SECTION 01110

SUMMARY OF THE WORK

PART 1 GENERAL

1.01 SUMMARY

A. Detailed requirements and work extent are stated in applicable specification sections of these and as shown in the Drawings as prepared by Craig A. Smith and Associates of Florida, Inc., **CAS Project No. 19-2037**

B. Provide and pay for labor, materials, equipment, tools, construction equipment, applicable taxes, other facilities, and services necessary for the execution, testing, and completion of the Work under this Contract.

C. Perform work not mentioned in the Specifications but shown in the Drawings or Work not shown in the Drawings but included in the Specifications, or items not specifically called out in the Contract Documents, which are necessary or normally required to make each installation satisfactory and legally operable, as incidental work without extra cost to the OWNER and include this expense in the applicable lump sum bid for the work.

1.02 CONTRACT DOCUMENTS

A. Contract Documents include the Bidding Requirements, Contract Forms, Conditions of Contract, General Conditions, Supplemental General Conditions, Specifications, Drawings, Addenda, and requirements and provisions incorporated therein by specific reference thereto.

B. Contract Documents are intended to be self explanatory and complimentary and to describe and provide for the complete work.

C. Bidders are required to familiarize themselves with the provisions of the Contract Documents and make available to prospective suppliers and subcontractors appropriate information from the Contract Documents.

1.03 SPECIFICATIONS

A. Specifications included in these Contract Documents establish the performance and quality requirements for materials and equipment and the minimum standards for the quality of workmanship and appearance.

B. No attempt has been made to separate the Specification Sections into groups of work of separate subcontractors or for work to be performed by the various trades.

C. Questions regarding the interpretation of a Specification should be directed to the ENGINEER prior to the submittal of a proposal for, or execution of, the work under this Contract.

1.04 DESCRIPTION OF WORK

A. Work to be performed under this Contract consists of furnishing materials, equipment, and labor for the construction of the **City of Belle Glade Pavilion Lake Piers, Docks & Gangway Engineering Improvements** as shown in the Drawings and described in the Specifications.

B. The project shall consist of but is not limited to:

1. The demolition and removal of approximately 900 LF of existing wood retaining wall (including piles and appurtenances), existing drainage pipe, and hedge row. Earthwork includes site clearing and grubbing, the relocation of existing concrete rip-rap/rubble to the lake's deep cut line, backfill, compact and shape embankment, shoreline grading, and soil and planting installation for littoral shelves.

   Work also includes the installation of approximately 950 LF of vinyl sheet pile seawall (including reinforcing, helical anchors and weep holes), reinforced concrete seawall cap, 6-foot wide reinforced concrete sidewalk, two floating docks with piles, two gangways, 6-foot high chain link fence and gates, aluminum hand rail, drainage pipe replacement, asphalt pavement and sod restoration. The piers, docks and gangway improvements to be installed at the Torry Island campground's Pavilion Lake facility.

C. Provide for the ENGINEER's approval complete and accurate survey of as-built new structures, new piping, and existing underground utilities uncovered during the course of the project showing elevations and locations, as specified in Section 01720.

D. Work under this Contract shall be constructed in accordance with the lines and grades shown on the Contract Drawings or as directed by the ENGINEER.

E. Elevations of existing ground, structures, and appurtenances, size, and location of existing piping are believed to be reasonably correct but are not guaranteed to be absolute and therefore are presented only as an approximation.

F. Errors or discrepancies in the data shown or omissions of data required for accurately accomplishing the stakeout survey shall be referred immediately to the ENGINEER for interpretation or correction.

G. Survey work for construction control processes shall be made by the CONTRACTOR at his expense.

1.05 WORK BY OTHERS

A. Conduct operations to cause a minimum of interference with the work of other CONTRACTORs.

PART 2 PRODUCTS

2.01 BUY AMERICAN PRODUCTS

A. In accordance with the Buy American Provision in Public Law 95217 (Section 215 of Public Law 92-500, as amended) the CONTRACTOR agrees that preference will be given to domestic equipment and construction material by CONTRACTOR, subcontractors and suppliers in the performance of this Contract.

PART 3 EXECUTION

3.01 TIME FOR COMPLETION

A. Work shall be commenced at the time stipulated in the written Notice to Proceed and shall be completed within the time stipulated in the Notice to Proceed.

3.02 LIQUIDATED DAMAGES

A. Liquidated damages for the work specified herein shall be as described in **Page 00500-2.**

B. Work must be completed within the time specified in the Contract Documents.

1. It is understood and agreed that deductions at the rates stipulated shall be made from the total contract price for each and every calendar day after and exclusive of the day within which completion was required, and up to and including the date of completion and acceptance by the OWNER.

2. Completion of the work, as mentioned above, shall include startup and testing of portions of the project, unless explicitly excluded.

C**.** The amount as set forth as liquidated damages is understood and agreed not to be a penalty; the said sum being specifically agreed upon in advance as the measure of damage to the OWNER resulting from the delay in completion of the work.

1. The expiration of the time stipulated without the work having been completed shall in itself constitute a default without the necessity of any notice being given by the OWNER to the CONTRACTOR.

2. The CONTRACTOR agrees and consents that the Contract price reduced by the aggregate of the entire damages so deducted shall be accepted by the CONTRACTOR in full satisfaction for work done under the Contract.

END OF SECTION

SECTION 01140

WORK RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

A. Work under this contract shall not reduce **utility** services provided to the residents of the **City of Belle Glade** nor dramatically impact the vehicular traffic in the area of this project.

B. Submit to the OWNER and ENGINEER a construction schedule explaining shut down procedures in detail.

1. Submit written notification 48 hours in advance of requested shut down.

1.02 CONNECTION TO EXISTING SYSTEMS

A. Connections to existing systems shall be performed with no damage and no interruption to the existing installation.

1. Damage caused to existing installations shall be repaired or replaced by the CONTRACTOR at no additional cost to the OWNER.

B. CONTRACTOR must contain and properly dispose of wastewater and sludge drained from existing pipelines and structures during construction.

1.03 COORDINATION WITH UTILITY PERSONNEL

A. Before commencing work involving removing or placing in operation existing or new facilities, notify the OWNER at least twenty (20) days in advance in writing.

1. The OWNER shall be responsible for removing facilities from operation.

1.04 PROTECTION OF PROPERTY

A. Protect property that may be affected by construction work or operations.

1. The location and extent of underground and covered facilities are not guaranteed.

2. Proceed with care in order to prevent the undermining or damage to existing structures, piping, or facilities.

B. Protect new and existing mechanical equipment from dust and debris.

1. Protective measures shall be furnished, installed, lighted, maintained, and removed at the CONTRACTOR's own cost.

C. When potable water is being used, the supply source shall be protected against contamination in accordance with existing codes and regulations.

D. Repair property damaged during construction.

1.05 WEATHER CONDITIONS

A. Work that may be affected by inclement weather shall be suspended until proper conditions prevail.

1. In the event of impeding storms, take necessary precautions to protect work, materials and equipment from exposure.

2. The OWNER reserves the right, through the opinion of the ENGINEER, to order that additional protection measures over and beyond those proposed by the CONTRACTOR, be taken to safeguard components of the project.

3. Do not claim compensation for precautionary measures so ordered, nor claim compensation from the OWNER for damage to the work from the elements of weather.

B. Provide, within 15 days of contract signing, a hurricane preparedness plan to be enacted in the event of hurricane conditions during construction.

1.06 FIRE PROTECTION

A. Prevent fires at or adjacent to the Work.

B. Provide adequate fire extinguishers and hose line stations.

1.07 SAFETY AND HEALTH REQUIREMENTS

A. Comply with Federal, State, and Local safety and health regulations.

B. Provide barricades and flashing lights or other devices to warn pedestrians and area traffic.

C. Immunize personnel working in contact with sewage and sewage sludge.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01312

PROJECT MEETINGS

PART 1 GENERAL

1.01 SUMMARY

A. The ENGINEER shall schedule and administer pre-construction meetings, periodic progress meetings, and specially called meetings throughout the progress of work.

B. For these meetings the ENGINEER shall:

1. Prepare agenda for meetings.

2. Make physical arrangements for meetings.

3. Preside at meetings.

4. Record the minutes; include significant proceedings and decisions.

5. Reproduce and distribute copies of minutes within five (5) working days after each meeting.

a. To participants in the meeting.

b. To parties affected by decisions made at the meeting.

C. Representatives of CONTRACTOR, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

D. The CONTRACTOR shall attend meetings to ascertain that work is executed consistent with Contract Documents and construction schedules.

1.02 RELATED SECTIONS

A. Instructions to Bidders - Division 0.

B. Scheduling of Construction - Division 1.

C. Shop Drawings, Working Drawings, and Samples - Division 1.

D. Project Record Documents - Division 1.

1.03 PRECONSTRUCTION MEETING

A. Schedule a pre-construction meeting no later than fifteen (15) days after date of Notice of Award.

B. Location: A central site, convenient for parties designated by the OWNER.

C. Attendance:

1. OWNER's Representative.
2. ENGINEER and his Professional Consultants.
3. Resident Project Representative.
4. CONTRACTOR's Superintendent.
5. Major Subcontractors.
6. Major Suppliers.
7. Utilities.
8. Others as appropriate.

D. Suggested Agenda:

1. Distribution and discussion of:
    a. List of major subcontractors and suppliers.
    b. Projected Construction Schedule.
2. Critical work sequencing/critical path scheduling.
3. Major equipment deliveries and priorities.
4. Project Coordination.
    a. Designation of responsible personnel.
5. Procedures and processing of:
    a. Field decisions.
    b. Proposal requests.
    c. Submittals.
    d. Change Orders.

e. Applications for Payments.

6. Adequacy of Distribution of Contract Documents.

7. Procedures for maintaining Record Documents.

8. Use of Premises:

   a. Office, Work, and Storage Areas.

   b. OWNER's Requirements.

9. Construction facilities, controls, and construction aids.

10. Temporary Utilities.

11. Maintenance of Traffic (MOT)

1.04 PROGRESS MEETINGS

A. Schedule regular periodic meetings.

B. The progress meetings will be held as required by progress of the work.

C. Hold called meetings as required by progress of the work.

D. Location of the meetings: Project field office of the CONTRACTOR or ENGINEER.

E. Attendance:

1. ENGINEER, and his professional consultants as needed.

2. CONTRACTOR's Superintendent.

3. Subcontractors as appropriate to the agenda.

4. Suppliers as appropriate to the agenda.

5. Others as appropriate.

6. OWNER’s Representative

F. Suggested Agenda:

1. Review, approval of minutes of previous meeting.

2. Review of work progress since previous meeting.

3. Field observations, problems, conflicts.

4. Problems which impede Construction Schedule.

5. Review of off site fabrication, delivery schedule.

6. Corrective measures and procedures to regain projected schedule.

7. Revisions to Construction Schedule.

8. Progress, schedule, during succeeding work period.

9. Coordination of schedules.

10. Review submittal schedules; expedite as required.

11. Maintenance of quality standards.

12. Pending changes and substitutions.

13. Review proposed changes for:

    a. Effect on Construction Schedule and on a completion date.

    b. Effect on other contracts of the Project.

14. Other business.

15. Construction schedule.

16. Critical/long lead items.

G. The CONTRACTOR is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics such as deliveries of materials and equipment and progress of work.

H. The CONTRACTOR is to provide a current submittal log at each progress meeting in accordance with Division 1.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01321

CONSTRUCTION PHOTOGRAPHS AND VIDEO RECORDING

PART 1 GENERAL

1.01 SUMMARY

A. Employ competent photographer to take construction record photographs for preconstruction conditions, periodically during course of Work, and post-construction.

B. Employ competent video recording professional to take pre-construction, existing conditions video record.

C. Employ competent video recording professional to perform gravity sanitary pipe inspection video recording.

1.02 RELATED SECTIONS

A. Application for Payment - Division 1.

B. Project Record Documents - Division 1.

1.03 PHOTOGRAPHY REQUIRED

A. Provide photographs taken on cutoff date for each scheduled Application for Payment.

B. View and Quantities Required:

1. Take a minimum of 12 exposures of the site and adjacent property at pre-construction, monthly, and post-construction.

2. Aerial photography shall be acceptable.

C. Negatives:

1. Remain property of photographer.

2. Requires that photographer maintain negatives for a period of two years from Date of Completion of entire project.

3 Photographer shall agree to furnish additional prints to OWNER and the ENGINEER at commercial rates applicable at time of purchase.

1.04 COSTS OF PHOTOGRAPHER

A. The CONTRACTOR to pay all costs for specified photography and prints.

1. Parties requiring additional photography or prints will pay photographer directly.

1.05 VIDEO REQUIRED

A. Prior to work commencement, provide continuous color audio-video DVD recording taken along the entire length of the individual project work sites to serve as a record of pre-construction conditions.

1. The purpose of creating this record is to be able to fairly establish the prework condition that the CONTRACTOR must protect or restore after the facilities are installed.

2. It is in the CONTRACTOR's interest that this record be as inclusive as possible, to protect the CONTRACTOR and the OWNER from spurious claims of private and public property damaged by the CONTRACTOR's operations.

3. No construction shall begin prior to review and approval of the tapes covering the construction area by the ENGINEER.

4. The ENGINEER shall have the authority to reject video tape not conforming to the specifications and order that it be redone at no additional charge.

5. Reschedule unacceptable coverage within five (5) days after being notified.

6. The ENGINEER shall designate those areas, if any, to be omitted from or added to the audio-video coverage.

7. DVD recordings shall not be made more than thirty (30) days prior to construction in any area.

8. DVD and written records shall become the property of the OWNER.

PART 2 PRODUCTS

2.01 PHOTOGRAPHIC PRINTS

A. Color:

1. Paper: Single weight, color print paper

2. Finish: Smooth surface, glossy

3. Size: 8-inch by 10-inch for aerial photographs
4-inch by 6-inch for site photographs

B. Identify each print on back, listing:

1. Name of Project

2. Orientation of View

3. Date and time of exposure

4. Name and address of photographer

5. Photographer's numbered identification of exposure.

2.02 VIDEO EQUIPMENT

A. Furnish equipment, accessories, materials and labor to perform this service.

B. Provide bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls or any other form of imperfection.

1. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume, clarity and be free from distortion and interruptions.

C. The color video camera used in the recording system shall be DVD format with the ability to view video taped site conditions directly by use of a conventional DVD player.

2.03 VIDEO MEASUREMENT AND PAYMENT

A. Payment for the work in this section shall be included as part of the appropriate lump sum bid prices stated in the Proposal Bid Form.

PART 3 EXECUTION

3.01 TECHNIQUE

A. Factual presentation

B. Correct exposure and focus

1. High resolution and sharpness

2. Maximum depth-of-field

3. Minimum distortion

3.02 PHOTOGRAPHIC VIEWS REQUIRED

A. Photograph from locations to adequately illustrate condition of construction and state of progress.

1. At successive periods of photography, take at least one photograph from the same overall view as previously.

2. Consult with the ENGINEER at each period of photography for instructions concerning views required.

3.03 DELIVERY OF PRINTS

A. Deliver two (2) sets of prints to the ENGINEER to accompany each Application for payment.

3.04 RECORDED INFORMATION - AUDIO

A. The audio track shall consist of an original live recording of the narrative commentary of the person video taping the work sites.

1. The tape shall begin with the current date, project name, and municipality and each section of the tape will have the general location, i.e. Construction Work Section, name of street, house address, viewing side, and direction of progress for each individual work site.

3.05 RECORDED INFORMATION - VIDEO

A. The video track shall consist of taping the pre-construction surface conditions of each individual work site for the Piping System Improvements.

1. The video taping shall show the full extents of the surface conditions from close-up and in the distance, both directly along the route of the work and the conditions to the sides of the work zones (i.e.; curbs, sidewalks, ditches and culverts, utility features, fences, bushes, trees and other landscaped features in and near yards, structures which could be impacted by the work).

2. The person video taping the site conditions shall use good photographic procedures and practices, such as steady handling of the video recorder, taping with their back to the position of the sun, refraining from taping in poor lighting, rain or other adverse weather conditions or moving the video camera too quickly.

3.06 SUBMITTAL OF TAPES

A. Audio-visual tape recordings of the pre-construction surface conditions of each individual work site shall be submitted to the ENGINEER.

1. Acceptable tapes will be turned over to the OWNER by the ENGINEER.

2. Acceptance of a video tape record by the ENGINEER will not relieve the CONTRACTOR of any liability he may incur by his failure to document a pre-work fault or defect that he may later be accused of causing.

END OF SECTION

SECTION 01327

SCHEDULING OF CONSTRUCTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Submit to the ENGINEER for approval, within fifteen (15) days after Notice of Award the estimated construction progress schedules for the work, with subschedules of related activities which are essential to its progress.

B. Submit revised progress schedules on a monthly basis.

C. No partial payments shall be approved by the ENGINEER until there is an approved construction progress schedule on hand.

D. An authorized representative of the CONTRACTOR's firm shall be designate and responsible for development and maintenance of the schedule and of progress and payment reports.

1. This representative of the CONTRACTOR shall have direct project control and complete authority to act on behalf of the CONTRACTOR's schedule.

1.02 RELATED REQUIREMENTS

A. Existing Conditions - Division 0

B. Summary of the Work - Division 1

C. Project Meetings - Division 1

D. Shop Drawings, Product Data, and Samples - Division 1

E. Work Restrictions - Division 1

1.03 FORM OF SCHEDULES

A. Prepare schedules in the form of a horizontal bar chart.

1. Provide separate horizontal bar for each trade or operation within each structure or item.

2. Horizontal time scale: In weeks from start of construction and identify the first work day of each month.

3. Scale and spacing: To allow space for notations and future revisions.

4. Minimum sheet size: 11 inches x 17 inches.

B. Format of listings: The chronological order of the start of each item of work.

C. Identification of listings: By major specification section numbers as applicable and structure.

D. Illustrate the expected progress payment for each month.

1.04 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity.

2. Show the dates for the beginning of, and completion of, each major element of construction in no more than a two week increment scale.

3. At a minimum, Specifically list:

a. Site Clearing

b. Demucking

c. Excavation

d. Pipeline Work

e. Structure Construction

f. Electrical Construction

g. Mechanical Construction

h. Testing

i. Start-up

j. Restoration

k. As-built Drawings

4. Show projected percentage of completion for each item, as of the first of each month.

5. Show projected dollar cash flow requirements for each month of construction.

B. Submittals Schedule for Shop Drawings, and Samples in accordance Division 1.

1. Show:

a. The dates for CONTRACTOR's submittals.

b. The dates submittals will be required for OWNER furnished products, if applicable.

c. The dates approved submittals will be required from the ENGINEER.

C. Provide a list of long lead items (equipment and materials).

1.05 PROGRESS REVISIONS

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

B. Show changes occurring since previous submission of schedule:

1. Major changes in scope.

2. Activities modified since previous submission.

3. Revised projections of progress and completion.

4. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem area, 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.

1.06 SUBMISSIONS

A. Submit initial schedules to the ENGINEER within fifteen (15) days after the effective date of the Agreement.

1. The ENGINEER will review schedules and return review copy within twenty-one (21) days after receipt.

2. If required, resubmit within seven (7) days after return of review copy.

B. Submit 4 copies of revised monthly progress schedules with that month's application for payment.

1.07 DISTRIBUTION

A. Distribute copies of reviewed schedules to:

1. ENGINEER (Two Copies)

2. Job Site File

3. Subcontractors

4. Other Concerned Parties

5. OWNER (Two copies)

B. Instruct recipients to report promptly to the CONTRACTOR, in writing, any problems anticipated by the projections shown in the schedule.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Prepare and submit documentation to support material, equipment, and work as required by the Contract Documents.

B. Individual specification sections in these Contract Documents may contain additional and special submittal requirements.

1. The OWNER reserves the right to direct and modify the procedures and requirements for submittals as necessary to accomplish the specific purpose of each submittal.

2. Should the CONTRACTOR be in doubt as to the procedure, purpose, or extent of submittal, he should direct his inquiry to the ENGINEER.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 HEADWAY

A. Unless otherwise specified or instructed, submittals under this contract shall be directed to the ENGINEER.

3.02 ADMINISTRATIVE SUBMITTALS

A. Provide submittals specified in The Bid Documents, the General Conditions, as may be specifically required in other parts of the Contract Documents, and as requested by the ENGINEER.

3.03 TECHNICAL SUBMITTALS

A. Miscellaneous

1. Requirements in this section are in addition to specific requirements for submittals specified in other Divisions and Sections of these Contract Documents.

2. Submitted data shall be fully sufficient in detail for determination of compliance with the Contract Documents.

3. Review, acceptance of substitutions, schedules, shop drawings, lists of materials, and procedures submitted or requested by the CONTRACTOR shall not add to the contract amount and additional costs which may result therefrom shall be solely the obligation of the CONTRACTOR.

4. The OWNER is not precluded, by virtue of review, acceptance, or approval from obtaining a credit for construction savings resulting from allowed concessions in the work or supply of equipment and materials.

5. The OWNER shall have no responsibility for the provision of engineering or other services to protect the CONTRACTOR from additional costs accruing from approvals or submittals.

6. No equipment or material for which listings, drawings, or descriptive material is required shall be purchased, fabricated, or installed until the ENGINEER has, on hand, copies of approved lists, and the appropriately stamped final shop drawings.

7. Submittals will be acted upon by the ENGINEER as promptly as possible and returned to the CONTRACTOR not later than the time allowed for review in the Shop Drawing Submittal Procedure.

8. Delays caused by the need for resubmittals shall not constitute reason for extension of the contract time.

3.04 SHOP DRAWING SUBMITTAL PROCEDURE

A. The Contract Documents outlines general guidelines regarding submittal and approval of shop drawings.

1. This section is intended to furnish details of the contents, identification, and final record requirements of shop drawings.

B. Shop Drawing Requirements

1. Shop drawings as referred to herein, shall include shop drawings and other submittals for both shop and field-fabricated items.

2. Submit, as applicable, the following for prefabricated or manufactured structural, mechanical, electrical, and plumbing equipment and materials:

a. Shop drawings or Equipment drawings including dimensions, size and location of connections and weight of equipment.

b. Catalog information and cuts.

1) Each separate catalog, brochure, or single page submitted shall have identification noted herein.

2) Catalogs or brochures submitted containing multiple items for approval, need the identification only on the exterior.

3) In these cases the identification shall include the page and catalog item numbers.

c. Setting plans or installation drawings for equipment, drives, and bases.

d. Supporting calculations for equipment and associated supports, or hangers required or specified to be designed by equipment manufacturers.

e. Complete manufacturer's specifications, including materials description and paint system.

f. List of materials and supplies furnished with the equipment.

g. Special handling instructions.

h. Requirements for storage and protection prior to installation.

i. Requirements for routine maintenance required prior to start up.

j. List of requested exceptions to the Contract Documents.

C. Identification Data:

1. Submittals for approval shall have the following identification data, as applicable, contained thereon or permanently adhered thereto:

a. Project name and location.

b. Job number.

c. Subcontractor's vendor's and/or manufacturer's name and address.

d. Product identification.

e. Shop drawing title, drawing number, revision number, date of drawing and revision.

f. Applicable contract drawings and specification section numbers.

g. Vacant space 6 inches by 4 inches shall be provided to receive the ENGINEER's review stamp.

2. Catalog data ("cut sheets")

a. Each separate catalog, brochure, or single page submitted shall have the identification required hereinbefore.

b. Catalogs or brochures submitted containing multiple items for approval need the identification only on the exterior.

c. In this instances the identification shall include page and catalog item numbers.

D. CONTRACTOR's Responsibility

1. Submittal of shop drawing or catalog data, bearing the CONTRACTOR's approval stamp, represents that the CONTRACTOR has determined and verified field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, or will do so, and that he has checked and coordinated each item with other applicable approved shop drawings and the contract requirements.

a. Shop drawings and catalog data submitted without the CONTRACTOR's stamp of approval will be returned to the CONTRACTOR without review.

2. Approval of shop drawings, samples, or catalog data by the ENGINEER shall not authorize deviation from the requirement of the Contract Documents nor shall this approval relieve the CONTRACTOR from responsibility for errors or omissions therein.

