES

1) This section references the following documents. They are a part of this section insofar as specified and modified herein. In case of conflict between the requirements of this section and the listed documents, the requirements of this section shall prevail.

Reference	Title
F.D.O.T.	Florida Department of Transportation (F.D.O.T.) Standard Specifications for Road and Bridge Construction (2013 edition), Sections: 706; 709; 711; and 971.

2. MATERIALS

A. PLASTIC REFLECTIVE PAVEMENT MARKERS

1) Plastic markers, if used, shall be methyl methacrylate or acrylonitrile butadine styrene in accordance with Section 706-2, F.D.O.T. Markers shall be in the shape of a frustrum of a pyramid, filled with a thermosetting compound. Markers used for restoration in areas damaged by construction shall be of the same size, shape, color, and have the same optical qualities of the original marker. Markers used for hydrant location identification shall be blue, have bidirectional optical properties, and have a minimum area for each reflective face of not less than 3.25 square inches.

B. PAVEMENT STRIPING MATERIALS

1) THERMOPLASTIC STRIPES AND MARKINGS

a. Traffic line or marking thermoplastic compound shall be furnished in accordance with F.D.O.T. Section 709 and shall be white or yellow as required.

2) GLASS BEADS FOR TRAFFIC LINE STRIPES OR MARKINGS

a. Glass beads for reflective traffic paint or thermoplastic compound shall be furnished in accordance with Section 971-1.7, F.D.O.T.

3. EXECUTION

A. GENERAL

1) Where disturbed or destroyed by construction, pavement stripes and markings shall be restored at the original locations and to the original lines. Pavement marking in public right-of-ways shall be restored with thermoplastic traffic markings, otherwise painted traffic markings may be used.

2) Plastic reflectorized pavement markers for hydrant valve location shall be installed on centerline stripes or at the pavement centerline for unstriped roadways. Each hydrant valve installed under or adjacent to paved areas shall receive a reflectorized marker.

B. THERMOPLASTIC TRAFFIC MARKINGS

1) Thermoplastic traffic markings shall be installed in accordance with the F.D.O.T., Section 711. Thermoplastic traffic markings shall not be applied to new asphalt pavements within 30 days of final asphalt placement.

C. PLASTIC REFLECTIVE PAVEMENT MARKERS

1) Plastic reflective pavement markers shall be installed in accordance with F.D.O.T., Section 706 and at the centerline of pavement at each hydrant valve location adjacent to paved surface courses.

*** * END OF SECTION * ***

SECTION 02922

SODDING

1. SCOPE

A. The Contractor shall furnish all materials, labor, equipment and supervision required to prepare the soil, fine grade the area and establish a healthy stand of grass by sodding of the areas so designated on the drawings and as specified herein.

2. GENERAL

A. AREAS TO BE SODDED

1. The minimum areas to receive sod shall be as follows:
   a. Those areas indicated on the Drawings
   b. Those areas indicated in other Technical Specifications herein
   c. All dirt shoulders of paved areas
   d. All dirt shoulders of concrete or paved sidewalks
   e. All dirt slopes on the project of 1:4 or greater

B. PREPARATION

1. The area to be sodded shall be clear of old sod and weeds. The area shall be fine graded and the surface loosened, by scarifying, if necessary. If the soil is dry it shall be moistened to provide an optimum growing condition.

C. FERTILIZER

1. Fertilizer shall be uniformly spread over the area to be sodded at the rate of 400 to 500 pounds per acre. The fertilizer shall have a chemical designation of 12-8-8. Soil which has a PH of 5.0 or lower shall, if directed by the CEI, have an application of dolomite limestone, but the amount of dolomite applied shall not raise the PH above 6.0.

D. SOD

1. The sod shall be of the Argentine Bahia variety, placed where specified on the Drawings or by this Specification. The sod shall be of a tough texture with a good mat of roots. It shall be free of weeds and other objectionable grasses. Approximately three days prior to cutting the sod, it shall be closely mowed and raked to remove excess growth and debris. The sod shall be cut with sufficient thickness to retain the root system intact. There shall be a minimum of delay between the cutting of sod and it's laying so that it is live, ***fresh, green,*** and uninjured when laid. No brown, dry grass shall be accepted for laying.

E. LAYING

1. No sod shall be laid until the CCEI has approved the condition of the prepared area. The sod shall be placed with the edges in close contact. Where the sod is laid on a slope the pieces of sod

shall be laid with staggered joints to minimize erosion along the joints and where the sod is laid in drainage swales and ditches the joints shall be staggered in the line of flow for the same reason. After the sod is laid it shall be brought into close contact with the soil by tamping, light rolling or other acceptable means. Where the sod may slide due to the steep slope it shall be pegged to firm soil with wood pegs.