E. Shop Drawing Review

1. The ENGINEER shall have ten (10) working days to review shop drawings.

a. In this case, working days shall be defined as days in which the ENGINEER's office is open for regular business.

3.05 FINAL SHOP DRAWINGS TO BE SUBMITTED TO OWNER

A. Complete sets of reproducible final shop drawings shall be submitted to the ENGINEER before, or at the time of, delivery of equipment to the site.

3.06 RECORD DRAWINGS

A. The CONTRACTOR will prepare a set of record drawings for the project which will include the changes made in materials, equipment locations, and dimensions of the work.

1. Each month, or as otherwise agreed, submit to the ENGINEER a current set of ongoing as-built drawings showing as-built status or each change incorporated into the work since the preceding submittal.

2. At the end of the project, submit to the ENGINEER the specified closeout documentation including required as-built drawings as described in Section 01785.

END OF SECTION

SECTION 01450

QUALITY CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. This section defines the CONTRACTOR's responsibilities regarding inspection of the work by the ENGINEER and/or third parties, tests on materials supplied for the work and completed portions of the work, schedules to be submitted by the CONTRACTOR including specific instructions covering the beginning and completion of each portion of the work and monthly reports to be submitted by the CONTRACTOR regarding progress to date and adjustments to previously submitted work schedules.

B. The work and reports set forth in this section shall not be taken to exclude other requirements as specified in other sections of the Contract Documents, as instructed by the ENGINEER or other incidentals necessary to complete the work in accordance with the plans and schedules.

1.02 RELATED SECTIONS

A. General Conditions

B. Supplemental General Conditions

C. Technical Specifications.

D. Submittal Procedure - division 1.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 INSPECTIONS

A. Provide continuous safe access to the work for the OWNER, ENGINEER, and their authorized representatives.

B. If the specifications, the ENGINEER's instructions, laws, ordinances, or public authority require work to be specially tested or approved, give timely notice of its readiness for inspection.

1. Inspections to be conducted by the ENGINEER will be made promptly and where practicable, at the source of supply.

2. If work should be covered up without approval or consent of the ENGINEER, it shall if required by the ENGINEER, be uncovered for examination at the CONTRACTOR's expense.

C. Reexamination of questioned work may be ordered by the ENGINEER, and if so ordered, the work shall be uncovered by the CONTRACTOR.

1. If this work is found to be in accordance with the Contract Documents, the OWNER will pay the cost of reexamination and replacement.

2. If this work is found not to be in accordance with the Contract Documents, correct the defective work and the cost of reexamination and correction of the defective work shall be paid by the CONTRACTOR.

D. When the CONTRACTOR's work requires inspection or test, notify the ENGINEER twenty-four (24) hours in advance of required tests or inspections.

1. Cooperate with the testing laboratory's representatives by giving ample notice of time, location and extent of work to be inspected or tested, by performing concrete slump tests, preparing concrete and other samples as instructed and by providing necessary facilities at the project site or in the shop for the testing agency.

3.02 TESTS

A. Furnish, without extra charge, the necessary test pieces and samples, including facilities and labor for obtaining the same, as requested by the ENGINEER.

1. When required, Furnish certificates of tests of materials and equipment made at the point of manufacture by a recognized testing laboratory.

B. Give the ENGINEER ample advance notice of appropriate times for tests.

1. Specified tests will be approved and supervised by the ENGINEER.

2. When specific inspections or tests are required, the work involved shall not proceed beyond that point until the ENGINEER has made or waived inspections or tests.

3.03 EXECUTION

A. Time is of the essence for the time of beginning, rate of progress, and time of completion of the work within this Contract.

1. The work shall be executed as may be required to complete the project as contemplated in the Contract Documents and the approved construction schedule.

B. Within thirty (30) days after the award of the Contract, submit to the ENGINEER, in triplicate, a listing of subcontractors, manufacturers, and suppliers who will be participating in the construction or who will be supplying materials and/or equipment for the project.

1. The address of each firm shall be listed and type of material furnished or work performed.

END OF SECTION

SECTION 01451

CONTRACTOR'S QUALITY CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. Furnish personnel and equipment which will be efficient appropriate and of sufficient quantity to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Proposal.

1. If at any time such personnel appear to the ENGINEER to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the CONTRACTOR to increase the efficiency, change the character or increase the personnel and equipment, and the CONTRACTOR shall conform to such order.

2. Failure of the ENGINEER to give such order shall in no way relieve the CONTRACTOR of his obligations to secure the quality of the work and rate of progress required.

1.02 PRIVATE LAND

A. Do not enter or occupy private land outside of easements, except by written permission of the OWNER.

1.03 PIPE LOCATIONS

A. Locate pipeline substantially as indicated on the Drawings, but the ENGINEER reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons.

1.04 OPEN EXCAVATIONS

A. Safeguard open excavation by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property.

1. Provide safe temporary bridges accommodating travel by pedestrians and workmen.

2. Remove temporary bridges when no longer required.

3. The length of open trench will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the ENGINEER.

4. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the ENGINEER may require special construction procedures such as limiting the length of open trench, prohibiting stacking excavated material in the street, and requiring that the trench shall not remain open overnight.

B. Take precautions to prevent injury to the public due to open trenches.

1. Trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night.

1.05 TEST PITS

A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled with no additional cost to OWNER and at the direction of the ENGINEER.

1. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the ENGINEER.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 COOPERATION WITHIN THIS CONTRACT

A. Firms or persons authorized to perform any work under this Contract shall cooperate with the General CONTRACTOR and his subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the ENGINEER.

3.02 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. Protect newly constructed work from damage.

1. Reconstruct damaged work at no additional cost to OWNER.

2. No wheeling, walking, or placing of heavy loads on it shall be allowed.

B. Protect structures in a manner approved by the ENGINEER.

1. Should any of the floors or other parts of the structures become heaved, cracked or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the CONTRACTOR at his own expense and to the satisfaction of the ENGINEER.

2. Special attention is directed to substructure bracing requirements described in Division 2.

3. If, in the final inspection of the work, any defects, faults or omissions are found, the CONTRACTOR shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required.

4. Assume responsibility for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the guarantee period described in the contract.

C. Take necessary precaution to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the OWNER.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. The CONTRACTOR shall furnish labor, materials, and equipment and perform functions required for the complete installation and maintenance of the Work covered by this section.

1. This Work shall include but not be limited to project field offices, sanitary facilities, construction utilities, construction consumable, safety and protection devices, storage facilities, security, traffic control and other construction aids and incidentals required for the completion of the Contract in accordance with the Contract Documents.

B. Construction operations including storage of materials, location of field offices, construction parking and delivery routing shall be limited to the limits of construction indicated or as directed by the Owner.

1.02 RELATED SECTIONS

A. General Conditions - Division 0.

B. Supplementary General Conditions - Division 0

C. Technical Specifications - Divisions 1 through 16

D. Submittals - Division 1

1.03 REFERENCES

A. Applicable Standards

1. National Electric Code.

2. Occupational Safety and Health Administration.

3. Florida State Department of Transportation's "Standard Specifications For Road And Bridge Construction" - latest edition.

B. Governmental Agencies

1. Work shall comply with the applicable standards of the appropriate governing body.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SANITATION FACILITIES

A. Provide and maintain, for the duration of the Work on the Project, toilet facilities for persons engaged in Work on the Project and provide said toilet facilities with adequate means of locking when workmen are not engaged on the Project.

1. Temporary toilets shall be chemical or other portable type approved by local health authorities and shall be removed upon completion of construction.

3.02 SAFETY AND PROTECTIVE DEVICES

A. Protect persons from injury and to avoid property damage.

1. Adequate barricades, construction signs, torches, red lanterns and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with federal, OSHA and local ordinances.

B. Repair or replace damages to the property or adjacent properties caused in the execution of this Contract.

C. Take necessary precautions for the safety of his employees on the job and shall comply with applicable provisions of Federal, State, County and Municipal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

1. The Owner reserves the right to seek restitution from the Contractor for fines incurred by the Owner as a result of the Contractor's non-compliance with said regulations.

D. In the event the Contractor's tools or materials delivered to the premises are stolen or damaged, the Contractor is responsible for such theft.

1. When the Work has been declared Substantially Complete and has been accepted by the Owner, the Owner will assume the responsibility for theft or damage.

2. Replace or repair stolen or damaged materials as soon as possible as directed by the Owner.

3.03 STORAGE FACILITIES

A. Maintain this storage facilities on the Project site as necessary for the proper execution of the Work.

1. These facilities shall be located so as to cause no interference to Work to be performed on the site.

2. Propose location and other requirements for approval by Owner.

B. Storage facilities shall provide protection from physical damage due to construction procedures, dampness, water, excessive temperatures and shall provide reasonable protection from loss due to fire or theft.

C. Storage facilities constructed for that sole purpose shall remain the property of the Contractor and shall be removed by him when they are no longer required or when so directed.

END OF SECTION

SECTION 01510

TEMPORARY UTILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Furnish, install, and maintain temporary utilities required for construction, remove on completion of work.

1.02 RELATED SECTIONS

A. Summary of Work - Division 1.

B. Field Offices - Division 1.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with National Electric Code.

B. Comply with Federal, State and Local codes and regulations and with utility company requirements.

C. Comply with County Health Department and Environmental Regulations.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

A. Arrange with utility company, provide service required for power and lighting, and pay costs for service and for power used in the construction, testing and trial operation prior to final acceptance of the work by the OWNER.

B. Install circuit and branch wiring, with the area distribution boxes located so that power and lighting is available throughout the construction by the use of construction type power cords.

C. Provide adequate artificial lighting for areas of work when natural light is not adequate to work, and areas accessible to the public.

2.03 TEMPORARY WATER

A. Arrange with the OWNER, as described in the Supplemental Conditions to provide water for construction purposes.

B. Install branch piping with taps located so that water is available throughout the construction by the use of hoses.

C. Install at each and every connection to the OWNER water supply a backflow preventer meeting the requirements of ANSI A40.6, latest revision. CONTRACTOR shall be required to meter and pay for water used.

2.04 TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities in compliance with laws and regulations.

B. Service, clean and maintain facilities and enclosures.

2.05 TEMPORARY VENTILATION

A. Provide temporary ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to temperature or humidity.

B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases.

C. Pay costs of installation, maintenance, operation and removal, and for fuel consumed.

D. Provide connections to existing facilities, extend and supplement with temporary units as required to comply with requirements. Pay costs of installation, maintenance, operation and removal. OWNER will pay costs of fuel used from the existing system.

2.06 TEMPORARY TELEPHONE SERVICE

A. Arrange with local telephone service company, provide direct line telephone service at the construction site for the use of personnel and employees. Service required:

1. One direct line instrument in CONTRACTOR's Field Office.

2. One direct line instrument in Field Office of ENGINEER.

3. One direct line facsimile (FAX) machine in CONTRACTOR's Field Office.

4. Other instruments at the option of the CONTRACTOR, or as required by regulations.

B. Pay costs for installation, maintenance and removal, and service charges for local calls. Toll charges shall be paid by the party who places the call.

PART 3 EXECUTION

3.01 GENERAL

A. Comply with applicable requirements specified in Division 15 -Mechanical and in Division 16 - Electrical.

B. Maintain and operate systems to assure continuous service.

C. Modify and extend systems as work progress requires.

3.02 REMOVAL

A. Completely remove temporary materials and equipment when their use is no longer required.

B. Clean and repair damage caused by temporary installations or use of temporary facilities.

C. Restore permanent facilities used for temporary services to specified condition.

END OF SECTION

SECTION 01550

TRAFFIC CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. The CONTRACTOR shall maintain traffic on existing roads affected by the construction and protect the traveling public from damage to person and property for the duration of the contract.

1. Abide by applicable laws, regulations, and codes thereof pertaining to Maintenance of Traffic (MOT) on public streets, detour of traffic, traffic control and other provisions as may be required for this Project.

2. Comply fully with the MOT provisions contained in the permits.

3. Work shall be in accordance with Florida Department of Transportation (FDOT) “Standard Specifications for Road and Bridge Construction”, latest edition, and the “Roadway and Traffic Design Standards” Index Nos. 600 to 651, latest edition, including preparation of a proposed Maintenance of Traffic Plan.

B. The CONTRACTOR shall assume responsibility for MOT on public streets, detour of traffic (including furnishing and maintaining regulatory and informative signs along the detour route), traffic control, and other provisions, throughout the Project, as required by the local Department of Public Works, Roads Department, or FDOT, as applicable.

1. Maintain traffic over a reasonably smooth traveled way which shall be so marked by signs, delineators, guiding devices, and other methods that a person who has no knowledge of conditions may safely and with a minimum of discomfort and inconvenience ride, drive, or walk, day or night, over the roadway where traffic is to be maintained.

2. Work shall conform to the drawings and to the requirements of the local Department of Public Works, Roads Department, or FDOT, as applicable.

1.02 RELATED SECTIONS

A. General Conditions

B. Supplementary General Conditions

C. Technical Specifications.

D. Submittals - Division 1

E. Permits - Division 1

1.03 STANDARDS AND REGULATIONS

A. Applicable Standards

1. Occupational Safety and Health Administration.

2. FDOT “Standard Specifications for Road and Bridge Construction”, latest edition, and the “Roadway and Traffic Design Standards” Index Nos. 600 to 651, latest edition, including preparation of a proposed Maintenance of Traffic Plan.

B. Governmental Agencies

1. Work shall comply with the applicable standards of the appropriate governing body.

1.04 Roadway Physical Conditions

A. Surface

1. Maintain the surface condition of the traveled way so it is consistent with the appropriate speed limits.

B. Drainage

1. Maintain the drainage facilities and other highway elements, old or new including detours.

C. Temporary Roads

1. Provide temporary relocated roads to maintain the required right-of-way.

D. Intersecting Roads

1. Provide ingress and egress to and from intersecting roads, buildings, and other facilities.

E. Haul Roads

1. Repair damage from CONTRACTOR's hauling operations along existing roads, and such operations shall be conducted with minimum interference to public traffic, as directed by the local Department of Public Works, Roads Department, or FDOT, as applicable.

F. Dust Control and Spillage

1. Control dust and keep the traveled way free from material spilled from hauling equipment.

2. This shall also apply to dust control and spilled material resulting from the CONTRACTOR's operations in the areas outside the contract limits.

G. Flagmen

1. Provide the necessary repairs to existing pavement and Flagmen for adequate traffic control on the traveled way.

2. Sign paddles are required.

H. Delineation and Guiding Devices

1. Provide and maintain delineation and guiding devices which shall include delineators, drums, cones, railing, temporary curb and other similar materials or methods indicated or directed.

2. The installation or moving of delineators or guiding devices together with removal of existing pavement markings shall be included in the work.

I. Project Site Patrol

1. Provide personnel to patrol the contract area as necessary to ensure that conditions on the site are adequate for public safety and convenience.

J. Construction Sign Barriers, Construction Barricades, and Lighting for Construction Barricades

1. Furnish, install, move, and maintain construction signs, barriers, construction barricades with warning lights, necessary arrow boards and signs, to warn motorists of the work throughout the Project.

2. Erected and maintained adequate approved devices to detour traffic away from the project during work.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Notify the local Department of Public Works, Roads Department, or FDOT, as applicable, 48 hours in advance of the construction date.

B. Pavement markings damaged during construction shall be remarked promptly by the CONTRACTOR as required by the local Department of Public Works, Roads Department, or FDOT, as applicable.

3.01 DRAINAGE

A. Keep drainage facilities fully operative.

1. Provide ditches to adequately drain the traveled way and the remainder of the right-of-way.

3.02 INGRESS AND EGRESS

A. Provide and maintain safe and adequate ingress and egress for intersecting points.

3.03 EXISTING PAVEMENT MARKINGS

A. Remove, as soon as practical, existing pavement markings, as required by local Department of Public Works, Roads Department, or FDOT, as applicable.

3.04 QUALITY CONTROL

A. Establish and maintain quality control for operations under this section to assure compliance with contract requirements and maintain records of his quality control for materials, equipment, and construction operations, including but not limited to the following:

1. Scheduling and traffic control.

2. Temporary pavement and drainage provisions.

3. Traffic control devices.

4. Maintaining traveled way.

5. Maintaining drainage.

END OF SECTION

SECTION 01560

TREE AND PLANT PROTECTION

PART 1 GENERAL

1.01 SUMMARY

A. Remove trees as noted in the Drawings.

B. Abide by requirements and conditions of the governing authority.

C. Assume full responsible for maintaining, in good condition, cultivated grass plots, trees, and shrubs.

1. Where maintained shrubbery, grass strips or area must be removed or destroyed incident to the construction operation, replace or restore to the original condition destroyed or damaged shrubbery or grass areas.

2. Tree limbs which interfere with equipment operation and are approved for pruning shall be neatly trimmed and the tree cut coated with a tree paint.

D. Grass areas shall be solid sodded with sod to match the existing grass and shall first be leveled, and debris, rocks and other matter removed.

E. The sod shall be placed with closely abutting joints, and shall completely cover the areas shown in the Drawings to be grassed.

1. The top of the new sod shall coincide with the top of pavement and sidewalk, both existing and proposed.

2. The sod shall be covered with a light top dressing of topsoil and shall then be thoroughly watered.

F. Weeded areas need not be replaced with grass sod, but shall be restored to a “green” area by dressing the area with a layer of top soil, and sowing a variety of permanent type grass seed, over the area as approved by the ENGINEER.

1. Water and maintain the seeded area until the ENGINEER is assured a good grass growth has developed, but not to exceed a maximum period of 60 days.

1.02 STANDARDS AND REGULATIONS

A. Work shall conform to the applicable standard.

PART 2 PRODUCTS (Not Used)

PART 3EXECUTION (Not Used)

END OF SECTION

SECTION 01568

SECURITY MEASURES

PART 1 GENERAL

1.01 SUMMARY

A. Security Program

B. Entry Control

C. Personnel Identification

D. Miscellaneous Restrictions

1.02 RELATED SECTIONS

A. Summary of Work - Division 1

B. Temporary Utilities - Division 1

1.03 SECURITY PROGRAM

A. Protect Work, existing premises and OWNER's operations from theft, vandalism and unauthorized entry.

B. Initiate program in coordination with OWNER's existing security system at job mobilization.

C. Maintain program throughout construction period until OWNER occupancy as directed by ENGINEER.

1.04 ENTRY CONTROL

A. Restrict entrance of persons and vehicles into project site and existing facilities.

B. Allow entrance only to authorized persons with proper identification.

C. Maintain log of workmen and visitors, make available to OWNER on request.

D. Coordinate access of OWNER's personnel to site in coordination with OWNER's security forces.

1.05 PERSONNEL IDENTIFICATION

A. Become familiar with OWNER and ENGINEER representatives.

B. Restrict access to job site to these representatives.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01600

EQUIPMENT AND MATERIALS

PART 1 GENERAL

1.01 SUMMARY

A. Incorporate new and unused equipment, materials, instruments, or devices in this project, unless indicated otherwise in the Contract Documents.

B. Deliver equipment and materials to be incorporated in the work sufficiently in advance of their installation and use to prevent delay in the execution of the work, and in order as required for reasonable executing the work.

C. Prevent deterioration and damage to equipment and materials.

1. Prevent warping, twisting, bending, breaking, chipping, rusting, damage, or theft of the equipment and materials handled and stored by the manufacturer, fabricator supplier, and CONTRACTOR before, during, and after shipment.

2. Removed and replaced warped, twisted, bent, broken, chipped, rusted, damaged equipment at the CONTRACTOR's expense for both labor and materials.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01610

BASIC PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Material and equipment incorporated into the Work:

1. Conform to applicable specifications and standards.

2. Comply with size, make, type and qualify specified, or as specifically approved in writing by the ENGINEER.

3. Manufactured and Fabricated products:

a. Design, fabricate and assemble in accord with the best engineering and shop practices.

b. Manufacture like part of duplicate units to standard sizes and gauges, to be interchangeable.

c. Two or more items of the same kind shall be identical, by the same manufacturer.

d. Products shall be suitable for service conditions.

e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.

4. Do not use material or equipment for purposes other than that for which it is designed or is specified.

1.02 RELATED REQUIREMENTS

A. General Conditions - Division 0

B. Summary of Work - Division 1

C. Special Project Procedures - Division 1

D. Shop Drawings, Working Drawings and Samples - Division 1

E. Project Record Documents - Division 1

F. Operating & Maintenance Data - Division 1

G. Warranties and Bonds - Division 1

H. Installation - Division 1

I. Product Delivery Requirements - Division 1

J. Product Storage and Handling - Division 1

K. Product Substitution Requirements - Division 1

1.03 APPROVAL OF MATERIALS

A. Only new materials and equipment shall be incorporated in the work.

1. Materials and equipment furnished are subject to the inspection and approval of the ENGINEER.

2. No material shall be delivered to the work without prior approval of the ENGINEER.

B. Within 30 days after the effective date of the Agreement, submit to the ENGINEER, data relating to materials and equipment he proposes to furnish for the work.

1. Data shall be in sufficient detail to enable the ENGINEER to identify the particular product and to form an opinion as to its conformity to the specifications.

2. The data shall comply with product submittals.

C. Furnish facilities and labor for handling and inspection of materials and equipment.

1. Prior to beginning or during progress of the work, submit samples of materials for such special tests as required by the ENGINEER to demonstrate that they conform to the specifications.

2. Samples shall be furnished, stored, packed, and shipped as directed at the CONTRACTOR's expense.

3. Except as otherwise noted, the OWNER will make arrangements for and pay for the tests.

D. Submit data and samples sufficiently early to permit consideration and approval before materials are necessary for incorporation in the work.

1. Delay of approval resulting from the CONTRACTOR's failure to submit samples or data promptly shall not be used as a basis of claim against the OWNER or the ENGINEER.

E. Provide samples of workmanship or finish as may be required.

F. The materials and equipment used on the work shall correspond to the approved samples or other data.

1.04 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

A. Provide manufacturer's printed instruction, obtain and distribute copies of such instructions to parties involved in the installation, including copies to the ENGINEER.

1. Maintain one set of complete instructions at the job site during installation and until completion.

B. Handle, install, connect, clean, condition, and adjust products in strict accord with such instructions and in conformity with specified requirements.

1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with ENGINEER for further instructions.

2. Do not proceed with work without clear instructions.

C. Perform work in accord with manufacturer's instructions.

1. Do not omit preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.05 TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accord with construction schedules, coordinate to avoid conflict with work and conditions at the site.

B. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

1. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and Undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.06 STORAGE AND PROTECTION

A. Furnish a covered, weather-protected storage structure providing a clean, dry, noncorrosive environment for mechanical equipment, valves, electrical and instrumentation equipment, and special equipment to be incorporated into this project.
   1. Storage of equipment shall be performed to allow easy access and be in strict accordance with the "instructions for storage" of each equipment supplier and manufacturer including weather/humidity protection, connection of heaters, placing of storage lubricants in equipment, blocking, or skid storage.

   2. Replace corroded, damaged, or deteriorated equipment and parts before acceptance of the project.

B. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.

   1. Store products subject to damage by the elements in weather-tight enclosures.

   2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

   3. Store fabricated products above the ground on blocking or skids, prevent soiling or staining.

   4. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.

   5. Store loose granular materials in a well drained area on solid surfaces to prevent mixing with foreign matter.

C. Materials and equipment to be incorporated in the work shall be handled and stored by the CONTRACTOR before, during, and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and injury, theft or damage to the material or equipment.

D. Store cement, sand, and lime under a roof and off the ground and keep completely dry.

E. Store structural and miscellaneous steel, and reinforcing steel off the ground or otherwise to prevent accumulations of dirt or grease, and to minimize rusting.

F. Store and handle brick, block, and similar masonry products in a manner to reduce breakage, chipping, and cracking.

G. Rotate moving parts no less than weekly to insure proper lubrications and to avoid metal-to-metal "welding".

H. Upon installation of the equipment, start the equipment, at least half load, weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.

I. Materials which, in the opinion of the ENGINEER, have become so damaged as to be unfit for the use intended or specified shall be promptly removed from the site of the work, and receive no compensation for the damaged material or its removal.

J. Arrange storage in a manner to provide easy access for inspection.

    1. Make periodic inspections of stored products to assure that products are maintained under specific conditions, and free from damage or deterioration.

K. Protection After Installation:

    1. Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations.

    2. Remove on completion.

I. Assume responsibility for materials, equipment, and supplies sold and delivered to the OWNER under this Contract until final inspection of the work and acceptance thereof by the OWNER.

    1. In the event material, equipment, and supplies are lost, stolen, damaged, or destroyed prior to final inspection and acceptance, replace same without additional cost to the OWNER.

M. Should the CONTRACTOR fail to take proper action on storage and handling of equipment supplied under this Contract within seven days after written notice to do so has been given, the OWNER retains the right to correct deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from the CONTRACTOR's Contract.

    1. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, engineering, and other costs associated with making the necessary corrections.

1.07 SPECIAL TOOLS

A. Furnish special tools (including grease guns or other lubricating devices) required for normal adjustment, operations and maintenance, together with instructions for their use.

B. Preserve and deliver to the OWNER these tools and instructions in good order no later than upon completion of the Contract.

1.08 WARRANTY

A. For major pieces of equipment, submit a warranty from the equipment manufacturer.

1.09 SPARE PARTS

A. Spare parts for certain equipment provided under Division 11 through 16 have been specified in the pertinent sections of the Specifications.

1. Collect and store spare parts as recommended by the manufacturer in a safe location.

2. Provide an inventory listing spare parts, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item.

3. Provide copies of actual invoices for each item furnished to substantiate the delivered cost.

1.10 GREASE, OIL, AND FUEL

A. Furnish grease, oil, and fuel required for testing of equipment with the respective equipment.

1. Furnish the OWNER a one (1) year supply of required lubricants including grease and oil of the type recommended by the manufacturer with each item of the equipment supplied under Division 11 through 16.

B. Assume responsibility for changing the oil in drives and intermediate drives of each mechanical equipment after initial break-in of the equipment, which in no event shall be longer than three weeks of operation.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01630

PRODUCT SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Materials or equipment specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular manufacturer, fabricator, supplier, or distributor; the naming of the item is intended to establish the type, function and quality of the item.

B. Materials or equipment of other manufacturers, fabricators, suppliers, or distributors may be accepted by the ENGINEER, provided that sufficient information is submitted by the CONTRACTOR to allow the ENGINEER to determine its equivalency.

C. No substitution is permitted if specifically identified that no substitution is permitted for that product or item.

1.02 CONDITIONS FOR REVIEW OF ALTERNATES

A. Requests for review of substitute items of material and equipment will not be accepted by the ENGINEER from anyone other than the CONTRACTOR.

1. If the CONTRACTOR wishes to furnish or use a substitute item of material or equipment, make a written application to the ENGINEER for acceptance thereof, certifying that the proposed substitute will adequately perform the functions and achieve the results required and be suitable for the same use as the material or equipment specified.

2. The application shall state that the evaluation and acceptance of the proposed substitute will not affect the CONTRACTOR's time of completion, whether or not acceptance of the substitute for use in the work required a change in the Contract Documents to adapt the substitute into the design or whether or not substitution in connection with the work is subject to payment of royalty or licensing fee.

B. Variations of the proposed substitute from that specified shall be identified in the application and available maintenance, repair and replacement services shall be included.

1. The application shall also contain a statement that the CONTRACTOR agrees to pay direct and indirect costs, resulting from acceptance of the substitute, including redesign and claims of other CONTRACTORs affected by the resulting change.

2. The ENGINEER may require additional data, at the CONTRACTOR's expense for proper evaluation of the proposed substitute.

C. The ENGINEER will be allowed reasonable time for the evaluation of proposed substitution and the Engineer's decision regarding acceptability will be final.

1. No substitute shall be ordered or installed prior to the Engineer's written acceptance.

D. The OWNER may require the CONTRACTOR, at the CONTRACTOR's expense, to supply a specific performance guarantee or other surety covering the substitution.

E. The ENGINEER will record time required by the ENGINEER or required Consultants in evaluating proposed substitutes by the CONTRACTOR as well as costs required for modification of the Contract Documents as a result thereof.

1. Reimburse the OWNER for costs of ENGINEER services associated with evaluating proposed substitute that the CONTRACTOR is proposing as an alternate or equal to the requirement of the Contract Documents. This could include all the costs for the Engineer and owner to visit an existing installation.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 SUBSTITUTIONS

A. Submit requests for substitution in writing, to the ENGINEER for review, and within thirty (30) days from the date of issue of the contract Notice To Proceed.

1. Requests submitted after the specified period may be rejected, at the Engineer's option, without review.

B. Each request for substitution shall be submitted separately in five (5) copies and shall contain complete data substantiating compliance of the proposed substitution with the Contract Documents.

3.02 CONTRACTORS OPTIONS

A. Requests for substitution can be classified into two general categories, products or construction methods.

1. Products (Materials or Equipment)

a. Provide products, to the maximum extent possible, of the same generic kind meeting the quality and performance of the referenced standard and from a single source.

b. Products specified by naming several products or manufacturers, select one of the products or manufacturers named which complies with the Contract Documents.

c. Products specified by naming one or more products or manufacturers and stating "or equal", submit a request for substitution for product or manufacturer not specifically named.

d. Products specified by naming one product or manufacturer and followed by words indicating no substitution, there is no option and no request for substitution will be considered.

e. Where more than one choice is available, as a CONTRACTOR's option, select a product which is compatible with other products specified or selected.

f. Requests for substitution for products or manufacturers shall contain product identification including: manufacturer's name and address; manufacturer's literature with model or catalog number; product description; test data; utility consumption (if applicable); justification for the proposed substitution; samples (if appropriate); name and address of similar projects on which product was used and date of installation; other data as requested by the ENGINEER to establish that the proposed substitution is equal to or better than that specified.

2. Construction Method

a. Detailed description of the proposed method(s) including name and address of projects where the method was used; drawings illustrating method(s) and reason or justification for the proposed substitution; other data as deemed necessary or as requested by the ENGINEER to establish that the proposed substitution is equal or superior to that specified.

3. Justification for Request for Substitution
   a. In making a request for substitution, the CONTRACTOR represents that CONTRACTOR has investigated the proposed substitution and has determined that it is equal or superior to that specified; that the CONTRACTOR will provide equal to or better warranties or bonds for the proposed substitution as for the product or method specified, that the CONTRACTOR waives claims for additional costs or extension of time related to the proposed substitution that may subsequently become apparent.

3.03 ENGINEER'S OPTIONS

A. Requests for substitutions may be rejected by the ENGINEER without further review if the request:

1. Is received more than thirty (30) days after the date of the Notice To Proceed.

2. Effects the project completion date.

3. Jeopardizes the performance or the intent of the project.

4. Requires substantial revision of the Contract Documents.

B. Requests will not be accepted that are indicated or implied on shop drawings and are not accompanied by a formal request for substitution by the CONTRACTOR.

C. If the ENGINEER determines that a proposed substitute meets the requirements of the Contract Documents and is suitable for the purpose intended, it may be accepted and if accepted, reimbursement to the OWNER for the Engineer's review will not be required.

D. If the ENGINEER determines that a proposed substitute does not meet the requirements of the Contract Documents and is not acceptable, furnish the specified product, manufacturer or method at no additional cost to the OWNER and shall reimburse the OWNER for the cost of the Engineer's review.

E. If the ENGINEER determines that a proposed substitute does not meet the requirements of the Contract Documents as specified but is suitable as a substitute for the purpose intended:

1. Reimburse the OWNER for the Engineer's review.

2. Furnish the product, manufacturer or method specified at no additional cost to the OWNER.

3. Request that the ENGINEER issue a change order in which case provide accurate cost data on the proposed substitution and comparison with the product or method specified, provide the OWNER with the benefit of savings in cost and reimburse the OWNER for the Engineer's cost of preparation and negotiation of the change order.

F. In the event an agreement cannot be reached, furnish the product or method specified at no additional cost to the OWNER and shall reimburse the OWNER for the Engineer's preparation and negotiation of the change order.

3.04 SHOP DRAWINGS

A. Acceptance of a substitution will not relieve the CONTRACTOR from the requirement for submission of Shop Drawings as set forth in the Contract Documents.

END OF SECTION

SECTION 01660

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. STORAGE

1. Store equipment and materials at the jobsite in accordance with the manufacturer's recommendations and directed by the OWNER.

2. Do not store unnecessary materials or equipment on the jobsite.

3. Prevent any structure from being overloaded and endanger the safety of his personnel or others.

4. Enforce the instructions of the OWNER and ENGINEER regarding the posting of regulatory signs for loadings on structures, fire safety and smoking area.

B. HANDLING AND MAINTENANCE

1. Follow manufacturer's storage instructions or approved written deviations.

   a. Forward a copy of manufacturer's approved written deviations to the ENGINEER.

2. Equipment with moving parts shall be rotated per the manufacturer's recommendations while in storage and during the period between installation and acceptance.

3. Equipment shall be stored fully lubricated unless otherwise instructed by the manufacturer.

4. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance.

5. New lubricants shall be put into the equipment at the time of acceptance.

6. Equipment having moving parts such as gears, and electric motors and instruments, control panels, and switchgear shall be stored in a temperature and humidity controlled building until such time as the equipment is to be installed.

7. Shafts shall be rotated as required per manufacturer's recommendations for storage.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01720

PROJECT RECORD DRAWINGS

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall keep and maintain, at the job site, one record copy of all drawings, specifications, addenda, change orders, and other modifications to the Contract, approved shop drawings, and field test records.

B. The CONTRACTOR shall mark the record drawings to indicate all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the WORK as actually constructed. These master record drawings of the CONTRACTOR's representation of as-built conditions, including all revisions made necessary by addenda and change orders shall be maintained up-to-date during the progress of the WORK.

C. Record drawings shall be accessible to the ENGINEER at all times during the construction period.

D. Monthly pay requests must be accompanied by an updated copy of the record drawings. Pay Applications submitted without record drawings shall not be proceeded by the ENGINEER, until the drawings are received. The CONTRACTOR shall submit one set of record drawings, 11 x 17 size shall be acceptable.

E. Final payment will not be acted upon until the CONTRACTOR has prepared and delivered record as-built drawings to the ENGINEER. Said up-to-date record drawings shall be in the form of a set of prints with carefully plotted information overlaid in red.

F. Upon substantial completion of the WORK and prior to final acceptance, the CONTRACTOR shall finalize and deliver a complete set of record drawings to the ENGINEER for transmittal to the OWNER, conforming to the construction records of the CONTRACTOR. This set of drawings shall consist of corrected drawings showing the reported location of the WORK. The information submitted by the CONTRACTOR and incorporated by the ENGINEER into the Record Drawings will be assumed to be correct, and the CONTRACTOR shall be responsible for the accuracy of such information, and shall bear the costs resulting from the correction of incorrect data furnished to the ENGINEER and the OWNER.

G. Surveyor Requirement and Certification

1. As-Builts shall include a signed, sealed and dated certification statement by the responsible Professional Surveyor and Mapper (PSM) registered in the State of Florida stating the information was obtained under his direction and is true and correct as shown.

2. The Surveyor shall be fully responsible for the accuracy of the as-Builts. As-Builts may not contain any statement that the information was obtained from another party other than a licensed land surveyor under his direction. (For example, a statement such as “As-built information provided by Contractor” shall not be permitted.)

1.2 RELATED REQUIREMENTS

A. Section 01300: Contractor Submittals

B. Section 01700: Project Closeout.

1.3 MARKING DEVICES

A. The CONTRACTOR shall provide felt tip marking pens for recording information in a color code.

1.4 RECORDING

A. Label each document “AS-BUILT” or “RECORD DRAWINGS” in neat large printed letters.

B. Record information concurrently with the progress of construction.

C. Legibly mark drawings to record actual construction

1. Provide horizontal location of pipes any time the pipe passes a permanent surface reference point. Permanent reference points are as defined herein. Any deviations from the alignment shown on the Contract Drawings must be noted.

2. Provide vertical locations at 100-foot intervals. Vertical location will be depth of cover or pipe elevation, whichever is called for on the drawings and document elevations of natural grade or pavement over pipeline at each location.

3. All fittings, including sleeves, valves, and services are to be located by two measurements to permanent surface reference points or by station and offset.

4. Permanent surface reference points are manholes, catch basins, power poles, concrete sidewalk, or concrete curbs. Edge of pavement and road intersections may not be used without the ENGINEER’s approval.

5. Field changes of dimension and detail.

6. Changes made by Field Order, Change Order, or Construction Change Directive.

7. Details not shown on the original Contract Drawings.

D. Legibly mark each Section of the Specifications and Addenda to record:

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

1.5 SUBMITTAL

A. Prior to Substantial Completion, submit Record Documents to the ENGINEER for delivery to the OWNER.

B. **At the completion of work, the CONTRACTOR must deliver complete "As-built" drawings to the ENGINEER for the OWNER. They shall consist of six (6) 24" x 36" blackline sets and one (1) CD consisting of the electronic CADD files.**

1. **These "As-built" drawings are to be signed and sealed by a Professional Surveyor and Mapper (PSM), currently registered and licensed in the State of Florida.**

2. **The ENGINEER will supply the electronic CADD files to the CONTRACTOR.**

3. **The "As-built" electronic CADD files shall be generated in .dgn, .dwg, or .dxf file format, as specified by the ENGINEER.**

C. 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

D. Any as-built drawing found to be inaccurate or incomplete will be rejected.

E. Record drawings for new pipelines shall address the following:

1. The as-built data on submitted plan sheets (line work, numerical data) must be easily legible, accurate (increase the font size and/or use different font style to improve legibility). Separate water and wastewater as-built plans may be required for projects with a high density of data and/or poor legibility.

2. The Contract Drawings shall be used for as-built presentation.

3. Identify street names, addresses, subdivision, homeowner's association contact for each well site.

4. Existing utility easements shall be identified on record drawings with ORB/Page, Plat Book/Page.

5. Complete title block with current file name (including plat name, etc.). Label drawings "Record Drawings" or "As-Builts" and show appropriate entries in the revision block.

6. Pipe lines shall be tied to survey baseline or center line not the right-of-way.

7. Horizontal As-Built data (stations, offsets, distances between fittings, manholes, and pull boxes) are to be rounded off to the nearest foot. Elevation data shall be shown to the hundredth of a foot (top of manhole, inverts), or to the tenth of foot for top of pipe elevations. Slopes shall be rounded off to the nearest one-ten thousandth.

8. As-built data must include stations and offsets and top of pipe elevations for all fittings, valves, hydrants, pipe conflicts, and pipe at 100-foot intervals. Horizontal pipe separation at 100-foot intervals is required for parallel piping systems. Show restrained pipe joints. For "wt tap" or "cut-in" connections into existing system, a distance from the point of connection to an existing in-line valve is required. Elevations of natural ground or pavement over pipe lines shall be shown at end position where the pipe elevation is shown.

9. As-built data shall include showing the transitions between the different types of pipe by station number (HDPE to DIP), show transition between push-on and restraint joint pipe by stations.

10. Completed operation and maintenance manuals must be submitted with final record drawings. (See Section 01787)

f. Record drawings for any above ground new equipment provided by the CONTRACTOR shall address the following information:

1. Document the name plate data from the manufacturer, document model number, serial numbers for each piece of equipment.

2. Horizontal and vertical as-built information shall be obtained from all installed equipment including all individual tanks, all above ground piping assemblies, all pumping, monitoring, and metering equipment, revise the drawings as required to reflect what was installed.

3. If the as-built equipment layout is different from the proposed bid set redraw what was installed with the correct locations and dimensions of the components. Show as-built elevations, all pipes in and out of equipment shall all be located and shown as it was installed. Obtain elevations of all pipes center lines and or top of pipe.

4. If components on the drawings were not included in the contract, indicate on the specific drawings N.I.C (not in contract).

5. If a drawing is revised with as-built information, indicate this in the drawings revision block located in the lower left-hand corner of each sheet. Write “record drawings” with a date on each sheet that’s affected. Additionally label drawing in lower right-hand corner “Record Drawings”.

7. Electrical schematic As-Built drawings are required, see Section 16050 for electrical As-Built drawing requirements.

PART 2 – PRODUCTS - Not Used

PART 3 – EXECUTION - Not Used

END OF SECTION

SECTION 01723

PROTECTION OF ADJACENT CONSTRUCTION

PART 1 GENERAL

1.01 SUMMARY

A. The underground utilities, structures, and other facilities shown in the Drawings are located according to the best information available, but may very by several feet from both the location and elevation shown.

1. Explore far enough in advance of his main trench to determine the exact location and condition of utilities, structures, or facilities so that, before the pipe is installed, the ENGINEER may change the line or grade of the pipe, should that become necessary to avoid a conflict.

B. Cost for changing the grade of the proposed main downward or upward in order to clear obstructions located differently than shown in the Drawings, or not shown in the Drawings, shall be included in the price established in the Proposal for the new depth of cut range that the main is installed in.

C. Where the main is deflected either horizontally or vertically, and the ENGINEER requires additional work and items such as paving, air release valve assemblies, and similar items for which a pay item was established in the proposal, additional work and items will be paid for at the price bid.

D. Determine the locations of recent additions to the systems and not shown in the Drawings.

1. Exercise extreme to prevent damage to utilities resulting from contract activities.

2. The location of the overhead utilities shall be verified and the ENGINEER notified of conflict which might occur.

3. Comply with the requirements of the utility companies and the ENGINEER for determining which poles will need shoring during excavation and shall provide shoring and support as required.

E. Where it is necessary to temporarily interrupt house or building services, notify the house or building owner or occupant, both before the interruption and again immediately before service is resumed.

1. Before disconnecting pipes or cables, obtain permission from the OWNER, or shall make suitable arrangements for their disconnection by the OWNER.

F. Assume responsibility for damage to pipes, conduits, or cables, and restore damaged items to service promptly.

G. Various drainage culverts and drainage ditches may be encountered along the route of the work.

1. Repair, restore, or reinstall culverts which are disturbed, damaged, or removed.

2. Drainage ditches shall be restored to the original cross sections existing prior to construction of this work.

3. Ditches shall be left clean and free of excavated materials or other materials deposited in them as a result of this construction.

4. Existing headwalls and slabs for drainage ditches, removed or damaged as a result of this construction, shall be restored.

5. This work shall be performed as directed by the ENGINEER, and the work shall be considered an incidental item and the cost included in the items listed in the Proposal.

1.03 REFERENCES

A. Governmental Agencies

1. Work shall conform to the applicable standards of local government engineering departments.

1.04 RELOCATE OF EXISTING UTILITIES

A. Relocate existing utilities, as noted in the Drawings, or for the convenience of construction.

1. This work shall be completed by either the forces of the existing utility or the CONTRACTOR’s forces at the discretion of the responsible utility.

2. Perform work in accordance with the utility company’s requirements.

B. Coordinate existing utility relocations with the appropriate utilities.

1. Provide temporary supports or protective encasements are required during the construction, at no additional cost.

C. Conflicts between the field investigation and the information shown in the Drawings shall be brought to the immediate attention of the ENGINEER.

1. There shall be no additional payment for adjustments in grades or location resulting from locations of existing utilities.

D. Representatives of the utility companies shall be notified in accordance with the provisions set forth in the relevant sections of the Specifications and the permitting documents.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01740

CLEANING

PART 1 GENERAL

1.01 SUMMARY

A. Execute cleaning, during progress of the Work, and at completion of the Work, as required by General Conditions.

1.02 RELATED SECTIONS

A. Conditions of the Contract.

B. Each Specification Section: Cleaning for specific Products or work.

1.03 DISPOSAL REQUIREMENTS

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

PART 2 PRODUCTS

2.01 MATERIALS

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

B. Use only those cleaning materials and methods recommended by 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 accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.

B. Provide on-site containers for the collection of waste materials, debris, and rubbish.

C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 DUST CONTROL

A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.

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

3.03 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

C. Wash and shine glazing and mirrors.

D. Polish glossy surfaces to a clear shine.

E. Ventilating Systems:

1. Clean permanent filters and replace disposable filters if units were operated during construction.

2. Clean ducts, blowers and coils if units were operated without filters during construction.

F. Broom clean exterior paved surfaces and rake clean other surfaces of the grounds.

G. Prior to final completion, or OWNER occupancy, CONTRACTOR shall conduct an inspection of sight-exposed interior and exterior surfaces, and work areas to verify that the entire work is clean.

END OF SECTION

SECTION 01741

FINAL CLEANING

PART 1 GENERAL

1.01 SUMMARY

A. The CONTRACTOR shall provide equipment, tools, materials, and labor required to maintain the project site in a clean and orderly manner throughout the duration of construction and for final cleaning and touch up at end of construction. This work shall include but not be limited to, sweeping, brushing, dust control, washing, waxing and polishing, debris removal, removal of excess materials, tools, equipment and scaffolding and final cleaning of installed work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cleaning materials and equipment used shall be selected and employed with care to avoid scratching, marring, defacing, staining, or discoloring the surfaces cleaned. Cleaning materials shall be as recommended by the manufacturer of products and materials being cleaning.

PART 3 EXECUTION

3.01 CLEAN-UP DURING CONSTRUCTION

A. Clean-up shall be performed as required to prevent accidents to personnel, protect work in place, and to affect the progress of the work in a timely and orderly manner.

B. Construction clean-up shall consists of, but not be limited to, the removal of mud, oil, grease, sand, gravel, dirt, trash, scrap, debris, and excess materials from the work site on a continuous basis. Small scrap and debris may be collected in containers and large materials may be stockpiled in an area to be removed from the site periodically at the Contractor’s cost.

C. Immediately prior to the Contractors request for final inspection of the project or portion thereof, final cleanup shall be performed. Pavement damaged shall be repaired in a manner approved by the Engineer. Final grade in the area of the pipe installation shall be returned to the pre-construction elevation and condition.

END OF SECTION

SECTION 01770

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

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

1.02 RELATED SECTIONS

A. Conditions of the Contract.

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

B. Project Record Documents - Division 1.

C. Closeout Submittals - Division 1.

1.03 BENEFICIAL OCCUPANCY

A. When the OWNER considers work is substantially complete for beneficial use, he will submit a letter to the CONTRACTOR informing intent to take early possession of the facility for partial use.

1. The written notice shall describe the OWNER's reason for early beneficial occupancy.

B. Adjust construction work schedule to accommodate the OWNER's plan to utilize the facility.

1. Continue the work while allowing the OWNER full access and use of the facility.

C. Requests for time extension or additional costs based upon the OWNER's early occupancy of the site and use of the facilities shall not be considered.

1. Additional costs associated with the OWNER's early occupancy of the site shall be borne by the CONTRACTOR.

1.04 SUBSTANTIAL COMPLETION

A. When the CONTRACTOR considers the work is substantially complete, he shall submit to the Engineer:
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, the ENGINEER will make an inspection to determine the status of completion.

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

1. The ENGINEER will promptly notify the CONTRACTOR in writing, giving the reasons therefore.

2. The CONTRACTOR shall remedy the deficiencies in the work and send a second written notice of substantial completion to the Engineer.

3. The ENGINEER will reinspect the work.

D. When the ENGINEER finds that the work is substantially complete, he will:

1. Prepare and deliver to the OWNER a tentative Certificate of Substantial Completion with a tentative list of items to be completed or corrected before final payment.

2. After consideration of any objections made by the OWNER as provided by Conditions of the Contract, and when the ENGINEER considers the work substantially complete, he will execute and deliver to the OWNER and the CONTRACTOR a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

1.05 REINSPECTION FEES

A. Should the ENGINEER perform reinspections due to failure of the Work to comply with the claims of status of completion made by the CONTRACTOR:

1. OWNER will compensate the ENGINEER for such additional services.

2. OWNER will deduct the amount of such compensation from the final payment to the CONTRACTOR.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SUMMARY

A. Upon final inspection and before acceptance and final payment, the CONTRACTOR shall deliver to the OWNER guarantees and warranties, affidavits of payments of claims and Record Drawings.

B. Required guarantees shall be bound in booklet form with covers properly labeled to identify the project and content.

C. Maintain a complete set of Contract Documents at the project site and on which maintain a complete record of actual construction which differs from what is shown in the Contract Documents.