F. WATERING

1. The sod shall be kept watered on an as need basis for the duration of the contract period and in no case for less than two weeks (not to exceed three days between waterings). When the grass is watered it should be at the rate of one inch or 620 gallons per 1000 square feet per application.

G. MAINTENANCE

1. The Contractor shall maintain the sodded area in a satisfactory condition until final acceptance of the project or until the end of the two weeks watering period, whichever is later (see Paragraph F above). Such maintenance shall include the filling, leveling and repair of any washed or eroded areas and the re-sodding of any areas which may have been damaged or are not growing to the satisfaction of the Owner.

**** END OF SECTION ****

SECTION 02926

HYDROSEEDING

PART 1 – GENERAL

1.01 SUMMARY

A. This section specifies a seed mix, mechanically applied to low sloped and flat areas requiring sustained vegetation.

1.02 REQUIREMENTS FOR HYDROSEEDING AND/OR SODDING

A. The Contractor shall sod slopes of 1:4 or greater as required by these Specifications in accordance with Section 02922 Sodding. Slopes less than 1:4 and flat bottoms Where hydroseeding quantities are provided in the Schedule of Contract Prices, the Contractor shall utilize hydroseeding unless, at the Contractor's election, sod is used in place of hydroseeding. There shall be no additional payment for sod where the Contractor elects to replace hydroseeding with sod.

1.03 AREAS FOR HYDROSEEDING

A. Hydroseeding may only be utilized on flat surfaces with no significant stormwater runoff or slopes less than 1:4 which discharge into stormwater treatment basins. ***All*** areas disturbed to bare ground by construction activities shall be Hydroseeded where not Sodded. The pay quantity indicated in the Contract Documents represents the minimal amount of coverage determined by the Engineer during design. Quantities required above the pay quantity in the Contract Documents to restore Contractor's operations will be deemed excessive and shall not be included in the Pay Item.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions. Include required substrate preparation, list of materials, and application rate.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from weather damage, moisture, excessive temperatures, and construction operations.

PART 2 – PRODUCTS

2.01 - ACCEPTABLE SEED MANUFACTURERS

A. Pennington Seed Inc. Seed Production, 1280 Atlanta Hwy., Madison, GA 30650, (800)-286-6100.
B. Seedland, Inc. , 9895 Adams Road, Wellborn, FL 32094, (386) 963-2080.
C. Scotts Co. LLC, 14111 Scottslawn Road, Marysville, OH 43041, (888)-270-3714).
D. Acceptable equivalent alternate, approved by CCEI.

2.02 - MATERIALS

A. Seed shall be a mixed of sustainable plant variety mixed with a fast germinating, annual plant cover. Seed mix shall be as follows:

1. Inert Material shall be less than 1%.
2. Other Crop Seed shall be less than .5%.
3. Weed Seed shall be less than 1%.
4. Seed shall be furnished with a protective coating which contains inoculating and fertilizing ingredients.
5. Packaging shall be provided seed in moisture proof bags or plastic pails.
6. Seed Mix shall contain the following permanent and temporary seed varieties at the specified ratios:

Bermuda (Heavily Coated)	1 part in 5 part mix
Bahia (Heavily Coated)	3 parts in 5 part mix
Brown-Top Millet	1 part in 5 part mix (Apr-Sept)
or Annual Rye	1 part in 5 part mix (Oct-March)

B. Hydro Mulch - Mulch shall be a blend of mulch, additives, green coloring agent. and tackifiers. The mulch shall be porous, absorbent, 100% biodegradable fiber, which shall be all wood or a blend of wood, cotton, straw, paper or other approved, clean organic fibers. Hydro – Mulch shall be incorporated into the hydroseed mix only in the amounts needed to assist in targeting of the application.

C. A balanced, commercial grade, dry fertilizer of 19-19-19 composition shall be incorporated into the hydroseed mixture.

D. A fast acting starter lime soil amendment shall be incorporated into the hydroseed mixture. Product shall be “Nutra – Lime Dry” or approved equal.

E. Agricultural Grade Lime shall be applied as specified as a soil amendment for long term pH adjustment of the soil to be hydroseeded.

F. Hydroseeding Equipment shall have a built-in mechanical agitation system and operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry containing not less than 44lbs of organic mulching amendment plus fertilizer, chemical additives, and solids for each 150 gallons of water.