1. Show actual installed locations of buried pipe and conduit and other matters or equipment which is indicated diagrammatically.

2. Make markings in a neat, legible manner and full identified and/or explained by notes.

1.02 RELATED SECTIONS

A. Conditions of the Contract: Fiscal provisions, legal submittals and additional administrative requirements.

B. Project Record Documents - Division 1.

C. Closeout Procedures - Division 1.

1.03 FINAL INSPECTION

A. When the 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. Work is completed and ready for final inspection.

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

C. Should the ENGINEER consider that the work is incomplete or defective.

1. The ENGINEER will promptly notify the CONTRACTOR in writing, listing the incomplete or defective work.

2. Remedy the stated deficiencies and send a second written certificate to the ENGINEER that the work is complete.

3. The ENGINEER will re-inspect the work.

D. When the ENGINEER finds that the work is acceptable under the Contract Documents, he shall request the CONTRACTOR to make closeout submittals.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

A. Evidence of compliance with requirements of governing authorities.

B. Project Record Documents: To requirements of Division 1.

C. Spare Parts and Maintenance Materials: Division 1.

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

1.05 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the Engineer.

B. Statement shall reflect all adjustment 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. Penalties and Bonuses

f. Deductions for liquidated damages

g. Deductions for re-inspection payments

h. Other adjustments

3. Total Contract Sum, as adjusted.

4. Previous payments.

5. Sum remaining due.

C. ENGINEER will prepare a final Change Order, reflecting approved adjustments to the Contract Sum where not previously made by Change Orders.

1.06 FINAL APPLICATION FOR PAYMENT

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

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01785

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Maintain at the site for the OWNER one record copy of:

1. Contract Drawings
2. Contract Specifications
3. Record Drawings
4. Addenda
5. Change Orders and other Modifications to the Contract
6. ENGINEER'S Field Orders or Written Instructions
7. Approved Shop Drawings, Working Drawings, and Samples
8. Field Test Reports
9. Construction Photographs

1.02 RELATED SECTIONS

A. Construction Photographs and Video Recordings – Section 01321

B. Shop Drawings, Product Data, and Samples – Section 01334

C. Closeout Procedure – Section 01770

D. Project Record Drawings – Section 01720

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in CONTRACTOR's field office apart from documents used for construction.

B. File documents and samples in accordance with Construction Specifications Institute (CSI) Master Format number system.

C. Maintain documents in a clean, dry, legible condition and in good order

1. Do not use record documents for construction purposes.

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

E. As a prerequisite for monthly progress payments, the CONTRACTOR is to exhibit the currently updated "record documents" for review by the ENGINEER and the OWNER.

1.04 RECORD DOCUMENTS

A. Label each document "RECORD" in neat large printed letters.

B. Record information concurrently with construction progress.

C. Drawings; Prepared a Certified Survey, by Professional Surveyor and Mapper (PSM) registered in the State of Florida, including elevations and stationing at increments specified by the ENGINEER, with the following information:

1. Depths of various elements of foundation in relation to datum.

2. Underground utilities.

a. Record horizontal and vertical locations of existing underground utilities (water, sewer, gas, electricity, signal cables, and drainage) impacted by the work, with ties from permanent features to manholes, valves, forcemain elbows, service lateral plugged ends, and connections to sewer mains and final surface grades, wherever it varies from existing grades and appurtenances uncovered during construction referenced to permanent surface improvements.

b. Record horizontal and vertical locations of new underground utilities and appurtenances: manholes, valves, elbows, fittings, service lateral plugged ends, connections to sewer mains, and final surface grades, 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 dimensions and details.

5. Changes made by Field Order or by Change Order.

6. Details not in original Contract Drawings.

7. Equipment and piping relocations.

8. Building and tank locations.

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.

E. Shop drawings (after final review and approval)

1. One set of record shop drawings for each process equipment, piping, (including casings) electrical system and instrumentation system.

1.05 SUBMITTAL

A. At the completion of work, the CONTRACTOR must deliver complete “As-Built” drawings to the ENGINEER for the OWNER. They shall consist of six (6) 24” x 36” blackline sets, one (1) CD consisting of the electronic CADD files containing the complete As-Built information, and one 11” x 17” size set of as-built drawings.

1. These “As-Built” drawings are to be signed and sealed by a Professional Surveyor and Mapper (PSM), currently registered and licensed in the state of Florida.

2. The ENGINEER will supply the electronic CADD files to the CONTRACTOR in either .dgn or .dxf format to be used so the CONTRACTOR can generate “As-Built” record drawings.

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

C. Submittal of “As-Built” drawings shall be in accordance with Division 1, and Section 01720

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 02200

SITE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

A. Provide equipment, materials, and labor and performing functions necessary to move personnel and equipment on site, set up offices, trailers, facilities, construction utilities, obtain permits, and prepare the sites for construction.

B. Remove personnel, equipment, temporary facilities, and provide final clean up of the sites when construction is complete.

1.02 WORK SPECIFIED ELSEWHERE

A. Contract Documents

B. General Requirements - Division 1

C. Temporary Utilities - Division 1

D. Earthwork - Division 2

E. Bituminous Concrete Pavement - Division 2

F. Clearing and Grubbing - Division 2

G. Construction Facilities - Division 1

PART 2 PRODUCTS

2.01 TEMPORARY FACILITIES

A. Provide temporary facilities required for performing the work.

2.02 PARKING FACILITIES

A. Provide parking facilities for personnel working on the project.

1. No employee or equipment parking will be permitted on the OWNER's property except as specifically designated for CONTRACTOR's use.

2.03 PROJECT SIGNS

A. Construction and installation of a project signs is not required, but if done must be in accordance with the OWNERS requirements.

2.04 CONTRACTOR'S STAGING AREA

A. At no expense to the OWNER, arrange for and provide staging area to base CONTRACTORS' office and for material and equipment storage.

1. The OWNER will not provide any land for this purpose.

PART 3 EXECUTION

3.01 LAYOUT

A. Set up construction facilities in a neat and orderly manner within a designated area at the location of his choice as approved by the OWNER and the ENGINEER.

B. Accomplish required work in accordance with applicable sections of these specifications or as approved.

C. Provide the services of a Professional Land Surveyor, currently licensed and registered in Florida, to provide necessary horizontal and vertical survey lines and control, based upon principal control points and bench marks provided by the OWNER, as required by the General Conditions.

3.02 OBSTRUCTIONS

A. Some obstructions may not be shown.

1. Bidders are advised to carefully inspect the existing facilities before preparing their proposals.

2. The removal and replacement of minor obstructions such as electrical conduits, air, water, waste piping, and similar items shall be anticipated and accomplished, even though not shown or specifically mentioned.

B. Major obstructions encountered that are not shown in the Drawings or could not have been foreseen by visual inspection of the site prior to bidding, should immediately be brought to the attention of the ENGINEER.

1. The ENGINEER will make a determination for proceeding with the work.

2. If the ENGINEER finds that the obstruction adversely affects the CONTRACTOR's costs or schedule for completion, a proper adjustment to the Contract will be made in accordance with the and the General Conditions.

3.03 HOUSEKEEPING

A. Maintain the work site and the temporary facilities in a clean and orderly manner.

1. The OWNER reserves the right to maintain the property in a neat and orderly state at the CONTRACTOR's expense if the CONTRACTOR fails to respond to notices by the OWNER within reasonable time.

3.04 DEMOBILIZATION

A. At the completion of work on each phase or portion of the project, remove construction personnel, equipment, and temporary facilities from the site.

B. Transporting unused materials belonging to the OWNER to a place of storage designated by the ENGINEER.

C. Remove and dispose of other materials and debris resulting from the construction, to an approved site.

D. Return areas to their original condition.

3.05 PROJECT SIGNS

A. If the CONTRACTOR is required to erect project signs, the ENGINEER will direct where the signs are to be placed.

1. Maintain signs in good condition until final completion of the project.

2. Remove the signs and restore the sites when directed.

3.06 RECORDS

A. Keep one record copy of Specifications, Drawings, Addenda, Modifications, and Shop Drawings at the site in good order and annotated to show changes made during the construction process.

END OF SECTION

SECTION 02220

SITE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

A. This section includes furnishing labor, materials, equipment and incidentals required for the demolition, relocation and/or disposal of building materials and equipment to be removed from the project.

B. This section provides for the complete or partial removal and disposal of specified existing structures, foundations, slabs, piping, mechanical, electrical, existing (to be abandoned) piping and miscellaneous appurtenances encountered during construction operations.

C. This Section calls attention to certain activities necessary to maintain and facilitate operation during and immediately following construction and do not purport to cover of the activities necessary.

1. Diligently direct activities toward maintaining continuous operation of the existing facilities and minimizing operation inconvenience.

2. Develop a Demolition and Removal Plan in accordance with Paragraph 1.06 of this Section.

D. Demolition includes:

1. Demolition, partial removal and cutting of existing masonry as required for the new construction.

2. Distribution of salvageable and excess unacceptable material as specified below.

3. Off-site disposal of excess and unacceptable materials.

E. Examine the drawings regarding the existing system, visit the site and determine the extent of the work and operational conditions under which the work is to be perform.

1.02 PERMITS AND NOTICES

A. Permits and Licenses:

1. Obtain necessary permits and licenses for performing the work and furnish a copy to the ENGINEER prior to commencing the work.

2. Comply with the requirements of the permits.

B. Notices:

1. Issue written notices of planned demolition to companies or local authorities owning utility conduit, wires or pipes running to or through the project site.

2. Submit copies of the notices to the ENGINEER.

C. Utility Services:

1. Notify utility companies or local authorities furnishing gas, water, electrical, telephone, or sewer service to remove equipment owned by them in structures to be demolished and to remove, disconnect, cap, or plug their services to facilitate demolition.

1.03 CONDITIONS OF STRUCTURES

A. The OWNER and the ENGINEER assume no responsibility for the actual condition of the structures to be demolished or modified.

B. Conditions existing at the time of inspection for bidding purposes will be maintained by the OWNER insofar as practicable.

1. However, variations within the structure may occur prior to the start of demolition work.

1.04 RULES AND REGULATIONS

A. The Standard Building Codes shall control the demolition, modification or alteration of the existing buildings or structures.

B. No blasting shall be done on site.

1. Do not bring to or store explosives on the project site.

1.05 DISPOSAL OF MATERIAL

A. Salvageable or specifically requested material is the property of the OWNER.

1. Dismantle material to such a size that it can be readily handled, and deliver the salvageable material requested by the OWNER to a storage area designated by the OWNER.

B. Materials that the OWNER rejects shall become the CONTRACTOR's property and must be removed from the site.

C. Haul concrete, concrete block, and unsalvageable brick to a waste disposal site.

D. Haul other material to a waste disposal site.

E. On site storage or sale of removed items is not allowed.

1.06 SUBMITTALS

A. Submit to the ENGINEER for approval, six (6) copies of the proposed Demolition and Removal Plan for the structures and modifications specified below prior to the start of work.

1. Include in the coordination of shutoff, capping and continuation of utility service as required.

2. Include in the Demolition and Removal Plan, the following:

a. A detailed sequence of demolition and removal work to ensure the uninterrupted progress of the OWNER's operations, and the expeditious completion of the CONTRACTOR's work.

b. Evidence (by signature) of approval of the OWNER of the work plan.

B. Before commencing demolition work, modifications necessary to bypass the affected structure will be completed.

1. Actual work will not begin until the ENGINEER has inspected and approved the modifications, and authorized commencement of the demolition work.

C. The above procedure must be followed for each individual demolition operation.

1.07 TRAFFIC AND ACCESS

A. Conduct demolition and modification operations, and the removal of equipment and debris to ensure minimum interference with roads, streets, walks both on-site and off-site and to ensure minimum interference with occupied or used facilities.

B. Special attention is directed towards maintaining safe and convenient access to the existing facilities by plant personnel and plant associated vehicles.

1. Relocation of the CONTRACTOR's materials, labor, or equipment due to uncoordinated interruption will be at the CONTRACTOR's expense.

C. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the ENGINEER and Plant Supervisor.

1. Provide alternate routes around closed or obstructed traffic in access ways.

1.08 DAMAGE

A. Promptly repair damage caused to adjacent facilities by demolition operations as directed by the ENGINEER and at no cost to the OWNER.

1.09 UTILITIES

A. Maintain existing utilities to remain in service and protect against damage during demolition operations.

B. Do not interrupt existing utilities serving occupied or used facilities, except when authorized by the ENGINEER.

1. Provide temporary services during interruptions to existing utilities as acceptable to the ENGINEER.

C. Cooperate with the OWNER to shut off utilities serving structures of the existing facilities as required by demolition operations.

D. Assume responsibility for making necessary arrangements and performing work involved in connections with the discontinuance or interruption of public and private utilities or services under the jurisdiction of the utility companies.

E. At the service mains disconnect and terminate utilities being abandoned

1. Maintain conformance with the requirement of the utility companies or the municipality owning or controlling them.

1.10 POLLUTION CONTROL

A. For pollution control, use water sprinkling, temporary enclosures, and other suitable methods as necessary to limit the amount of dust and dirt rising and scattering in the air to the lowest level of air pollution practical for the conditions of work.

1. Comply with the governing regulations.

B. Clean structures and improvements of dust, dirt and debris caused by demolition operations as directed by the ENGINEER.

1. Return areas to conditions existing prior to the start of work.

1.11 QUALITY CONTROL

A. Protect existing materials and equipment to be salvaged or reused from damage.

B. Cup or plug pipelines to be abandoned.

1. Place covers and label junction boxes, conduits and wire as abandoned.

C. Leave exposed ends of pipe and conduit or junction boxes covered and safe.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SEQUENCE OF WORK

A. The sequence of demolition and renovation of existing facilities will be in accordance with the approved Demolition and Removal Plan as specified in Paragraph 1.06 of this Section.

B. Reduce the out of service time for the equipment to be removed, refurbished, and relocated.

3.02 REMOVAL OF EXISTING PROCESS EQUIPMENT, PIPING, AND APPURTENANCES

A. Clean, flush, and drain equipment, piping, and appurtenances.

1. Equipment to be retained by the OWNER as specified in Paragraph 1.05 above shall be dismantled sufficiently to permit thorough cleaning and draining.

2. Leave valves open.

3. Cap and sleeve abandoned piping.

4. Plug and seal openings remaining after removal of the existing equipment, piping, and appurtenances, as directed by the ENGINEER.

3.03 STRUCTURES TO BE COMPLETELY DEMOLISHED

A. Demolish existing structures as shown in the Drawings.

1. **Demolish above ground structures to make room for construction or new facilities, unless otherwise shown in the Drawings.**

2. **Remove demolished material and equipment from site.**

3. **Remove mechanical, electrical, instrumentation, piping, and miscellaneous appurtenances before commencing structural demolition.**

B. Removal of existing structures by blasting will not be acceptable.

END OF SECTION

SECTION 02231

CLEARING AND GRUBBING

PART 1 GENERAL

1.01 SUMMARY

A. Supply equipment, materials, and labor and performing functions required for clearing and grubbing the work site in preparation for the Construction.

B. Clear and grubbing the area within the limits of construction as required, including utility easements.

1.02 WORK SPECIFIED ELSEWHERE

A. General Conditions

B. General Requirements - Division 1

C. Site Preparation - Division 2

D. Earthwork - Division 2

1.03 STANDARDS AND REGULATIONS

A. Comply with regulations and ordinances of the State of Florida, County, and City regarding burning and disposal of debris resulting from the clearing and grubbing operation.

1.04 SUBMITTALS

A. Submit for approval, the location of sites to be used for disposal of debris resulting from the clearing and grubbing operation.

1.05 MEASUREMENT AND PAYMENT

A. Measurement and payment will be included in the lump sum prices bid for each Construction Work Section, as shown on the Bid Schedule, for which price and payment shall constitute full compensation for furnishing materials, equipment and performing work in connection therewith.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 CONSTRUCTION

A. The work of clearing and grubbing shall include the removal and satisfactory disposal of structures and of other obstructions, including underground obstructions, except for work which might be specifically included for removal under other items of work.

B. Deposits of muck, peat, bark, trash, or other debris occurring within the limits of clearing and grubbing or where directed by the ENGINEER shall be removed to their full depth and backfilled with native sand.

C. Protect from injury property obstructions which are to remain in place, such as buildings, sewers, drains, water, or gas pipes, except for unusual cases when so directed by the ENGINEER.

D. Areas of the right-of-way outside of the limits of construction may be shown in the Drawings or designated by the ENGINEER to be landscaped.

E. Clearing and grubbing shall include removal of undesirable trees, stumps, undergrowth, and vegetation within the areas of work.

F. Save natural growth and trees for landscaping as the ENGINEER directs.

G. Standard clearing and grubbing shall consist of the complete removal and disposal of sidewalks, drives, trees, shrubs, walls, timber, brush, stumps, roots, grass, weeds, sawdust, rubbish, and other obstructions resting on or protruding through the surface of the existing ground and the excavated areas.

H. Remove stumps, roots, and other debris from excavation for construction of roadway embankment, roadway base, or building pads, to a depth of at least one (1) foot below the ground surface.

I. Plow the surface to a depth of not less than six (6) inches and remove stumps and roots thereby exposed to a depth of at least one (1) foot.

J. Remove stumps and roots protruding through or appearing on the sides and surface of the completed excavation to a depth of at least one (1) foot.

3.02 DISPOSAL OF MATERIALS

A. Timber, stumps, brush, roots, rubbish and other objectionable material resulting from clearing and grubbing shall be disposed of by the CONTRACTOR in locations and by methods approved by the ENGINEER.

B. Burning shall be subject to applicable laws, ordinances, and regulations and shall be done at locations where trees and shrubs adjacent to the cleared area will not be harmed.

   1. Obtain necessary permits for on-site burning.

C. Where burning is prohibited by law, ordinance or regulation, dispose of the materials within approved areas or hauled to the county landfill in accordance with local laws and regulations.

D. Applicable landfill or dumping fees will be paid by the CONTRACTOR.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

A. Furnish equipment, materials, and labor and performing functions required for earthwork as specified in the Drawings and Specifications as well as unspecified earthwork necessary to complete the work as specified, including demucking, excavating, filling, grading, compaction, and disposal of excess material.

B. Any list of equipment and/or materials set forth in this section shall not be taken to exclude other incidentals necessary to complete the work in accordance with the Drawings and Specifications for the intended use.

1.02 RELATED SECTIONS

A. General Conditions - Bidding and Contract Requirement

B. General Requirements - Division 1

C. Site Conditions - Division 1

D. Payment Procedures - Division 1

E. Site Preparation - Division 2

F. Pipe and Tubes - Division 2

1.03 STANDARDS AND REGULATIONS

A. Florida Department of Transportation - Standard Specifications for Road and Bridge Construction - Latest Edition.

B. American Association of State Highway and Transportation Officials (AASHTO).

1.04 SUBMITTALS

A. Submit a schedule of earthwork activities together with an estimated list of equipment to be used.

B. The schedule shall be subject to approval by the ENGINEER and shall be updated periodically as requested by the ENGINEER.

1.05 MEASUREMENT AND PAYMENT

A. Measurement and payment will be compensated on a unit and/or lump sum price as delineated in the Proposal Bid Form for which price and payment shall constitute full compensation for furnishing labor, equipment, and materials to perform work in connection therewith.

1.06 GUARANTEES

A. Guarantee materials and work performed for a period of one (1) year from the date of substantial completion.

B. Take corrective action to eliminate defective materials or workmanship for the guarantee period.

1.07 TESTS AND CERTIFICATES

A. Perform compaction tests as specified, as requested by the ENGINEER, and in accordance with AASHTO.

1.08 EXISTING CONDITIONS

A. Project borings and soils report are presented in Division 1.

PART 2 PRODUCTS

2.01. BEDDING AND BACKFILL:

A. Refer to Division 2 Excavation and Fill and as shown in the Drawings.

B. UNSATISFACTORY MATERIALS

1. Unsatisfactory materials, as are identified below.

a. Materials which can not be satisfactorily placed and compacted to a stable and durable condition.

b. Soil that contains excessive moisture or moisture that will limit the degree of compaction.

1) At the CONTRACTORS option and expense, material may be dried and used for backfill.

2) New material shall be at CONTRACTORS expense.

c. Materials including, but not limited to, materials containing roots, loam, wood, or other organic matter, trash, debris, muck, sod, peat, or other objectionable materials which may be compressible or cannot be properly compacted.

d. Man-made fills, refuse, or backfills from previous construction.

B. UNYIELDING MATERIALS

1. Shall consist of rock and gravely soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

D. SATISFACTORY MATERIALS

1. Refer to the details shown in the Drawings for specific requirements.

E. ROCK BEDDING, HAUNCHING, AND INITIAL BACKFILL MATERIAL

1. Rock bedding shall meet the Florida Department of Transportation Standard Specification for No. 57 stone.

2. Pipe haunching shall contain good clean structural type fill.

3. Initial backfill material shall be common fill as described above.

F. BACKFILL MATERIALS

1. Shall consist of satisfactory material consisting of natural, predominantly well graded materials with no more than 40 percent by weight passing the No. 200 sieve and at a moisture content that will facilitate compaction, free from stones of such size as recommended by the pipe manufacturer, or larger than 2 inches in any dimension, whichever is smaller.

2. The backfill material shall be free of stones larger than 1 inch in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, when pipe is coated or wrapped for protection against corrosion.

3. Shall be clean earth fill, composed of sand, sand and clay, sand and rock, or crushed rock.

4. Where concrete or other encasement of pipe or other utilities is indicated, the backfill shall begin after the encasement has been inspected and approved and has attained 3/4 of its designed strength.

5. Material for the first layers of backfill shall be lowered to within 2 feet above the top of pipes before it is allowed to fall on the pipes, unless the material is placed with approved chutes or other devices that protect the pipes from the impact of stones conveyed from greater height.

G. FINE MATERIALS

1. Shall be carefully placed and tamped around the lower half of the utility; backfilling shall be carefully continued in layers not exceeding 6-inches above the top of the utility, using the best available material from the excavation, if approved, and excluding stones or rock fragments larger than:

1) 3 inches	On concrete, cast-iron or steel pipe
2) 1 1/2 inches	On clay pipe
3) 1 inch	On plastic pipe
4) 1/2 inch	On fiber and asbestos cement pipe

G. BORROW MATERIALS

1. Shall be used if suitable material from the excavation is not available.

2.02 PLASTIC WARNING TAPE:

A. Plastic marking tape shall be acid and alkali resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch.

B. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise.

C. The tape shall be manufactured with integral wires, foil backing, or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep.

D. The tape shall be of a type specifically manufactured for marking and locating underground utilities.

E. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion.

F. Tape color shall be as specified in Table 1 and shall bear a continuous printed inscription describing the specific utility.

TABLE 1. Tape Color

Red:	Electric
Orange:	Telephone, Alarm, and Communications
Blue:	Water Systems
Green:	Sewer Force Mains, Sewer Service Laterals

2.03 GEOTEXTILE FILTER FABRIC:

A. Filter fabric for mats and liners shall be a pervious sheet of polyester, nylon, or polypropylene filaments woven or otherwise formed into a uniform pattern with distinct and measurable openings.

B. The filter fabric shall provide an Equivalent Opening Size (EOS) no finer than the US Standard Sieve No. 100 and no coarser than the US Standard Sieve No. 50.

1. EOS is defined as the number of the US Standard Sieve having openings closest in size to the filter fabric openings.

C. The filaments shall consist of a long-chain synthetic polymer composed of at least 85 percent, by weight, of propylene, ethylene, or vinylidene-chloride.

D. The filaments shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure.

E. The fabric shall have a minimum physical strength of 50 pounds per inch in direction when tested in accordance with ASTM D 1682, using the Grab Test Method with one square inch jaws and a constant rate of travel of 12 inches per minute.

F. Elongation at failure shall be between 30 and 70 percent.

G. The fabric shall be constructed so that the filaments will retain their relative position with respect to each other.

H. The edges of the fabric shall be selvaged or otherwise finished to prevent the outer material from pulling away from the fabric.

I. The fabric shall be woven into a width such that it may be installed without longitudinal seams.

PART 3 EXECUTION

3.01 DEMUCKING

A. Muck, organic matter, or other unsuitable material within the limits of the worksite, shall be excavated and removed.

B. Depth of removal shall be that required to reach suitable material.

C. The muck hole shall be dewatered to provide visual inspection by the ENGINEER.

D. The muck shall be removed in such a manner as to prevent the unsuitable materials from mixing with suitable material to be used for backfilling.

E. Where muck is encountered at the boundary of the site; sheeting shall be installed and left in place to preclude future damage to the installed fill by adjacent muck.

F. Suitable material shall be placed and compacted where muck or other unsuitable material has been removed and as required to elevate the site to finish grade as specified in this section.

G. Muck and other unsuitable material shall be disposed of at locations secured by the CONTRACTOR and approved by the ENGINEER.

H. Furnish to the ENGINEER, a written release from the OWNER of the property on which the excess material is disposed, stating that the agreements have satisfactorily been fulfilled.

I. Material shall be spread in a manner to drain properly and not disturb existing drainage conditions.

J. Where approved by the ENGINEER muck may be stockpiled and used for top dressing on areas to be grassed.

1. The muck to be used for top dressing shall be free from appreciable quantities of hard clods, stiff clay, hard pan, gravel, brush, large roots, or other deleterious materials, and of reasonably uniform quality.

2. The organic content shall be at least 5 percent and the pH shall be in the range of 5.0 to 7.0.

3.02 UTILITIES

A. Furnish equipment, materials, and labor required to complete excavating, trenching and backfilling for utilities, including dewatering, shoring, bracing, utility bed compacting, protecting slabs, restoration of surfaces, and disposing of surplus materials as identified in the Drawings and/or Specifications.

B. Length of trench to be excavated ahead of pipe laying shall be limited to sufficient trench for one day's pipe laying operation.

C. Where existing utilities are indicated, or their presence is suspected, employ appropriate detection methods to locate the utilities.

D. Excavation in the vicinity of utilities shall be carefully carried out to prevent damage to the existing utilities.

E. Excavation within 12-inches of existing utility shall be by hand.

3.03 TRENCH EXCAVATION

A. Where trenches are to be cut in pavement, the pavement cut shall be made ahead of the excavation, leaving a uniform edge with minimum disturbance of the remaining pavement.

B. Pavement pieces 6-inches and larger are not to be mixed with other excavated material, but are to be disposed of away from the work site before the remainder of the excavation is made.

C. Minimum width of the trench shall be equal to the outside diameter of the pipe at the joint plus 12-inches on each side.

D. Maximum trench width shall not exceed the nominal diameter plus 2-feet.

E. Trench walls shall be vertical, however, for large diameter piping, or where deep trenching is required, sloped sides may be permitted subject to the approval of the ENGINEER.

3.04 BEDDING

A. The pipe bed shall be adequately graded and shaped such that the pipe will be in continuous contact for its full length and the bottom 1/3 of its circumference, spaces for joints, fittings, manholes and pump stations shall be excavated with space to install joint couplings and other connecting devices.

B. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing.

C. Stones of one inch or greater in dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

D. Filter material and bedding shall be provided under utility lines, where indicated or specified.

E. Trench grade for utilities or structures not requiring special bedding material are to be defined as the grade of the bottom surface of the utility or structure to be considered to be part of this work.

F. Trench grade for utilities in rock shall be defined as 4-inches below the outside of the bottom of the utility or structure, which 4-inches shall be backfilled with suitable bedding material.

G. Overexcavation made in error shall be backfilled to trench grade with suitable compacted fill at the CONTRACTOR's expense.

3.05 GRAVITY PIPE AND STRUCTURES

A. Where the Drawings indicate a force main paralleling a gravity sewer, the CONTRACTOR may utilize a common trench, subject to the ENGINEER's approval.

B. Where a common trench is used, the force main shall be founded on a shelf of undistributed soil.

C. Excavation for manholes and wetwells, or similar structures, shall be of sufficient size to permit the installation of precast structures or the placement and removal of forms for the full length and width of cast-in-place structure footings and foundations, as shown.

D. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation.

E. Excavation to the final grade level shall be verified before the concrete or masonry is to be placed.

3.06 ROCK

A. Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped or serrated, as shown or as directed.

B. Loose disintegrated rock and thin strata shall be removed.

3.07 SHEETING

A. Sheeting and bracing shall be provided and continuously maintained where required to prevent damage to property, injury to persons, or erosion and cave-ins.

B. Where practical sheeting shall be driven prior to excavation to avoid loss of material to be retained.

C. When excavating below the sheeting, care shall be taken to avoid trimming that will cause voids in the banks to be retained.

D. Sheeting and bracing shall be removed as backfilling progresses and shall be completely removed when the trench has been backfilled to at least 1/2 its depth or when removal will not endanger construction or adjacent structures.

E. Voids caused by removal shall be backfilled immediately with sand or other approved fine material and compacted by ramming or by watering.

F. When required and directed in writing, by the ENGINEER, sheeting, bracing, or shoring shall be left in place and the top shall be cut off neatly at an approved elevation below finished grade.

3.08 SEQUENCE OF EXCAVATION

A. Excavation in a given area shall proceed from the deepest excavation to the shallowest excavation to avoid undermining completed roadways, utilities or structures.

3.09 DEWATERING

A. Utilities are to be laid "in the dry."

1. Trench excavations may be dewatered by using one or more of the following methods:

a. Well point systems:

1) Shall be efficient enough to lower the water level in advance of the excavation and maintain the level continuously to keep the trench bottom and sides firm and dry

2) Shall designed especially for this type of service, and the pumping unit used is to be capable of maintaining a high vacuum and at the same time of handling large volumes of air as well as water.

3) Shall be operated in such a manner as to prevent damage to other property.

b. Gravity underdrain systems

1) Shall have adequate capacity to lower the water level in the trench such that the main utility may be laid “in the dry.”

c. Sumps

1) Shall be provided at various points along the route of the underdrain system for the use of pumps to remove the water.

2) If the material encountered at trench grade is suitable for passage of water without destroying the sides or bottom of the trench sumps may be provided at intervals at the at the side of the main trench excavation and pumps may be used to lower the water level by taking their suction from these sumps.

3) Care shall be exercised to prevent the movement of utility foundation material and a bed of crushed stone may be required.

B. Grading shall be done, as may be necessary to prevent surface water from flowing into the excavation, and water accumulating therein shall be removed so that the stability of the bottom and sides of the excavation is maintained.

C. The excavation shall be dewatered by appropriate methods where and when necessary to maintain a dry and stable excavation bottom, and keep free from water during construction.

D. Obtain required dewatering permits from applicable agency having jurisdiction.

1. Costs of complying with such permit requirements shall be borne solely by the CONTRACTOR.

E. Water from trench dewatering operations shall be disposed of without causing damage or inconvenience to the work, the surrounding area or general public.

3.10 OBSTRUCTIONS

A. The exact location of pipes, conduits, wires, mains, footings and other underground structures and obstructions encountered in trenching or excavating shall be determined.

B. The obstructions shall be protected adequately from damage or displacement.

C. Damage thereto shall be promptly and properly repaired, and displacements shall be corrected.

D. Survey monuments or bench marks which are to be disturbed by this work shall be carefully witnessed before removal and replaced upon completion of the work by a Registered Land Surveyor.

3.11 BEDDING, BACKFILL, AND COMPACTION

A. Bedding shall be of the type and thickness shown.

B. Maximum stone size shall not exceed 3/4-inch, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

C. Initial backfill material shall be placed in layers of a maximum of 6 inches loose thickness and compacted with approved tampers to 95 percent maximum density and to a height of at least 1-foot above the utility pipe or conduit.

D. The first layers of the backfill shall be thoroughly compacted and be completed before the remainder of the trench is backfilled.

1. Compaction shall be equal to 98 percent of maximum density, as determined by AASHTO Specification T-99.

E. Compaction by water flooding or jetting will not be permitted.

F. Density tests for determination of the above specified compaction shall be made by a testing laboratory designated by the ENGINEER and at the expense of the CONTRACTOR.

G. Test locations will be determined by the ENGINEER, but shall be spaced not more than 300 feet apart where the trench cut is continuous in pavements or areas to be paved.

H. Tests shall also be made where a trench crosses a paved roadway or future paved roadway.

I. If test results are unsatisfactory, re-excavate and re-compact the backfill at his expense until the desired compaction is obtained.

J. For continuous trenches, additional compaction tests shall be made on each side of an unsatisfactory test to determine the extent of re-excavation and re-compaction necessary.

K. Spacing of the additional tests will be determined by the ENGINEER.

L. Backfilling operations for excavations for utilities within buildings that have soil-bearing floor slabs shall be conducted in a manner resulting in densities comparable to the densities of the soil adjacent to the excavation.

M. Excavation within buildings shall be maintained free of water until the backfilling is completed.

N. Flooding or puddling with water to consolidate backfill may be done, in unpaved areas only and only when approved by the ENGINEER.

O. Where approved, the flooding or puddling operation shall be repeated with each 2 feet of backfill placed.

P. Mechanical compaction shall be accomplished using pneumatic or gasoline-powered tampers and/or flat plate vibrators, except in close proximity to the utility in the first layers of the backfill where compaction is to be obtained with hand-operated tamping devices.

3.12 BACKFILL ON SIDES OF PIPE

A. The backfill shall be brought up evenly on both sides of pipe for the full length of the pipe.

B. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

3.13 BACKFILL ABOVE THE PIPE

A. The remainder of the trench shall be backfilled in layers not exceeding 9-inches.

B. Maximum dimension of a stone or rock fragment shall be 6-inches.

C. Backfill shall be suitably compacted by rolling, tamping, or other settlement.

D. When trenches are cut in pavements or areas to be paved, compaction, as determined by AASHTO Specification T-99, shall be equal to 98 percent of maximum density; in other areas compaction shall not be less than 98 percent of maximum density.

E. Backfill for sidewalks, turned, or seeded area and miscellaneous areas not specifically designated above shall be deposited in layers of a maximum of 10 inches loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils.

F. Plastic warning tape shall be placed directly over the pipes and conduits at a depth of 18 inches below finished grade for the sewage force main, sewer service laterals, water lines, electric lines, alarm and communications lines.

3.14 SLAB

A. Where insufficient cover, excessive loads or local jurisdiction require, a protective concrete slab 6 inches thick, as indicated in the Drawings or as required by local authority, whichever is of greatest depth, shall be provided.

B. The trench shall be properly stepped back, as required, but the width of the slab shall not be less than the width of the trench plus 2 feet.

C. Concrete shall be ready-mixed and have twenty-eight (28) day compressive strength of 3,000 psi.

   1. Finished top surface shall be screened.

D. Minimum reinforcement shall be welded wire fabric, 6 inches by 6 inches - w2.9 by w2.9.

E. Top of slab shall be 1 inch minimum below finished grade of the final surface course.

3.15 EXISTING OBSTRUCTIONS

A. Pavement cut or damaged in connection with the work under this section shall be rebuilt or repaired.

B. Restored pavement shall be at least equal in every respect to the pavement that was cut or damaged, including the base course, surface treatment and grade.

C. Temporary sand seal coat pavement surface shall be applied to the cut or damaged areas.

D. This temporary surfacing shall be replaced by the final restored pavement.

E. Sand seal coat temporary surfacing shall not be removed until fifteen (15) days after it has been constructed.

F. Existing pavement shall be cut back a minimum of 1 foot beyond each edge of the pavement that was cut when the trenching was done or 1 foot beyond each edge of the trench, whichever is greater.

G. Temporary surfacing, backfill, existing pavement and its base course shall be removed to a depth of 7 inches or to the depth indicated.

3.16 STOCKPILING OF SUITABLE EXCESS MATERIAL

A. During excavation, excess material from one trench area that is satisfactory for backfilling shall be stockpiled for use in other areas of the work in an orderly manner, at a distance from the banks of the trench sufficient to avoid overloading and to prevent slides or cave-ins.

B. Failure to protect the stockpiles and allowing material to becomes unsatisfactory as a result, such material, if directed, shall be removed and replaced with satisfactory on-site or imported material from approved sources at no additional cost to the OWNER.

C. Excavated material not required or not satisfactory for backfill shall be removed from the site and shall be disposed of in designated or spoil areas.

D. Excess suitable material shall be carefully stockpiled for use in other portions of the work, as specified below.

E. Debris and excess material shall be disposed of off site, as approved by the ENGINEER.

END OF SECTION

SECTION 02310

GRADING

PART 1 GENERAL

1.01 SUMMARY

A. Perform grading work within the limits, elevations and grades indicated in the Drawings and as specified herein.

B. This Section specifies material and placement of fill above existing grades that is not to be located under roads or under structures.

1.02 QUALITY CONTROL

A. Grade the site to the required elevations.

B. Spot elevations are shown in the Drawings and uniformly slope the finished surfaces between these locations.

C. Excavated material meeting the requirements noted in the paragraph “Fill” may be used in the formation of embankments as shown in the Drawings.

D. Provide from off-site sources additional fill material required to complete the embankments.

PART 2 PRODUCTS

2.01 FILL

A. Fill material shall meet the requirements as described in Division 2 - “Earthwork”.

B. Fill material shall be reviewed by the Engineer prior to use.

C. Determine the volume of material required for the site.

PART 3 EXECUTION

3.01 GRADING AND COMPACTION

A. Place fill material in lifts not to exceed 12-inches and compacted to a density of not less than 95 percent of maximum dry density at optimum moisture as determined by ASTM D1557 method D.

B. Place fill material with a moisture content within plus or minus 2 percentage points of optimum.

3.02 FINE GRADING

A. Fine grade disturbed areas after structures, bases, and pavements are completed and the yard piping trenches backfilled.

B. Remove lumber, undesirable materials and rocks larger than the 3-inch size from the surface.

C. Shaped and sloped the completed surface to drain away from the structures.

D. Completed surface elevations shall be within 0.1 foot of the elevation shown in the Drawings, unless directed by the ENGINEER.

E. Minor adjustments to line and grade may be required as the work progresses in order to satisfy field conditions.

END OF SECTION

SECTION 02315

EXCAVATION AND FILL

PART 1 GENERAL

1.01 SUMMARY

A. Furnish labor, materials, equipment, and incidentals necessary to perform excavation, backfill, fill, grading, and slope protection required to complete the piping work shown in the Drawings and Specifications.

B The work shall include, but not necessarily be limited to: manholes, pits and pipe, bedding, backfilling, fill and required borrow; grading and disposal of surplus and unsuitable materials; and related work such as sheeting, bracing, and water handling.

C. Provide trench safety systems such as sheeting and bracing in accordance with state and local regulations.

D. No claims for additional monies will be allowed or considered based on substrata or ground water conditions.

E. Prior to commencing the excavation, submit a plan of CONTRACTORS proposed operations to the ENGINEER for review.

1.02 RELATED SECTIONS

A. Site Preparation - Division 2

B. Earthwork - Division 2

C. CONTRACTOR’s Quality Control - Division 1

1.03 REFERENCES

A. Florida Chapter 90-96 “Trench Safety Act”.

1.04 TRENCH PROTECTION

A. Construct and maintain sheeting and bracing as required to support the sides of excavations, to prevent movement which could diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing piping and foundation material from disturbance, undermining, or other damage.

B. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed they shall be immediately filled and compacted.

C. For pipe trench sheeting, no sheeting is to be withdrawn if driven below mid-diameter of pipe, and no wood sheeting shall be cut off at a level lower than 1 foot above the top of pipe unless otherwise directed by the ENGINEER.

D. If during the progress of the work the ENGINEER decides that additional wood sheeting should be left in place, he may direct the CONTRACTOR in writing.

E. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given by the ENGINEER for an alternate method of removal.

F. Sheeting and bracing, not left in place, shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping.

G. Voids left or caused by withdrawal of sheeting shall immediately be refilled with sand or ramming with tools especially adapted to that purpose, by watering or otherwise as may be directed.

H. The right of the ENGINEER to order sheeting and bracing left in place shall not be construed as creating obligation on his part to issue these orders, and his failure to exercise his right to do so shall not relieve the CONTRACTOR from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the CONTRACTOR to leave in place sufficient sheeting and bracing to prevent caving or moving of the ground.

1.05 JOB CONDITIONS

A. Examine the site and review the available test borings or undertake CONTRACTORs soil borings prior to submitting bid, taking into consideration conditions that may affect work.

B. Assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the investigation was made.

C. Existing Utilities: Locate existing underground utilities in the areas of work.

1. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the ENGINEER and the OWNER of such piping or utility immediately for directions.

3. Cooperate with OWNER and utility companies in keeping respective services and facilities in operation.

4. Repair damaged utilities to satisfaction of utility OWNER.

5. Demolish and completely remove from site existing underground utilities indicated in the Drawings to be removed.

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

1. Operate warning lights as recommended by authorities having jurisdiction.

E. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

1.06 SUBMITTALS

A. Furnish the ENGINEER, for approval, laboratory test report of a representative sample of fill material obtained from on site sources weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of this material.

B. For each material obtained from other than on site sources, notify the ENGINEER of the source of the material and shall furnish the ENGINEER, for approval, laboratory test reports of a representative sample weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of this material.

PART 2 PRODUCTS

2.01 MATERIALS

A. Description:

1. Materials for use as base, fill and backfill shall be described below:

a. Satisfactory soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M-145, soil classification Groups A-1, A-2-4, a-2-5, and a-3.

b. Unsatisfactory soil materials are those defined in AASHTO M-145 soil classification Groups A-2-6, A-2-7, A-4, a-5, A-6, and a-7 along with peat and other highly organic soils.

B. Structural Fill:

1. Structural fill material shall be a well graded, suitable soil material consisting of a minimum of 60 percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressible percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressed material.

2. Rock in excess of 2 1/2-inches in diameter shall not be used in the fill material.

3. Structural fill shall not contain hardpan, stones, rocks, cobbles, or other similar materials.

C. Common Fill:

1. Common fill material shall be satisfactory soil material containing no more than 20 percent by weight finer than No. 200 mesh sieve.

2. It shall be free from organic matter, muck, marl, and rock exceeding 2 1/2-inches in diameter.

3. Common fill shall not contain broken concrete, masonry, rubble or other similar materials.

4. Materials falling within the above Specifications, encountered during the excavation, may be stored in segregated stockpiles for reuse.

5. Material which, in the opinion of the ENGINEER, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials by the CONTRACTOR.

D. Rock Bedding:

1. Rock bedding shall be 3/8-inch to 3/4-inch washed and graded limerock.

2. This rock shall be graded so that 99 percent will pass a 3/4-inch screen and 80 percent will be retained on a No. 8 screen.

3. Material meeting the Florida Department of Transportation Standard Specification for No. 57 stone shall be acceptable.

PART 3 EXECUTION

3.01 GENERAL

A. Excavation, backfill, and grading necessary to complete the work shall be made by the CONTRACTOR and this cost shall be included in the Contract price.

B. Material shall be furnished as required from off site sources and hauled to site.

C. Take necessary precautions to maintain the work area in a safe and workable condition.

D. Protect work by flagging, marking, lighting and barricading.

E. Preserve and protect above and underground structures, pipe lines, conduits, cables, drains, or utilities which are existing at the time he encounters them.

F. Failure of the Drawings to show the existence of these obstructions shall not relieve the CONTRACTOR from this responsibility.

G. The cost of repair of damage which occurs to these obstructions during or as a result of construction shall be borne by the CONTRACTOR without additional cost to the OWNERs.

H. Trench Boxes, Drag Boxes, or Drag Shields made of steel may be used.

3.02 TRENCH EXCAVATION

A. Excavation for trenches required for the installation of pipes shall be made to the depths indicated in the Drawings.

B. Excavate trench to provide minimum of 36-inch clear cover over the pipe bell unless otherwise noted in the Drawings.

C. Excavate in a manner and to a width that will give suitable room for laying the pipe within the trenches, for bracing and supporting and for pumping and drainage facilities.

D. The trench width at the top of the pipe shall not exceed the allowable as determined by the depth of cut and indicated in the Drawings.

E. Rock shall be removed to a minimum 8-inches clearance around the bottom and sides of the pipe or ducts being laid.

F. Where pipe is to be laid in limerock bedding or encased in concrete, the trench may be excavated by machinery to or just below the designated subgrade provided that the material remaining in the bottom of the trench remains undisturbed.

G. Where the pipes or ducts are to be laid directly on the trench bottom the lower part of the trenches shall not be excavated to the trench bottom by machinery.

H. The last of the material being excavated shall be done manually in such a manner that will give a flat bottom true to grade so that pipe can evenly and uniformly supported along its entire length on undisturbed material or bedding rock.

I. Bell holes shall be made as required manually so that there is no bearing surface on the bells and pipes are supported along the barred only.

J. The bottom of the excavations shall be firm and dry and acceptable to the ENGINEER.

K. Excavate organic soil material from the bottom of the trench and replace with rock bedding, at least 6 inches thick.

3.03 PIPE INTERFERENCES AND ENCASEMENT

A. Abide by the following schedule of criteria concerning interferences with other utilities.

1. In no case shall there be less than 0.3-feet between two pipe lines and structures.

2. Class I Concrete Encasement: Wherever there is clearance between water mains or water services, then a concrete encasement shall be provided in accordance with the typical detail as shown in the Drawings.

3. Class II Concrete Encasement: Wherever there is more than 0.3 foot, but less than 1.0 foot clearance between two pipe lines, or between pipe lines and structures, then a concrete encasement shall be provided in accordance with the typical detail as shown in the Drawings.

B. The ENGINEER shall have full authority to direct the placement of the various pipes and structures in order to facilitate construction, expedite completion and to avoid conflicts.

3.04 BACKFILLING

A. Backfilling over pipes shall begin as soon as practical after the pipe has been laid, jointed, and inspected and the trench filled with suitable compacted material to the mid-diameter of the pipe.
B. Backfilling over ducts shall begin not less than three days after placing concrete encasement.

C. Backfilling shall be prosecuted expeditiously as detailed in the Drawings.

D. Space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth, from stones having a diameter no greater than 2-inches and thoroughly compacted by non-mechanical methods, as fast as materials are placed, up to a level of one foot above the crown of pipe.

E. Compact to 98 percent maximum density in layers not to exceed 4-inches up to the centerline of the pipe from the trench bottom and in layers not to exceed 6-inches from the pipe centerline to 12-inches above the pipe.

F. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.

G. The remainder of the trench above the compacted backfill, as just described above, shall be filled and thoroughly compacted with common fill by rolling, ramming, or puddling, as the ENGINEER may direct.

H. Compact common fill in 12-inch layers to 98 percent maximum density.

I. The bedding rock in muck areas shall consist of the at least 10-inches of washed and grade limerock placed in the trench to the proposed elevation of the centerline of the pipe prior to pipe laying.

J. This bedding shall not be used as a drain for ground water.

K. Take precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of this bed.

L. In locations where pipes pass through building walls, take the following precautions to consolidate the refill up to an elevation of at least 1-foot above the bottom of the pipes:

1. Place structural fill in these areas for a distance of not less than 3-feet either side of the centerline of the pipe in level layers not exceeding 6-inches in depth.

2. Wet each layer to the extent directed and thoroughly compact each layer with a power tamper.

3.05 GRADING

A. Grading shall be performed at places indicated in the Drawings, to the lines, grades and elevations shown or as directed by the ENGINEER and shall be made in a manner that the requirements for formation of embankments can be followed.

B. Unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of as directed.

C. During the process of excavation, the grade shall be maintained in a well drained condition.

1. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the prosecution or condition of the work.

D. If at the time of excavation it is not possible to place material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use.

E. No extras will be considered for the stockpiling or double handling of excavated material.

F. The right is reserved to make minute adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies in the Drawings or in order to obtain satisfactory construction.

G. Stones or rock fragments larger than 2 1/2-inches in their greatest dimensions will not be permitted in the top 6-inches of the subgrade line of fills or embankments.

H. Fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown in the Drawings, or as directed by the ENGINEER.

I. In cut, loose, or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope.

J. Cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown in the Drawings or as specified by the ENGINEER.

K. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until these lines which must be maintained are relocated, or where lines are to be abandoned, required valves are closed and drains plugged at manholes.