PART 3 – EXECUTION

3.01 - SUBSTRATE PREPARATION

A. Agricultural Lime or pelletized lime should be added during the slope preparation stage at the rate recommended according to soil analysis. Apply agricultural lime or pellet lime at a rate of 2000 lbs. per acre if no soil analysis has been performed.

B. Examine substrates and conditions where material will be applied. Do not proceed with installation until all unsatisfactory conditions are corrected. Only apply product to geotechnically stable slopes that have been built to the Contract Drawings and Specifications.

C. Examine related work including irrigation and grading of surface before

proceeding with any work and notify the CCEI in writing on conditions which may prevent the proper execution of this work. All grading or tracking on slopes should be performed so that all cleats are running perpendicular to the flow of water down the hill.

3.02 – INSTALLATION

A. Mix the seed, soil amendments, and commercial fertilizer in the following amounts with a small amount of the Flexible Growth Medium for visual targeting and metering of the hydroseed mixture:

1. Seed mixture shall be provided at the minimum rates of: 100lbs/acre (2.30lbs./1000 square feet) during the warm season (Apr-Sept); and at 200lbs/acre (4.6 lbs./1000 square feet) during the cold season (Oct-March).
2. Dry Fertilizer shall be provided at the minimum rate of 250lbs per acre (5.5lbs./1000 square feet).
3. Hydro - Mulch shall be a blended at the minimal amount needed to provide visual targeting and metering of the hydroseed application.
4. The soil amendment “Neutra Lime Dry”, or approved equal, shall be provided at the minimum rate of 80lbs per acre (1.85lbs./1000 square feet).

B. Add water to the above ratio hydroseed mixture in strict compliance with the equipment manufacturer’s installation instructions and recommendations.

C. Apply along the areas to be vegetated being sure to apply seed and amendments at the rates as specified above.

D. Exercise special care to prevent any of the slurry from being sprayed onto any hardscape areas including roadways, fences, walls, buildings, etc. Remove all slurry sprayed onto these surfaces immediately.

E. Mix of Dry Hydro Mulch – Prepare mulch at a rate of 50lbs per 150 gallons of water or at the equipment manufacturer’s recommendation. Hydromulch over all freshly seeded areas. This product shall be applied at a minimum rate of 3000lbs/acre (70lbs/1000 square feet). Hydromulch shall be applied in multiple directions so that shadowing does not occur and to insure uniformity of the application. Confirm the loading rates with equipment manufacturers. Do not leave seeded surfaces unprotected, especially if precipitation is imminent.

3.03 – MAINTENANCE

A. Frequent light irrigation will need to be applied to seeded areas if no natural rain events have occurred within one week of hydroseeding. Water should be applied long enough to moisten the soil thoroughly to the depth of the slurry mulch taking care not to super saturate or wash away the slurry and seed.

B. After seed germination has occurred and plants are visible the frequency of irrigation should be cut back still making sure that heavier application rates do not super saturate or wash away the slurry and seed.

C. Repair all seed washings and erosion.

**** END OF SECTION ****

SECTION 02990

SITE CLEANUP

1. GENERAL

A. The Contractor shall furnish all plant, labor, equipment, appliances and materials required or necessary to clean up the site after the construction is completed and to restore items disturbed or damaged due to his construction operation.

2. MATERIALS N/A

3. EXECUTION OF WORK

A. During the progress of the project, the work and the adjacent areas affected thereby shall be kept in a neat and orderly condition. All rubbish, surplus materials, and unused construction equipment shall be removed. All damage shall be repaired so that the public and private property owners will be inconvenienced as little as possible.

B. Where material or debris has been deposited in watercourses, ditches, gutters, drains, or catch-basins as a result of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the work, and the ditches, channels, drains, etc., shall be kept clean.

C. Before the completion of the project, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures which he builds; remove all temporary works, tools, and machinery or other construction equipment furnished by him; remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; remove all rubbish from any grounds which he has occupied; and leave the roads, all parts of the premises and adjacent property affected by his operations, in a neat and satisfactory condition.

D. It shall be the responsibility of the Contractor to repair, rebuild, or restore to its former conditions, any and all portions of existing utilities, structures, equipment, appurtenances, trees and shrubs, or facilities, other than those to be paid for under the specifications, which may be disturbed or damaged due to his construction operations.

E. The Contractor shall thoroughly clean all materials and equipment installed by him and his subcontractors and on completion of the work shall deliver the facilities undamaged and in fresh and new-appearing condition.

4. PAYMENT

Payment for site cleanup shall be included in the price paid for Erosion Control / Pollution Prevention. Failure to perform site cleanup shall be grounds for refusal to approve payments in accordance with the Contract General Conditions.

*** * END OF SECTION * ***