L. Replace pavement cut or otherwise damaged during the progress of the work as specified elsewhere herein or as shown in the Drawings.

3.06 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

A. Surplus and unsuitable excavated material shall be disposed of at the CONTRACTOR's cost in one of the following ways as directed by the ENGINEER.

1. Transport to soil storage area on OWNER's property and stockpile or spread as directed by the ENGINEER.

2. Transport from OWNER's property and legally dispose of.

3. Permits required for the hauling and disposing of this material beyond OWNER's property shall be obtained prior to commencing hauling operations.

4. Copies of required permits shall be provided to the ENGINEER.

5. Suitable excavated material may be used for fill if it meets the Specifications for common fill and is approved by the ENGINEER.

6. Excavated material so approved may be neatly stockpiled at the site where designated by the ENGINEER provided there is an area available where it will not interfere with the operation of the facility nor inconvenience traffic or adjoining property OWNERs.

3.07 FIELD QUALITY CONTROL

A. Retain a certified laboratory and make arrangements for testing necessary to comply with these Specifications, in accordance with Division 1.

B. Provide copies of laboratory test results to the ENGINEER.

C. Conduct one test per lift for each 500 linear feet of pipeline, or a minimum of two compaction tests per lift for projects with less than 1,000 linear feet of pipeline, at locations directed by the ENGINEER.

D. Provide, at CONTRACTOR expense, additional compaction tests requested by the ENGINEER to ensure that proper compaction is provided.

END OF SECTION

SECTION 02319

TRENCHING

PART 1 GENERAL

1.01 SUMMARY

A. Furnish labor, materials, equipment, and incidentals necessary to perform excavation, backfill, fill, grading, and slope protection required to complete the piping work shown in the Drawings and Specifications.

B. The work shall include, but not necessarily be limited to: manholes, pits and pipe, bedding, backfilling, fill and required borrow; grading and disposal of surplus and unsuitable materials; and related work such as sheeting, bracing and water handling.

C. Provide trench safety systems such as sheeting and bracing in accordance with state and local regulations.

1.02 RELATED WORK

A. Site Preparation - Division 2

B. Earthwork - Division 2

C. Excavation and Fill - Division 2

1.03 TRENCH PROTECTION

A. Structural Excavation Backfill & Compaction

1. Construct and maintain sheeting and bracing as required to support the sides of excavations, to prevent movement which could diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing piping and foundation material from disturbance, undermining, or other damage.

2. Prevent voids outside of the sheeting, but if voids are formed they shall be immediately filled and compacted.

3. For pipe trench sheeting, no sheeting is to be withdrawn if driven below mid-diameter of pipe, and no wood sheeting shall be cut off at a level lower than 1 foot above the top of pipe unless otherwise directed by the ENGINEER.

4. If during the progress of the work the ENGINEER decides that additional wood sheeting should be left in place, he may direct the CONTRACTOR in writing.

5. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given by the ENGINEER for an alternate method of removal.

6. Sheeting and bracing, not left in place, shall be carefully removed not to endanger the construction or other structures, utilities, existing piping.

7. Voids left or caused by withdrawal of sheeting shall immediately be refilled with sand or ramming with tools especially adapted to that purpose, by watering or otherwise as may be directed.

8. The right of the ENGINEER to order sheeting and bracing left in place shall not be construed as creating obligation on the ENGINEER to issue an order, and the ENGINEERs failure to exercise the ENGINEERs right to do so shall not relieve the CONTRACTOR from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the CONTRACTOR to leave in place sufficient sheeting and bracing to prevent caving or moving of the ground.

1.04 JOB CONDITIONS

A. Examine the site and review the available test borings or undertake his own soil borings prior to submitting his bid, taking into consideration conditions that may affect Construction work.

B. The OWNER and ENGINEER will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the investigation was made.

C. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the ENGINEER and the OWNER of this piping or utility immediately for directions.

2. Cooperate with OWNER and utility companies in keeping respective services and facilities in operation.

3. Repair damaged utilities to satisfaction of utility OWNER.

4. Demolish and completely remove from site existing underground utilities indicated in the Drawings to be removed.

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

D. Operate warning lights as recommended by authorities having jurisdiction.

1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.05 SUBMITTALS

A. Furnish the ENGINEER, for approval, a representative sample of fill material obtained from on site sources weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of this material.

B. For each material obtained from other than on site sources, notify the ENGINEER of the source of the material and shall furnish the ENGINEER, for approval, a representative sample weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of this material.

PART 2 PRODUCTS

2.01 MATERIALS

A. General:

1. Materials for use as base, fill, and backfill is described below:

a. Satisfactory soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M-145, soil classification Groups A-1, A-2-4, a-2-5, and a-3.

b. Unsatisfactory soil materials are those defined in AASHTO M-145 soil classification Groups A-2-6, A-2-7, A-4, a-5, A-6, and a-7 along with peat and other highly organic soils.

B. Structural Fill:

1. Structural fill material shall be a well graded, suitable soil material consisting of a minimum of 60 percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressible percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressed material. Rock in excess of 2 1/2 inches in diameter shall not be used in the fill material.

2. Structural fill shall not contain hardpan, stones, rocks, cobbles, or other similar materials.

C. Common Fill:

1. Common fill material shall be satisfactory soil material containing no more than 20 percent by weight finer than No. 200 mesh sieve. It shall be free from organic matter, muck, marl, and rock exceeding 2 1/2 inches in diameter.

2. Common fill shall not contain broken concrete, masonry, rubble, or other similar materials.

3. Materials falling within the above Specifications, encountered during the excavation, may be stored in segregated stockpiles for reuse.

4. Material which, in the opinion of the ENGINEER, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials.

D. Rock Bedding:

1. Rock bedding shall be 3/8-inch to 3/4-inch washed and graded limerock.

2. This rock shall be graded so that 99 percent will pass a 3/4-inch screen and 80 percent will be retained on a No. 8 screen.

3. Material meeting the Florida Department of Transportation Standard Specification for No. 57 stone shall be acceptable.

PART 3 EXECUTION

3.01 GENERAL

A. Excavation, backfill and grading necessary to complete the work shall be made by the CONTRACTOR and the cost thereof shall be included in the Contract price.

B. Material shall be furnished as required from off site sources and hauled to site.

C. Take necessary precautions to maintain the work area in a safe and workable condition.

D. Protect work by flagging, marking, lighting and barricading.

E. Preserve and protect above and underground structures, pipe lines, conduits, cables, drains, or utilities which are existing at the time the CONTRACTOR encounters them.

F. Failure of the Drawings to show the existence of these obstructions shall not relieve the CONTRACTOR from this responsibility.

G. The cost of repair of damage which occurs to these obstructions during or as a result of construction shall be borne by the CONTRACTOR without additional cost to the OWNERs.

3.02 TRENCH EXCAVATION

A. Excavation for trenches required for the installation of pipes shall be made to the depths indicated in the Drawings.

B. Excavate trench to provide minimum of 30-inch clear cover over the pipe bell unless otherwise noted in the Drawings.

C. Excavate in a manner and to a widths as will give suitable room for laying the pipe within the trenches, for bracing and supporting, and for pumping and drainage facilities.

D. The trench width at the top of the pipe shall not exceed the allowable as determined by the depth of cut and indicated in the Drawings.

E. Rock shall be removed to a minimum 8-inches clearance around the bottom and sides of the pipe or ducts being laid.

F. Where pipe is to be laid in limerock bedding or encased in concrete, the trench may be excavated by machinery to or just below the designated subgrade provided that the material remaining in the bottom of the trench remains undisturbed.

G. Where the pipes or ducts are to be laid directly on the trench bottom the lower part of the trenches shall not be excavated to the trench bottom by machinery.

H. The last of the material being excavated shall be done manually in a manner that will give a flat bottom true to grade so that pipe can evenly and uniformly supported along its entire length on undisturbed material or bedding rock.

I. Bell holes shall be made as required manually so that there is no bearing surface on the bells and pipes are supported along the barred only.

J. The bottom of the excavations shall be firm, dry, and acceptable to the ENGINEER.

K. Excavate organic soil material from the bottom of the trench and replace with rock bedding, at least 6 inches thick.

3.03 PIPE INTERFERENCES AND ENCASEMENT

A. Abide by the following schedule of criteria concerning interferences with other utilities.

1. In no case shall there be less than 0.3-feet between two pipe lines and structures.

2. Class I Concrete Encasement: Wherever there is clearance between water mains or water services, then a concrete encasement shall be provided in accordance with the typical detail as shown in the Drawings.

3. Class II Concrete Encasement: Wherever there is more than 0.3-foot, but less than 1.0-foot clearance between two pipe lines, or between pipe lines and structures, then a concrete encasement shall be provided in accordance with the typical detail as shown in the Drawings.

B. The ENGINEER shall have full authority to direct the placement of the various pipes and structures in order to facilitate construction, expedite completion, and to avoid conflicts.

3.04 BACKFILLING

A. Backfilling over pipes shall begin as soon as practical after the pipe has been laid, jointed, and inspected and the trench filled with suitable compacted material to the mid-diameter of the pipe.

B. Backfilling over ducts shall begin not less than three days after placing concrete encasement.

C. Backfilling shall be prosecuted expeditiously as detailed in the Drawings.

D. Space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth, from stones having a diameter greater than 2-inches and thoroughly compacted with a tamper as fast as placed, up to a level of one foot above the top of pipe.

1. Compact to 95 percent maximum density in layers not to exceed 4 inches up to the centerline of the pipe from the trench bottom and in layers not to exceed 6 inches from the pipe centerline to 12 inches above the pipe.

E. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.

F. The remainder of the trench above the compacted backfill, as just described above, shall be filled and thoroughly compacted with common fill by rolling, ramming, or puddling, as the ENGINEER may direct. Compact common fill in 12-inch layers to 95 percent maximum density.

G. The bedding rock in muck areas shall consist of the at least 10 inches of washed and grade limerock placed in the trench to the proposed elevation of the centerline of the pipe prior to pipe laying.

1. This bedding shall not be used as a drain for ground water.

2. Take precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of this bed.

H. In locations where pipes pass through building walls, take the following precautions to consolidate the refill up to an elevation of at least 1 foot above the bottom of the pipes:

1. Place structural fill in these areas for a distance of not less than 3 feet either side of the centerline of the pipe in level layers not exceeding 6-inches in depth.

2. Wet each layer to the extent directed and thoroughly compact each layer with a power tamper.

3.05 GRADING

A. Grading shall be performed at these places as are indicated in the Drawings, to the lines, grades and elevations shown or as directed by the ENGINEER and shall be made in a manner that the requirements for formation of embankments can be followed.

1. Unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of as directed.

2. During the process of excavation, the grade shall be maintained in a well drained condition.

3. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water, which may affect the prosecution or condition of the work.

B. If at the time of excavation it is not possible to place material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use.

    1. No extras will be considered for the stockpiling or double handling of excavated material.

C. The right is reserved to make minute adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies in the Drawings or in order to obtain satisfactory construction.

D. Stones or rock fragments larger than 2 1/2 inches in their greatest dimensions will not be permitted in the top 6 inches of the subgrade line of fills or embankments.

E. Fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown in the Drawings, or as directed by the ENGINEER.

F. In cut, loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope.

    1. Cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown in the Drawings or as specified by the ENGINEER.

G. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until the lines which must be maintained are relocated, or where lines are to be abandoned, required valves are closed and drains plugged at manholes.

H. Replace pavement cut or otherwise damaged during the progress of the work as specified elsewhere herein or as shown in the Drawings.

3.06 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

A. Surplus and unsuitable excavated material shall be disposed of at the CONTRACTOR's cost in one of the following ways as directed by the ENGINEER.

    1. Transport to soil storage area on OWNER's property and stockpile or spread as directed by the ENGINEER.

    2. Transport from OWNER's property and legally dispose of surplus and unsuitable materials.

        a. permit required for the hauling and disposing of this material beyond OWNER's property shall be obtained prior to commencing hauling operations.

b. Provide copies of required permits to the ENGINEER.

3. Suitable excavated material may be used for fill if it meets the Specifications for common fill and is approved by the ENGINEER.

   a. Excavated material so approved may be neatly stockpiled at the site where designated by the ENGINEER provided there is an area available where it will not interfere with the operation of the facility nor inconvenience traffic or adjoining property OWNERs.

4. Removal as described in Division 2.

3.07 FIELD QUALITY CONTROL

A. The CONTRACTOR shall retain a certified laboratory and make arrangements for testing necessary to comply with these Specifications, in accordance with Division 1.

   1. One copy of the laboratory test results will be sent to the ENGINEER.

B. Conduct one test per lift for each 300 linear feet of pipeline, or a minimum of two compaction tests per lift for projects with less than 300 linear feet of pipeline, at locations directed by the ENGINEER.

END OF SECTION

SECTION 02513

ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Prepare sub-grade to receive base course.

B. Place stabilizing base courses, work and compact.

C. Prime base course, place asphalt pavement.

1.02 RELATED WORK

A. Section 01410: Testing Laboratory Services.

B. Section 02211: Site Grading.

C. Section 02580: Pavement Marking.

1.03 REFERENCE STANDARDS

A. ASTM D1557 - Tests for Moisture - Density Relationship of Soils using 10 lb. Rammer in 18 inch Drop.

B. AASHTO M-81 - Penetration Graded Asphalt Cement.

C. AASHTO M-140 - Emulsified Asphalt.

D. FDOT Standard Specifications for Road & Bridge Construction - Section 200 - Rock Base

E. FDOT Standard Specifications for Road and Bridge Construction - Section 285 – Optional Base Material.

F. FDOT Standard Specifications for Road and Bridge Construction - Section 250 - Shell Stabilized Base.

G. FDOT Standard Specifications for Road and Bridge Construction - Section 320 - Hot Mix Asphalt – Plant Methods and Equipment.

H. FDOT Standard Specifications for Road and Bridge Construction - Section 330 - Hot Bituminous Mixtures General Construction Requirements.

I. FDOT Standard Specifications for Road and Bridge Construction - Section 334 – Superpave Asphalt Concrete.

J. FDOT Standard Specifications for Road and Bridge Construction - Section 913A – Shell-Rock Material.

K. FDOT Standard Specifications for Road and Bridge Construction - Section 916 – Bituminous Materials.

1.04 TESTING AND INSPECTION

A. Testing and inspection of asphalt pavement mixes and testing of placed stabilizing base course and asphalt pavement will be performed by an independent testing laboratory, in accordance with Section 01410-Testing Lab Services, and Section 01020-Allowances. Testing and inspection will be performed so as to minimize disruption to work.

B. Allow testing laboratory access to the mixing plant for verification of weights or proportions, character of materials used and determination of temperatures used in the preparation of asphalt concrete mix.

C. When and if required, the testing laboratory will perform laboratory tests on proposed asphalt pavement mixes to determine conformity with requirements.

D. The testing laboratory will perform one series of compaction tests for stabilizing base course and for asphalt pavement. The contractor shall pay for costs of additional testing as required due to improper performance of work.

E. When stabilizing base course or portion thereof has been placed and compacted in accordance with requirements, notify the testing laboratory to perform density and bearing value tests. Do not place asphalt pavement until results have been verified and base course installation approved.

F. If compaction tests indicate that stabilizing base course or asphalt paving do not meet specified requirements, remove defective work, replace and retest at Contractor's expense.

PART 2 - MATERIALS

2.01 Shell-Rock

A. Shell-rock materials to be used for shell-rock base shall be defined as naturally occurring heterogeneous deposits of limestone with interbedded layers or lenses of loose and cemented shell, to include cemented sands (calcitic sandstone). This material shall be mined and processed in a manner that will result in a reasonably homogenous finished product. Approval of mineral aggregate sources shall be in accordance with 6-3.3.

B. Deleterious Substances- Shell-rock materials shall not contain lumps of clay, organic matter, cherty or other extremely hard materials, or other substances not defined, in sufficient quantity as to be detrimental to the finishing, strength, or performance of the base. The material shall not contain loose, free silica sand in sufficient quantity to prevent bonding of the base, or to result in a surface which is susceptible to distortion under construction traffic, or accumulation of loose sand on the finished surface which precludes bonding of the bituminous tack coat with the base, nor shall the material contain more than 50% loose, free shells, corals or skeletal remain of other marine invertebrates (retained on the No. 4 sieve). Materials shall contain no water sensitive clay minerals.

C. Physical and Chemical Properties - Shell-rock material shall meet the following physical and chemical properties:

Limerock Bearing Ratio (LBR) (FM 5-515) - Production of this material shall be controlled so as to meet the following requirements for LBR value:

- The average of test values shall not be less than 100.
- No individual test value shall be less than 90.
- No two consecutive test values between 90 and 100.

Plasticity (AASHTO T89 and AASHTO T90) - That portion of the material passing the No. 40 sieve shall be non-plastic.

Carbonates (FM-5-514) - The minimum of the average percentage of carbonates of calcium and magnesium shall be 50. Material represented by any individual carbonate LOT average of less than 45% is unacceptable.

Gradation Requirements - Materials classified as shell-rock shall be graded uniformly down to dust and in addition, meet the following specific requirements:

- Passing 3-1/2 inch sieve (maximum dimension not to exceed
- 6 inches) ..... minimum 97%
- Passing No. 4 sieve ..... maximum 70%
- Passing No. 200 sieve ..... maximum 20% (washed)

2.02 LIMEROCK

A. Composition - The minimum percentage of carbonates of calcium and magnesium in the limerock material shall be 70. The maximum percentage of water-sensitive clay mineral shall be 3 percent. Limerock material shall not contain cherty or other extremely hard pieces, or lumps, balls or pockets of sand or clay size material in sufficient quantity as to be detrimental to the proper bonding, finishing, or strength of the limerock base.

B. Gradation and Size Requirements - At least 97 percent (by weight of the material shall pass a 3½ inch sieve and the material shall be graded uniformly down to dust. The fine material shall consist entirely of dust of fracture. All crushing or breaking-up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.

C. Limerock Bearing Requirements - Limerock material used in construction of limerock base shall have an average LBR value of not less than 100. The average LBR value of material produced at a particular source shall be determined in accordance with an approved quality control procedure.

2.03 CRUSHED CONCRETE

A. Composition - The minimum percentage of carbonates of calcium and magnesium in the material shall be 70. All foreign material such as metal fragments, organic matter, etc. shall be removed from the material before delivery to the job site.

B. Gradation - 100 percent (by weight) of the material shall pass a 3 inch sieve, with 40 percent to 70 percent passing the number 10 sieve. Not more than 20 percent, by dry weight, of the material shall pass the 200 sieve by washing. all crushing or breaking up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.

C. Bearing Requirements - The Crushed Concrete Base shall have an average Limerock Bearing Ration (LBR) of not less than 100. The average LBR value of material produced at a particular source shall be determined in accordance with an approved quality control procedure.

D. Crushed Concrete may be substituted for Limerock as base material by adding 2 inches to the specified thickness.

2.04 PRIME COAT

A. Prime coat shall be one of the following:

1. Cutback Asphalt, Grade RC-70 or RC-250 shall meet the requirements of AASHTO Specification M-81.

2. Emulsified Asphalt Grade SS-1 or SS1H shall meet the requirements of ASSHTO Specifications M-140 and/or M-280.

2.05 TACK COAT

A. Tack coat shall be one of the following:

1. Asphalt Cement, Penetration Grade 85-100 shall meet the requirements of AASHTO Specification M-20.
2. Emulsified Asphalt, Grade RS-2 shall meet the requirements of AASHTO Specification M-140.

2.06 ASPHALTIC CONCRETE

A. Asphaltic concrete surface course - Type SP-12.5 asphaltic concrete wearing surface, 1½ inches in compacted thickness or as indicated on the Drawings, in accordance with the aforesaid DOT Standard Specification.

PART 3 - EXECUTION

3.01 PREPARATION

A. Subgrade shall be stabilized per Section 160 - Stabilizing, of the FDOT Standard Specifications.

B. Bearing Value Requirements for subgrade stabilization

1. Limerock Bearing Ratio - Minimum LBR 40 under paved and curbed areas, and minimum LBR 30 in shoulder and swale areas.
2. Florida Bearing Value - Minimum FBV 75 pounds per square inch (psi) under paved and curbed areas, and minimum FBV 50 psi in shoulder and swale areas.

3.02 TRANSPORTING BASE COURSES

The limerock shall be transported to the point where it is to be used, over rock previously placed if practicable, and dumped on the end of the preceding spread. Hauling over the subgrade and dumping on the subgrade will be permitted when these operations will not be detrimental to the base as determined by the Engineer.

3.03 EQUIPMENT

A. Base Course - The rock shall be spread by mechanical rock spreaders, equipped with a device which strikes off the rock uniformly to laying thickness, and capable of producing an even distribution of the rock.

B. Pressure Distributor - The pressure distributor shall be equipped with pneumatic tires having a sufficient width of rubber in contact with the road surface to avoid breaking the bond or forming a rut in the surface. The distance between the centers of openings of the outside nozzles of the spray bar shall be equal to the width of the application required, within an allowable variation two (2) inches.

3.04 SPREADING BASE COURSE

A. Method of Spreading - The limerock shall be spread uniformly with equipment as specified in 3.02 above. All segregated areas of fine or coarse rock shall be removed and replaced with properly graded rock.

B. Number of Courses - When the specified compacted thickness of the base is greater than six inches, the base shall be constructed in two courses. The thickness of the first course shall be approximately one-half the total thickness of the finished base, or enough additional to bear the weight of the construction equipment without disturbing the subgrade.

3.05 COMPACTING AND FINISHING BASE

A. Dynamic Compactor with vibratory rollers shall not be used on this project and shall not be permitted at the job site. The contractor is responsible for all damages caused by compaction operations.

B. Single-Course Base - For single-course base, after the spreading is completed the entire surface shall be scarified and then shaped so as to produce the required grade and cross section after compaction.

C. Double-Course Base - For double-course base, the first course shall be cleaned of foreign material and bladed and brought to a surface cross section approximately parallel to that of the finished base. Prior to the spreading of any material for the upper course, the density tests for the lower course shall be made and the Engineer shall have determined that the required compaction has been obtained. After the spreading of the material for the final course is completed, its surface shall be finished and shaped so as to produce the required grade and cross section after compaction, and free of scabs and laminations.

D. Moisture Content - When the material does not have the proper moisture content to insure the required density, wetting or drying will be required.

When water is added it shall be uniformly mixed-in by disking to the full depth of the course which is being compacted. Wetting or drying operations shall involve manipulation, as a unit, of the entire width and depth of the course which is being compacted.

E. Density Requirements - As soon as proper conditions of moisture are attained the material shall be compacted to a density of not less than 98 percent of maximum density as determined by AASHTO T-180. The minimum density which will be acceptable at any location outside the traveled roadway.

F. Density Test - At least three density determinations shall be made on each day's final compaction operations on each course, and the density determinations shall be made at more frequent intervals if deemed necessary by the Engineer.
During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density tests on the finished base.

G. Correction of Defects:

1. Contamination of Base Material - If, at any time, the subgrade material should become mixed with the base course material, the Contractor shall, without additional compensation, dig out and remove the mixture, reshape and compact the subgrade and replace the materials removed with clean base material, which shall be shaped and compacted as specified above.

2. Cracks and Checks - If cracks or checks appear in the base, either before or after priming, which, in the opinion of the Engineer, would impair the structural efficiency of the base, the Contractor shall remove the cracks or checks by rescarifying, reshaping, adding base material where necessary, and recompacting.

H. Surface Testing - The finished surface of the base course shall be checked with a templet cut to the required crown and with a 15 foot straightedge laid parallel to the center line of the road. All irregularities greater than ¼ inch shall be corrected by scarifying and removing or adding base course material as required, after which the entire area shall be recompacted.

3.06 PRIMING

A. Preparation - The prime coat shall be applied only when the base meets the specified density requirements and the moisture content in the top half of the base does not exceed 90 percent of the optimum moisture of the base

material. At the time of priming, the base shall be firm, unyielding and in such condition that no undue distortion will occur.

Before any bituminous material is applied, all loose material, dust, dirt, caked clay and other foreign material which might prevent proper bond with the existing surface shall be removed for the full width of the application. Particular care shall be taken in cleaning the outer edges of the strip to be treated, to insure that the prime or tack coat will adhere.

When the prime or tack coat is applied adjacent to curb and gutter, valley gutter or any other concrete surfaces, such concrete surfaces (except where they are to be covered with a bituminous wearing course) shall be covered with heavy paper, or otherwise protected while the prime or tack coat is being applied. Any bituminous material deposited on such concrete surfaces shall be removed.

The temperature of the prime material shall be between 100 degrees Fahrenheit and 150 degrees Fahrenheit. The actual temperature shall be that which will insure uniform distribution. The material shall be applied by means of a pressure distributor. The amount to be applied will be dependent on the character of the surface and shall be sufficient to coat the surface thoroughly and uniformly, with no excess.

B. Rate of Application - The rate of application shall be not less than 0.10 gallon per square yard, unless a lower rate is approved by the Engineer.

C. Sprinkling - If so required by the Engineer the base shall be lightly sprinkled with water and rolled with a traffic roller, in advance of the application of the prime.

D. Sanding - The primed base shall be covered by a light uniform application of cover material. If considered necessary for proper distribution of spread, the cover material shall be lightly dragged with a drag broom, after which it shall be rolled with a traffic roller.

E. Sampling Device on Transport Tanks - All transport tanks delivering bituminous materials for use on the project shall be equipped with an approved spigot-type sampling device.

F. Temperature Sensing Device on Transport Tanks - All transport tanks delivering bituminous materials shall be equipped with an approved dial type thermometer. The thermometer shall have a temperature range from 50 degrees Fahrenheit to 500 degrees Fahrenheit in 25 degrees Fahrenheit increments with a minimum dial diameter of two inches.

3.07 QUALITY CONTROL

A. Testing Surface - The finished surface of the base course shall be checked with a templet cut to the required crown and with a 15-foot straightedge laid parallel to the centerline of the road. All irregularities greater than ¼ inch shall be corrected by scarifying and removing or adding rock as required, after which the entire area shall be recompacted as specified hereinbefore. In the testing of the surface, the measurements will not be taken in small holes caused by individual pieces of rock having been pulled out by the grader.

B. Thickness Requirements:

1. Measurements - Thickness of base shall be measured at intervals of not more than 200 feet. Measurements shall be taken at various points on the cross section, through holes not less than three inches in diameter.

2. Areas Requiring Correction - Where the compacted base is deficient by more than ½ inch from the thickness called for in the plans, the Contractor shall correct such areas by scarifying and adding rock. The base shall be scarified and rock added for a distance of 100 feet in each direction from the edge of the deficient area. The affected areas shall then be brought to the required state of compaction and to the required thickness and cross section.

3. Deficient Areas Left in Place - As an exception to the requirement for correcting areas of base which show a thickness deficiency exceeding the allowable ½ inch, the deficiency might be considered as not sufficient to seriously impair the required strength of the base and may be left in place. No payment, however, will be made for such deficient areas left in place and not corrected.

3.08 MAINTENANCE

The Contractor will be responsible for assuring that the true crown and templet are maintained, with no rutting or other distortion, and that the base meets all the requirements, at the time the surface course is applied.

3.09 PROTECTING ADJACENT WORK

Provide adequate protection for all adjacent construction, whatever it may be, against bituminous spraying. Spraying of bituminous material on work, other than base course, will not be accepted.

3.10 TRANSPORTATION OF THE ASPHALT

The surface course shall be transported in tight vehicles previously cleaned of all foreign material. The inside surface of the truck bodies shall be only thinly coated with soapy water or an approved emulsion containing not over 5 percent oil. Kerosine, gasoline or similar products shall not be used. After coating and before loading, the truck bodies shall be raised and drained of all excess liquids.

3.11 INSTALLATION OF FINAL ASPHALTIC CONCRETE SURFACE COURSE

The Contractor shall install Type SP-12.5 asphaltic concrete surface course over the entire surface in two (2) ¾ inch lifts.

Mechanical spreading and screeding equipment shall be of an approved type that is self-propelled and can be steered. It shall be equipped with a receiving and disbursing hopper and a mechanical screed or strike-off member capable of adjustment to regulate the depth of material being spread. Tandem Type 5 to 12 ton steel- wheeled rollers shall be used for sealing. Self- Propelled, pneumatic-tired traffic rollers equipped with at least 7b smooth tread, low pressure tires, having a total weight of 6 to 10 tons shall be used for final rolling.

3.12 FIELD QUALITY CONTROL

The final surface course of all pavements will be required to be checked by a rolling straightedge. The finished surface shall not vary more than 3/16 inch from the straightedge applied parallel to the centerline of the pavement. The straightedge shall have an effective length of 15 feet.

END OF SECTION

SECTION 02630

STORM DRAINAGE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division 1 Specification Sections, apply to work specified in this section.

1.02 SCOPE

A. The work specified in this section consists of furnishing drainage pipe, conforming to these specifications and of the particular types, sizes and dimensions shown in the plans. This work shall include the installation of the pipe at locations called for, in conformity with the lines and grades given, and the furnishing and construction of such catch basins, inlets, manholes, walls, joints, connections, etc., to new and existing pipes as may be required to complete the work as indicated in the plans.

1.03 WORK SPECIFIED ELSEWHERE

A. Cast-in-Place Concrete – Section 03300

1.04 STANDARDS AND REGULATIONS

A. Applicable Standards:

1. American Association of State Highway and Transportation Officials (AASHTO).

2. American Society for Testing and Materials (ASTM).

3. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction – latest edition.

B. Governmental Agencies: All work shall conform to the applicable standards of the FDOT.

1.05 SUBMITTALS

A. The CONTRACTOR shall submit five (5) copies of shop drawings of all pipe, pipe joints, pipe connecting bands, drainage structures, structure frames and grates and any other materials used for construction of the storm drainage.

1.06 GUARANTEE

A. The CONTRACTOR shall guarantee all materials and equipment furnished and installed and all work performed for a period of one (1) year from the date of substantial completion. The guarantee shall stipulate that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects, including the repairs of any damage to other parts of the system resulting from such defects.

PART 2 - PRODUCTS

2.01 PIPE MATERIALS

A. Reinforced Concrete Pipe: Concrete pipe shall be of first quality and manufactured conforming to ASTM Designation C 76, latest revision, minimum design requirements shall be for Class III Reinforced Concrete Pipe, wall designation B, as modified by Section 941 Concrete Pipe, Section 942 Pipe Gaskets, and Section 430-7 Requirements for Concrete Pipe, FDOT, Standard Specifications for Road and Bridge Construction.

B. Corrugated Aluminum Pipe: Corrugated Aluminum Pipe shall conform to the requirements of AASHTO M 196 (circular corrugated pipe) or AASHTO M 211 (helically corrugated pipe), and Section 945 FDOT, Standard Specifications.

C. Corrugated Steel Pipe: Corrugated Steel Pipe shall conform to the requirements of AASHTO M36 and Section 943, FDOT Standard Specifications and shall be bituminous coated.

D. Corrugated High Density Stormwater Polyethylene Pipe: shall conform to the requirements of ASTM D3212 and AASHTO M294 and FDOT Section 948-2 as manufactured by Advanced Drainage Systems, Inc. (ADS). The corrugated HDPE stormwater pipe shall have corrugated exterior and smooth interior walls.

E. Polyvinyl Chloride Pipe: Polyvinyl Chloride Pipe shall conform to the requirements of ASTM D-3034, SDR 35.

F. High Density Polyethylene Forcemain Pipe: shall conform to AWWA C906, ductile iron pipe with fusion welded but joints. Refer to section pipes and tubes for a complete specification for HDPE pipe.

2.02 JOINTS

A. Concrete Pipe Joints: Except where otherwise specified, round rubber gaskets for use in concrete pipe joints shall meet with the requirements of Article 5.9 of

ASTM C361, with the additional requirements that the gasket used shall be of such cross sectional area and perimeter as to properly fit the space provided in the pipe joint in which it is to be used, and shall be the sole element relied on to maintain a tight joint. Prior to use, the gasket shall be stored in as cool a place as practicable. The concrete joints shall conform to FDOT Standards Section 941 Concrete Pipe, Section 942 Pipe Gaskets, Section 430-7 Requirements for Concrete Pipe, and ASTM C443-98.

B. Corrugated Aluminum Pipe Joints: Field joints for aluminum pipe shall be made with bands fabricated of the same alloy as the culvert sheeting and shall meet the requirements of AASHTO M196. The banded joints shall be gasketed with neoprene gasket of a design shown to secure a soil tight or watertight joint.

C. Corrugated Steel Pipe Joints: Field joints for steel pipe shall be made with bands fabricated of the same alloy as the culvert sheeting and shall meet the requirements of AASHTO M36. The banded joints shall be gasketed with a neoprene gasket of a design shown to secure a soil-tight or watertight joint.

D. Corrugated Polyethylene Pipe Joints: series 65 Pro Link WT watertight joining system with O-ring gaskets as manufactured by Advanced Drainage Systems, Inc. (ADS). Performance specifications ASTM D3212 and AASHTO M294.

E. Polyvinyl Chloride Pipe Joints: Rubber sealing rings for pipe joints shall conform to ASTM D-3212.

2.03 FRENCH DRAINS

A. French drains shall conform to the requirements of Section 4431 FDOT Standard Specifications.

B. Filter fabric shall conform to the requirements of Sections 514 and 985, FDOT Standard Specifications.

2.04 INLETS MANHOLES AND JUNCTION BOXES

A. All drainage inlets, manholes, and junction boxes shall be precast concrete conforming to ASTM C-478 and 64T. All concrete shall have not less than 3000-psi compressive strength at 28 days.

B. Structure sections shall be joined with a mastic sealing compound. The remaining space shall be filled with the cement mortar and finished so as to produce a smooth continuous surface inside and outside the wall sections.

C. All openings in precast structures shall be cast at the time of manufacture. Holes for piping shall be six inches larger than the outside diameter of the

proposed pipe. All spaces between the manhole and the pipe shall be completely filled with mortar and finished smooth.

D. Mortar used for concrete structures shall conform to M C-270. Mortar material shall be mixed one part Type 2 Portland cement to two parts aggregate by volume. Portland cement shall conform to ASTM C-144 and aggregate shall conform to ASTM C-144.

E. The CONTRACTOR shall furnish the ENGINEER with shop drawings of all precast structures for his approval prior to fabrication. Shop drawings shall show all dimension, reinforcing steel and specifications.

F. Handling and Storing: Pipe shall be protected during shipping, storage and handling against impact shocks, free fall or other damage. Any damaged pipe shall be removed from the job site immediately.

2.05 GRATINGS

A. Iron frames, grates, and lids shall conform to ASTM A48 and shall be Class 30. The castings shall be true to design, dimension, weight, and detail as shown on the contract drawings.

2.06 FORMS

A. Forms for cast in place headwalls or other concrete structures shall be wood or metal, so designed and constructed that they may be removed without injury to the concrete. They shall be built true to line and grade and braced in a substantial and unyielding manner, and shall be approved by the ENGINEER before being filled with concrete.

2.07 CONCRETE

A. Class I, concrete shall be used for headwalls, pipe, end walls, and other miscellaneous concrete items. Except as may be modified in the plans or special provisions the required minimum 28-day compressive strength for Class I concrete shall be 2500 psi.

2.08 CONCRETE REINFORCEMENT

A. Concrete reinforcement in sizes No. 3 (3/8-inch) and larger shall be deformed steel bars of the shapes and sizes indicated on the drawings.

B. The steel shall be newly rolled stock, substantially free from mill scale, rust, dirt, grease, or other foreign matter. Bars shall be domestic billet steel.

C. Reinforcing bars shall be Grade 60, in conformance with ASTM Specifications for Concrete Reinforcement, Designation A615, except stirrups and ties shall be Grade 40.

D. Deformations on bars for concrete reinforcement shall conform to the ASTM Specifications for concrete reinforcement, Designation A615.

E. Tie Wire - The tie wire shall be 16 gauge or heavier, black annealed wire.

F. Metal Accessories - metal accessories shall be galvanized and sufficient in size and number to rigidly support the reinforcing steel under all conditions.

G. Clean loose rust, grease, or any other coating that could interfere with bond. Where there is delay in depositing concrete after reinforcement is in place, bars shall be reinspected and cleaned when necessary.

H. All steel reinforcing shall be placed in the exact positions and with the spacing shown on the plans or as ordered, during the placing of the concrete. The clear distance between parallel bars shall not be less than one and one half times the bar diameter, and shall in no case be less than one inch, nor less than one and one-third times the maximum size of coarse aggregate. Unless shown otherwise on the drawings, bars shall be lapped not less than 24 diameters nor less than 12 inches.

I. Minimum concrete coverings over reinforcement shall be as follows:

1. For footings and slabs deposited against earth -three inches.

2. For formed surfaces to be exposed to weather, dampness, or in contact with ground after removal of forms - two inches.

2.09 RIP RAP HEADWALLS

A. Portland cement shall be from an approved source and the product of an established and reputable manufacturer.

B. Fine aggregate shall meet the requirements of Section 902-2.3 of FDOT Standard Specifications.

C. Sacks shall be jute sacks, or any suitable sacks of any material which will hold the sand-cement mixture without leakage when handled and which are permeable or absorptive enough to permit the passage of water when wetted. The sacks shall be of uniform size and dimensions, in order to provide uniformity of lines in the completed work. They shall be free from holes and strong enough to stand handling without ripping or splitting. Only one type and size of sack shall be used at any one structure.

2.10 STORMCEPTOR

A. The separator shall remove oil and sediment from storm water during frequent wet weather events. The separator shall treat a minimum of 75 to 90 percent of the annual runoff volume and be capable of removing 50 to 80 percent of the total suspended sediment lad (TSS) and 60 to 95 percent of the floatable free oil. The separator must be capable of trapping silt and clay size particles in addition to large particles. The separator shall be installed underground as part of the storm sewer system and be structurally designed for HS-20 (OHBDC) traffic loading at the surface. The storage in the separator shall be vertically oriented. The separator shall be maintainable from the surface via one access point without requiring entry into the separator.

B. The separator shall be equipped with an internal high flow bypass that regulates the flow rate into the treatment chamber and conveys high flows directly to the outlet such that scour and/or re-suspension of material previously collected in the separator does not occur. External bypasses are not acceptable. The bypass are shall be physically separated from the separation area to prevent mixing. The separator shall be circular, and constructed from either fiberglass or precast concrete risers. The concrete separator shall be designed and manufactured in accordance with ASTM C-478. The concrete joints shall be oil resistance, water tight and meet the design criteria according to ASTM C-443. In the concrete Stormceptor, a fiberglass insert, bolted and sealed watertight to the inside of the bypass chamber, will divert low to normal stormwater flows into the treatment chamber. The first 16 inches (405 mm) of oil storage shall be lined with fiberglass to prevent migration through the pores in the concrete.

C. The difference between the inlet pipe elevation to the separator and the outlet pipe elevation from the separator shall be 1 inch (25 mm). For a multiple inlet pipe design there is a 3-inch (75 mm) difference between the inlet pipe inverts and the outlet pipe invert. The separator shall be able to be used as a bend structure in the storm sewer system. The access cover for the separator shall clearly indicate that it is an oil/sediment separator.

D. The separator shall be capable of containing spills of floatable substances such as free oil and not be compromised by temporary backwater conditions (i.e., trapped pollutants should not be re-suspended and scoured from the separator during backwater conditions). The capabilities of the selected separator must be documented with scientific studies and reports.

PART 3 – EXECUTION

3.01 EXCAVATION

A. Requirements for all Excavation: Foundation pits shall be excavated to permit the placing of the full widths and lengths of footings shown in the plans with full horizontal beds. Corners or edges of footings shall not be rounded or undercut. All excavation shall be carried to foundation materials satisfactory to the ENGINEER regardless of the elevation shown on the plans. Unless a firm footing can be established on solid rock before such depths is reached, it shall be carried to such additional depth as may be necessary to eliminate any danger of undermining. Wherever rock bottom is secured, the excavation shall be done in such manner as to allow the solid rock to be exposed and prepared in horizontal beds for receiving the masonry. All loose and disintegrated rock or thin strata shall be removed. All foundation excavations shall be inspected and approved by the ENGINEER prior to the placing of masonry.

B. Earth Excavation - Foundation Material other than Rock:

1. When masonry is to rest on an excavated surface other than rock, special care shall be taken to avoid disturbing the bottom of the excavation, and the final removal of the foundation material to grade shall not be made until just before the masonry is to be placed. In case the foundation material is soft or mucky the ENGINEER may require the CONTRACTOR to excavate to a greater depth and to backfill to grade with approved material.

C. Removal of Obstructions:

1. The CONTRACTOR shall perform all excavation of whatever substances encountered to the depths indicated on the drawings or as necessary. Excavation shall be unclassified regardless of material encountered. This shall include necessary clearing and grubbing of any foreign substance encountered within the structure or trench area.

2. Boulders, logs, or any unforeseen obstacles encountered in excavating shall be removed and no additional compensation will be allowed because of difficulties met in driving through or removing such obstructions.

3. No separate payment for excavation as such will be made. The cost thereof shall be included in the prices for the pipe installation. Excavation material suitable for backfill shall be piled in an orderly manner at a sufficient distance from the trench to avoid overloading and to prevent slides or cave-ins.

D. Rock Excavation:

1. All rock and other hard foundation material shall be freed of all loose material, cleaned, and cut to a firm surface; either level, stepped vertically and horizontally, or serrated, as may be directed by the ENGINEER. All seams shall be cleaned out and filled with concrete or mortar.

E. Removal of Unstable Material:

1. It is the intent of this specification that all pipe and other structures shall be provided with a stable foundation, and that any material, which by reason of kind or condition is not and cannot be made stable by drainage or compaction, shall be removed or replaced. Therefore, any material encountered at the elevation shown on the drawings or specified for pipe that will not or cannot be improved to provide a stable foundation for the pipe, shall be removed and replaced. All unstable material below the grade line of the pipe shall be removed for the full width of the trench and replaced with suitable selected material, compacted as specified elsewhere in these specifications. For the purpose of this specification, muck, peat and other highly organic soils shall be considered to be unstable materials. Also, any soil which is or might become wet to such a degree that its moisture content is equal to or greater than 90 percent of its liquid limit will have to be specifically approved by the ENGINEER with regard to stability, or shall be considered to be an unstable material requiring removal and replacement.

3.02 PIPE TRENCH EXCAVATION

A. Trenches for pipe culverts and for storm sewers shall be excavated to the required depth and to a width sufficient to provide adequate working room. For pipe lines placed above the natural ground line the embankment shall be placed and compacted, prior to excavation of the trench, to an elevation at least two feet above the top of the pipe and to a width equal to four pipe diameters, and the trench then excavated to the required grade. Where the soils permit, the trench sides shall be vertical up to at least the mid-point of the pipe.

B. Work shall be performed in compliance with applicable Trench Safety Standards identified in the Occupational Safety and Health Administration's Excavation Safety Standards (OSHA), 29 C.F.R.S. 1926.650 Subpart P will be adhered to during trench excavation in accordance with Florida Statutes 553.60 through 533.64 inclusive (1990), "Trench Safety Act".

C. For all pipe culverts and storm sewers 24 inches or over in diameter (except side drain), the bedding shall be shaped to conform to the outside of the pipe, for a depth of not less than 10 percent of its total height (outside dimensions) and recesses provided to receive the bell.

D. Where wet conditions are such that dewatering by normal pumping methods, including wellpointing, would not be effective, then this requirement may be modified by the ENGINEER. No payment will be allowed for select bedding material, which might be utilized by the CONTRACTOR for his own convenience in lieu of dewatering.

E. For all side drains, and for pipe culverts less than 24 inches in diameter, the trench bottom may be either flat, or shaped to fit the bottom of the pipe, except as provided for trenches, cut below grade and for areas of unsuitable foundation material. Regardless of the shape of the trench bottom, excavation shall be made for the hubs as required to allow the pipe barrel to rest firmly on the trench bottom. The bottom of the trench shall be rounded so that the bottom quadrant of the pipe will rest firmly on undisturbed soil for as nearly the full length of the barrel as proper jointing operations will permit. This part of the excavation shall be done manually only a few feet in advance of the pipelaying by men skilled in this type of work. Unauthorized overdepths shall be backfilled with loose, granular, moist earth, thoroughly tamped. Whenever the presence of incipient slides is noted during excavation, the trench walls shall be restrained with adequate sheeting, shoring and bracing. Trench excavation in the proximity of certain existing sanitary sewers and other utility lines shall be protected by either steel or wood sheeting. Used sheet piling in good condition, which has been inspected and approved by the ENGINEER, may be used in place of new sheet piling.

F. The CONTRACTOR shall provide adequate equipment for the removal of storm or subsurface waters, which may accumulate in the excavated areas. If subsurface water is encountered, the CONTRACTOR shall utilize approved means to adequately dewater the excavation so that it will be dry for working and pipelaying. A wellpoint system or other approved dewatering method shall be utilized, if necessary, to maintain the excavation in a dry condition for preparation of the trench bottom and for pipe laying.

G. Contractor shall, wherever necessary, provide temporary sidewalks and driveway entrances at his own expense, including safe bridges over trench and fencing around excavations for pedestrian protection.

H. Contractor to adhere to the construction pollution prevention plan prior to any activities.

3.03 UNSUITABLE MATERIAL

A. When rock, boulders, or other hard, lumpy or unyielding materials are encountered in the trench bottom they shall be removed to a depth at least 12 inches below the bottom of the pipe. Muck or other soft material considered by the ENGINEER to be unsuitable as foundation for the pipe shall be removed to a depth as where sand or other acceptable material is encountered, and to the width of the trench as directed by ENGINEER.

3.04 PIPE BEDDING

B. When undercutting is required in order to remove unsuitable material (either hard or soft), the trench shall be backfilled to a point six inches above the bottom of the pipe, with suitable granular material which will form a firm bed for

the pipe, and the bottom shall be shaped to fit the pipe to a point six inches above the bottom of the pipe. Such bedding material shall be coarse sand, washed limerock or other suitable granular material. Where bell and spigot pipe is used, the bell holes shall be deep enough to ensure that the bell does not bear on the bottom of the excavation, and shall not be excessively wide in the longitudinal direction of the culvert or storm drain.

3.05 COMPACTION

A. When a pipe trench is undercut in order to remove unsuitable material or for other reasons, it shall be brought to required grade using suitable materials, after which the bottom shall be compacted to match approximately the density of the soil in which the trench was cut.

3.06 PIPELAYING

A. As pipe laying progresses, the interior of the pipe shall be cleaned of all dirt and superfluous materials. The CONTRACTOR shall, at all times, take whatever measures are necessary to prevent the entrance of dirt and other foreign matter into the storm sewer system. In the event that it is necessary to clean the pipe before final acceptance, the CONTRACTOR shall do so without additional compensation.

B. Open Trench - No more than 200 linear feet, or the length of trench between consecutive drainage structures, shall be left open behind pipe laying, whichever distance is greater. In no instance shall any trench be left open for more than 24 hours before backfilling in accordance with these specifications.

3.07 DEWATERING

A. The CONTRACTOR shall provide adequate equipment for the removal of storm or subsurface waters that may accumulate in the excavation. If subsurface water is encountered, the CONTRACTOR shall utilize suitable equipment to adequately dewater the excavation so that it will be dry for work and pipelaying. A wellpoint system or other ENGINEER approved dewatering method shall be utilized, if necessary, to maintain the excavation in a dry condition for preparation of the trench bottom and for pipe laying. Dewatering by trench pumping will not be permitted if migration of fine-grained natural material from bottom, sidewalls or bedding material will occur. In the event that satisfactory dewatering cannot be accomplished due to subsurface conditions or where dewatering could damage existing structures, the CONTRACTOR shall obtain the ENGINEER’s approval of wet trench construction procedure before commencing construction. Dewatering shall cease in a manner to allow the subsurface water to slowly return to normal levels.

B. Water pumped from the trench or other excavation shall be disposed of in storm sewers having adequate capacity, canals or suitable disposal pits. CONTRACTOR is responsible for acquiring all permits required to discharge the water, and shall protect waterways from turbidity during the dewatering operation. In areas where adequate disposal sites are not available, partially backfilled trenches may be used for water disposal only when the ENGINEER approves the CONTRACTOR's plan for trench disposal in writing. The CONTRACTOR's plan shall include temporary culverts, barricades and other protective measures to prevent damage to property or injury to any person or persons. No flooding of streets, roadways, driveways or private property will be permitted. Engines driving dewatering pumps shall be equipped with residential type mufflers.

3.08 PUMPING

A. Pumping from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of any portion of the concrete materials being carried away. No pumping shall be done while concrete is being placed, or for a period of at least 24 hours thereafter, unless it is done from a suitable pump separated from the concrete work by a watertight wall.

3.09 BACKFILLING

A. Backfill Materials:

1. Backfilling to the original ground surface or subgrade surface of openings made for structures, with a sufficient allowance for settlement, shall be a part of the work of excavation, although the ENGINEER may require that the material used in making the backfill be obtained from a source entirely apart from the structure. All material used for backfill shall be of a quality acceptable to the ENGINEER, and shall be free from large lumps, wood, or other extraneous material.

2. Heavy construction equipment will not be permitted to cross over culvert or storm sewer pipes until backfill material has been placed and compacted to the finished earthwork grade or to an elevation at least 2-1/2 feet above the crown of the pipe.

B. Compaction Under Wet Conditions:

1. Where wet conditions do not permit the use of mechanical tampers, compaction of the backfill shall be done with hand tampers. Only A-3 material will be allowed for use in the hand tamped portions of the backfill. When the backfill has reached an elevation and condition such as to make the use of the mechanical tampers practicable, the mechanical tamping shall be done in such a manner and to such extent as to transfer the compaction force into the sections previously tamped by hand.

C. Compaction Requirements for Pipe Culverts and Storm Sewers:

1. The backfilling of pipe trenches shall be done in three stages as follows:

   a. In the first stage the CONTRACTOR shall provide adequate compacted fill beneath the haunches of the pipe, using mechanical tampers suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe.

   b. In the second stage the CONTRACTOR shall obtain a well-compacted bed and fill along the sides of the pipe and to a point at lest one foot above the top of the pipe. The width of backfill and compaction to be done under this second stage shall be the width of the portion of the trench having vertical sides, or, when no portion of the trench having vertical sides, it shall be to a width at least equal to twice the outside diameter of the pipe.

   c. In the third stage the remainder of the trench shall be backfilled with suitable material, which shall be compacted in accordance with the requirements below.

2. Compaction:

   a. The backfill for the first and second stages shall be placed in six-inch layers (compacted thickness) and shall be compacted to 98% of maximum density as determined by AASHTO T180. Where the backfill lies within the roadway embankment or subgrade, it shall be compacted to the densities specified for these areas.

   b. When pavement is to be constructed over the pipe, the backfill for the third stage shall be placed in the manner and compacted to the degree required for the first and second stages. Where no pavement is to be constructed and vehicular traffic is not to pass over the pipe, the third stage backfill shall be compacted to a firmness approximately equal to that of the soil adjacent to the pipe trench.

D. Backfill Under Wet Conditions:

1. Where wet conditions are such that dewatering by normal pumping methods would not be effective, the procedure outlined below may be used when specifically authorized by the ENGINEER in writing and noted in the job diary. In such specifically authorized cases the backfill material used below the elevation at which mechanical tampers would be effective shall be of the A-3 soil classification (based on AASHTO Designation M145-49). After the pipe is bedded properly, the A-3 material shall be placed, and rammed and compacted under the pipe haunches by the use of timbers or

hand tampers, and hand-tamping continued during the placing of the backfill until the backfill reaches an elevation such that its moisture content will permit the use of mechanical tampers. When the backfill has reached such elevation, normally acceptable backfill material may be used and compaction shall be obtained by the use of mechanical tampers. The mechanical tamping shall be done in such manner and to such extent as to transfer the compacting force into the previously hand-tamped fill.

E. Requirements for Thick Lift Compaction in Granular Materials:

1. If the CONTRACTOR has compaction equipment with which the required density can be obtained in thicker lifts than permitted above and upon satisfactory evidence that the proposed equipment will produce work equal in quality to that produced by the specified methods, the ENGINEER may permit placement of granular material of soil groups A-1, A-2, or A-3 in lifts up to a maximum of three foot compacted thickness. The CONTRACTOR will be required to furnish equipment and labor to excavate and backfill test pits to be dug for the performance of density tests.

2. Use of thick lift compaction procedures will not be allowed for first stage backfilling (beneath the haunches) of pipe culverts and storm sewers.

3.10 CONSTRUCTION METHODS FOR RIP RAP HEADWALLS

A. The sand and cement shall be mixed dry, in the proportions of five cubic feet of sand to one bag of cement, until the mixture is of uniform color.

B. The mixed material shall be accurately measured into each sack, with care being taken to place the same amount of material in each sack, and at least the top six inches of the sacks shall remain unfilled to allow for properly tying or folding and to insure against breakage of the sack during placing.

C. The filled sacks shall be placed with their tied or folded ends all in the same direction unless otherwise shown on the plans. The sacks shall be laid with broken joints, in a regular pattern. The sacks shall be rammed or backed against each other so as to form a close and molded contact after the sand and cement mixture has set up. Sacks ripped with sound, unbroken sacks. Reinforcing rods shall be added as shown on the plans. All sacks shall then be thoroughly saturated with water.

D. Immediately after watering, all openings between sacks shall be filled with dry grout composed of one part Portland cement and five parts sand.

E. After the bags have been set up, a concrete cap shall be formed and poured on the headwall as shown on the plans.

3.11 TESTING

A. The Contractor is required to perform lamping and infiltration/exfiltration tests on the gravity stormwater pipe system to verify that the pipe system is watertight.

B. The Contractor will be required to video the gravity stormwater pipe system after completion to verify that the pipe system is watertight.

3.12 REPLACING PAVEMENT

A. Where existing pavement, curb, curb and gutter, sidewalk or valley gutter is removed only for the purpose of constructing or removing box culverts, pipe culverts, storm sewers, inlets, manholes, etc., such pavement, etc., shall be replaced and restored to as good condition as determined by the ENGINEER, as before removal, and without direct compensation therefore. The replaced pavement shall be of the same or similar type as that removed.

3.13 CLEANING UP

A. Upon completion of the work, the CONTRACTOR shall leave the structure and all adjacent areas affected by his operations in a neat and presentable condition, and shall remove and clean up all rubbish and surplus material at locations and methods approved by the ENGINEER.

3.14 SUBMITTALS

A. As-Built Drawings - During the progress of work of the storm drain system, the Contractor shall record on a spare set of site drawings the exact locations, as installed, of all underground and otherwise concealed piping and other storm drainage system items not installed in locations shown on the Contract Drawings.

B. These drawings shall be submitted to the Owner prior to request for final payment.

END OF SECTION

SECTION 02775

SIDEWALKS

PART 1 GENERAL

1.01 SUMMARY

A. Furnish labor, equipment, and material required for cutting, removing, protecting, and replacing existing sidewalks of the various types encountered, removed or damaged under this Contract.

B. Provide damage protection for adjacent concrete driveways, sidewalk, and curb and gutters within the work area.

C. Furnish labor, equipment, and material required for installation of sidewalks of the various types specified under this Contract.

1.02 PAYMENT

A. If payment items have not been established in the Proposal for the removal and replacement of concrete sidewalks, the cost for such work shall be included in the overall Project cost bid.

B. If payment items have not been established in the Proposal for new concrete sidewalks, the cost for such work shall be included in the overall Project cost bid.

C. No other compensation will be provided.

1.03 REFERENCES

A. State of Florida Department of Transportation
Roadway and Traffic Design Standards: Sections 304, 305, and 310.

1.04 RELATED SECTIONS

A. Concrete, Division - 3

B. Reinforced Cement Concrete Pavement, Division - 2

PART 2 PRODUCTS

2.01 CONCRETE

A. Concrete shall conform to the applicable provisions specified in Division 3 of these Contract Documents.

PART 3 EXECUTION

3.02 SIDEWALKS

A. Restore sidewalks in full section.

B. Removal of existing sidewalk, installation of forms, preparation of subgrade, and perform the final finish as specified hereinabove for driveways, except that the minimum thickness of the sidewalk shall be 4 inches thick.

END OF SECTION

SECTION 02821

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SUMMARY

A. Furnish and install fencing indicated on the Contract Drawings.

B. Temporary installation and removed of fencing as required for the construction performed under this Contract.

1.02 SUBMITTALS

A. Furnish shop drawings for the materials, construction and installation of the fence in accordance with the Special Conditions.

1.03 RELATED SECTIONS

A. Cast-in-Place Concrete – Division 3

B. Shop Drawings, Product Data, and Samples – Division 1

1.04 REFERENCES

A. ASTM A 491

B. ASTM A 153

C. ASTM C 150

D. ASTM C 33

PART 2 PRODUCTS

2.01 MATERIALS

A. Fabric

1. Use galvanized steel fabric No. 9 gauge wire woven in a two (2) inch mesh.

2. Provide fabric conforming to ASTM A 491.

B. Framework

1. Provide hot dipped galvanized steel posts and other appurtenances used in the construction of fence with a minimum of 1.8 ounces per square foot of surface.

2. Sizes referred to are nominal O. D. as commonly used in the trade.

C. Line Posts

1. Provide 2 1/2 inch O. D., hot dipped galvanized steel, and weight 3.65 pounds per lineal foot Intermediate line posts.

2. Crown posts without arms to shed water.

D. Terminal Posts

1. Provide 3 inch O. D, hot dipped galvanized steel, and weight 5.79 pounds per lineal foot end and corner posts.

2. Crown posts without arms to shed water.

E. Swing Gate Posts

1. Provide 4 inch O. D., hot dipped galvanized steel, and weight 9.1 pounds per lineal foot swing gate posts.

F. Bottom Wire

1. Provide seven (7) gauge coil spring galvanized steel bottom tension wire.

2. Stretch tension wire taut from terminal to terminal post and securely fastened to each inter-mediate post six (6) inches above the grade line.

3. Attach tension wire to the fence fabric with galvanized steel hog rings every twelve (12) inches.

G. Line and Corner Post Arms

1. Equip line and corner posts with outside drive on type heavy galvanized malleable iron 45 degree barb wire arms with set screw to exclude moisture.

2. Intermediate line post tops to be one piece galvanized steel, outside sleeve type and to facilitate passage of top rail through same.

H. Top Rail

1. Provide 1 5/8 inch O. D., hot dipped galvanized steel, and weight 2.27 pounds per lineal foot rails.

2. Provide outside type six (6) inch long couplings and joined at approximate twenty (20) feet intervals top rails.

3. The top rail is to pass through line post tops to form a continuous brace end to end of each stretch of fence.

I. Braces

1. Make brace pipe the same as top rail and install midway between the top rail and ground and extend from the terminal post to the first adjacent line post.

2. Securely fastened brace pipe to posts with malleable iron rail end cap and have beveled edge pressed steel brace band with bolt, then trussed from line post to base of terminal post with a 3/8 inch truss rod and tightener.

3. On runs of fence requiring two (2) line post or less, omit truss rod assembly and install a continuous center brace rail.

J. Miscellaneous Hardware

1. Provide steel, malleable iron, or ductile iron: stops, latches, keepers, post caps, barb wire supporting arms, fasteners, and hardware.

2. Provide hot dip galvanizing after fabrication, using zinc grade E, in accordance with Federal Specification QQ-2-Z-51 with a minimum of 1.2 ounces of zinc per square foot of surface.

K. Gate Hardware

1. Provide galvanized finish conforming to ASTM A 153.

2. Size hinges and the material must suit the gate size, non-lift-off type, offset to permit 180 degree gate opening; 1-1/2 pairs.

3. Use forked type or plunger-bar type latch to permit operation from either side of the gate, with padlock eye as an integral part of the latch.

4. Use mushroom type gate stops flush plates with anchors, set in concrete, and designed to engage center drop rod or plunger-bar.

    a. Include locking device and padlock eyes as an integral part of the latch, permitting both gate leaves to be locked with a single padlock.

PART 3 EXECUTION

3.01 INSTALLATION

A. Evenly space posts in the line of fence at a maximum of ten (10) feet on center.

B. Provide professional installation with skilled mechanics experienced in erection of this type of fence.

C. Erect the fence on line and to grade as shown in the Drawings.

D. Set posts in concrete foundations in the ground to a minimum of four (4) times the diameter of the post.

E. Provide Portland cement, ASTM C 150, aggregates ASTM C 33, Cast-In Place Concrete.

1. Mix material to obtain concrete with a minimum twenty-eight (28) day compressive strength of 2500 psi.

2. Use at least four (4) sacks of cement per cubic yard, one (1) inch maximum aggregate size, and clean water.

2. Achieve a maximum three (3) inch slump and two (2) to four (4) percent entrained air.

3. The exposed surface of the concrete shall be crowned to shed water.

3.02 FABRIC FASTENING

A. Fabric to be stretched taut from terminal to terminal and secured to same with a heavy galvanized 3/4-inch tension bar and heavy beveled edge tension band with bolts, one (1) band less than the height of fence.

B. Fasten chain link fabric to rails, intermediate posts with a No. 6 gauge galvanized steel tie a maximum of fourteen (14) inch on center.

C. The tie ends to be wrapped on it's own end a minimum of two (2) times and turned in to eliminate hazardous condition.

3.03 REMOVAL OF EXISTING FENCING

A. Remove existing fencing as shown in the Drawings.

B. Removed fencing shall remain property of the OWNER, unless otherwise noted.

3.04 CLEANUP

A. Upon completion of the installation, remove debris created by the installation from the premises of the OWNER or disposed of as directed by the OWNER.

END OF SECTION

SECTION 02919

TOPSOIL

PART 1 GENERAL

1.01 SUMMARY

A. The work covered by this section consists of furnishing labor, equipment, and material needed to provide finished grass ground cover by the placing and spreading of topsoil.

1.02 RELATED SECTIONS

A. Clearing and Grubbing - Division 2.

B. Mulching - Division 2.

C. Earthwork - Division 2.

D. Seeding and Soil Supplements - Division 2.

1.03 REFERENCES

A. Standards - Federal Specifications (FS) 0-F-241C.

B. Testing Agency - Independent testing laboratory.

C. Requirements of Regulating Agencies - Comply with requirements of the State Department of Agriculture.

D. Cost of Testing - The testing is at expense of the CONTRACTOR.

1.04 SUBMITTALS

A. Test Report - Results of seed purity and germination tests.

B. Certificates - Manufacturer's certification that materials meet specification requirements.

1.05 MEASUREMENT AND PAYMENT

A. Payment will be made at the unit price bid for topsoil, which price and payment shall constitute full compensation for furnishing materials and performing work in connection therewith and incidental thereto.

PART 2 PRODUCTS

2.01 WATER

A. Free or matter harmful to plant growth.

2.02 TOPSOIL

A. Material used for topsoil shall be material supplied by CONTRACTOR from off-site sources or from excavated pond bottom area if suitable for this use.

B. Topsoil mixture shall be suitable for plant growth and free from hard clods, stiff clay, hardpan, gravel, brush, large roots, refuse or other deleterious material, and shall be of reasonably uniform quality.

C. Rocks larger than 1 inch in diameter shall be removed.

D. Organic content as determined in accordance with AASHTOT 194 shall be at least five percent (5%) and the pH shall be between 5.0 and 7.0.

PART 3 EXECUTION

3.01 CONDITIONS

A. Check that preceding work affecting ground surface is completed.

B. Do not start work until conditions are satisfactory.

3.02 PREPARATION

A. Stockpiled topsoil shall be spread to a thickness of two (2) inches over areas to be seeded.

1. The resulting ground elevation shall be the proposed finished grade shown in the Drawing.

B. Till fertilizer into top two (2) inches of soil at rate of 12 lbs/1000 sq. ft.

C. Water dry topsoil to depth of five (5) inches at least forty eight (48) hours prior to seeding to obtain a loose friable seed bed.

END OF SECTION

SECTION 02924

SODDING

PART 1 GENERAL

1.01 SUMMARY

A. Repair lawns and grassed rights of way damaged or removed during the construction of the pump station.

1.02 RELATED WORK

A. Clearing and Grubbing - Division 2.

B. Earthwork - Section 2.

C. Top Soil - Division 2.

1.03 REFERENCES

A. Federal Specification (FS) 0-F-241q (1), Fertilizer Mixed, Commercial.

B. Materials shall conform to the requirements established by the State Department of Agriculture.

1.04 SUBMITTALS

A. Growers Certification:

1. Grass species.

2. Compliance with State and Federal quarantine restrictions.

B. Manufacturer’s certification of fertilizer and herbicide composition and application rates.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver sod on pallets.

B. Protect roots from exposure to wind and sun.

C. Protect sod against dehydration, contamination and heating during transportation and delivery.

D. Do not deliver more sod than can be installed within twenty-four (24) hours.

E. Keep stored sod moist and under shade or covered with moistened burlap.

F. Do not stack sod more than two (2) feet deep.

G. Do not tear, stretch, or drop sod.

1.07 WARRANTY

A. Guarantee sod for period of three (3) months after date of substantial completion.

B. Repair damage to other plants during sod replacement at no cost to the OWNER.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sod

1. Grass Species is to be Stenotaphrum secundatum - St. Augustine “Floratam”, or approved equal.

2. American Sod Producers Association (ASPA) Grade

   a. Use nursery grown or approved equal sod.

3. Furnish sod in pads of the following dimensions:

   a. Length: twenty-four (24) inches plus or minus five (5) percent

   b. Width: sixteen (16) inches plus or minus five (5) percent

   c. Thickness: 1-1/2 inches excluding top growth and thatch.

4. Grow sod in organic “muck” soil, with minimum 1-inch soil intact on roots.

5. Mow sod to a uniform height of 2- 1/2 inches, when harvested.

6. Thatch: Maximum 1/2-inches uncompressed.

7. Use diseases free sod: entomologist of the State Department of Agriculture must inspect for nematodes, pests, and pest larvae.

8. Weeds: Free of Bermuda grass, nut grass, and other objectionable plant and material.

9. Uniform in color, leaf texture and density.

B. WATER

1. Free of substances harmful to plant growth. Free from chemicals or minerals that stain or discolor.

C. FERTILIZER

1. Federal Specification (FS) O-F-241 c (1), Grade A or 8.

2. The chemical designation shall be 16-4-8, with at least fifty (50) percent of the nitrogen from a non-water-soluble organic source.

D. HERBICIDES

1. As approved by the State of Department of Agriculture.

E. TOPSOIL

1. Topsoil mixture shall be suitable for plant growth.

2. Topsoil mixture shall be free from hard clods, stiff clay, hardpan, gravel, brush, large roots, refuse, or other deleterious material and of reasonable uniform quality.

3. Maximum Soluble Salts: 550 ppm

4. Top soil mixture shall be free of weeds, plants, seeds, insects, and undesirable materials, before delivery to the site.

a. Sterilization of topsoil shall not affect viability of new plant growth in treated topsoil.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

A. Wet surface to a uniform depth of two (2) to three (3) inches or until upper surface is reasonable wet and compacted before installing sod.

B. Roll soil with 100 lb. roller; make two (2) passes.

3.02 INSTALLATION

A. Verify topsoil placement.

B. Install sod species as specified herein.

C. Locate trees and palms and paint a forty-eight (48) inch diameter circle on the soil around the trunk of each species planted in sodded areas.

    1. Do not install sod within painted circle.

D. Begin sodding at bottom of slopes and install parallel to contours.

E. Lay first row of sod in straight line with long dimension of pads parallel to slope contours; continue laying sod accordingly.

F. Butt side and end joints flush and tight.

    1. Do not allow ends to curl or break.

G. Stagger end joints in adjacent rows.

    1. Do not stretch or overlap sod.

H. Peg sod on slopes with a ratio of 1:3 (rise:run) or greater using a minimum of two stakes per square yard, using six (6) inches minimum nursery grade bamboo stakes.

I. Sod installed adjacent to planting beds should be a minimum distance from the first row of shrubs, equal half the spacing of the shrubs (Example: shrubs spaced eighteen (18) inches on center - sod should be nine (9) inches from center of shrub).

J. Trim sod to provide clean edges for trees and planting beds; sod should follow planting beds to provide clean, smooth, and flowing lines.

K. Water sod immediately after transplanting.

L. Roll sod, except on pegged areas, with roller weighing not more than 100 lbs. per foot of roller width; make two (2) passes.

M. Water sod and soil to depth of six (6) inches within four (4) hours after rolling.

N. Cut a forty-eight (48) inch diameter, clean round saucer around each tree or palm planted in sodded areas to provide for mulch.

    1. Do not injure root ball or cut sprinkler or utility lines.

3.03 SOD ESTABLISHMENT

A. Watering:

1. Keep sod moist during first week after planting.

2. After first week, supplement rainfall to produce total of one (1) inch per day until sod has acclimated.

B. Weed Eradication: maintain grass in a weed free condition until OWNER acceptance.

C. Fertilizer: Apply fertilizer uniformly at manufacturer's recommended rate, two weeks after sod installation.

1. Fertilizer should be dispensed using lightweight spreaders.

D. Maintenance period to extend until acceptance of the OWNER.

3.04 CLEANING

A. Immediately clean spills from paved and finished surface areas.

B. Remove debris and excess materials from project site.

3.05 FINAL INSPECTIONS

A. Project final payment approval determines OWNER acceptance.

B. Replace rejected sod areas with acceptable sod within two weeks after the inspection.

END OF SECTION

SECTION 02956

RESTORATION OF UNDERGROUND PIPES

PART 1 GENERAL

1.01 SUMMARY

A. The work specified in this Section includes all labor, materials, equipment, and tools necessary to seal sewer joints and cracks remotely, to test and confirm the effectiveness of the seal.

1.02 CLEANING

A. Cleaning shall be performed by the Contractor using a hydraulic cleaner and is to be adequate for seating a lateral packer.

B. If the main sewer is not cleaned adequately for seating a lateral packer and/or accessing lateral connections, the Contractor will move to a different line section and continue working.

C. When this line is cleaned a second time, the Contractor will reinspect by a “Quick Pull” and determine if the sewer line is clean, and if the laterals are accessible.

1.03 TELEVISION INSPECTION

A. Television inspection is limited to a “Quick Pull”.

B. During the television inspection the operator notes obstructions, offset joints, debris, the location of lateral connections, and the general condition of each lateral.
C. The “Quick Pull” inspection is videotaped, and only data relating to the lateral sealing report is logged.
D. During the television inspection, the Contractor determines which laterals can be accessed, and if there is enough clearance for the lateral sealing packer.

E. The Contractor makes the final determination on lateral sealing packer clearance.

PART 2 PRODUCTS

2.01 CHEMICAL SEALING MATERIAL

A. The following is a generic listing of acceptable chemical sealing materials and the basic requirements, properties and characteristics of each.

1. Acrylamide base gel sealing material:

    a. A minimum of 10% acrylamide base material by weight in the total sealant mix.

    b. Higher concentration (%) of acrylamide base material may be used to increase strength or offset dilution during injection.

    c. Ability to tolerate some dilution and react in moving water during injection.

    d. Viscosity of approximately 2 centipoise, which can be increased with additives.

    e. Constant viscosity during the reaction period.

    f. Controllable reaction time from 10 seconds to 1 hour.

    g. Reaction (curing), which produces a homogeneous, chemically stable, non-biodegradable firm flexible gel.

    h. Ability to increase mix viscosity, density, and gel strength by the use of additives.

2. Acrylic base gel chemical sealing material:

    a. Minimum of 10% acrylic base material by volume in the total sealant mix.

    b. A higher concentration (%) of acrylic base material may be used to increase strength or offset dilution during injection.

    c. Ability to tolerate some dilution and react in moving water during injection.

    d. Viscosity of approximately 2 centipoise, which can be increased with additives.

    e. Constant viscosity during the reaction period.

    f. Controllable reaction time from 5 seconds to 6 hours.

    g. Reaction (curing), which produces a homogeneous, chemically stable, non-biodegradable flexible gel.

    h. Ability to increase mix viscosity, density and gel strength by the use of additives.

3. Acrylate base gel chemical sealing material:

    a. A minimum of 12%* acrylate base material by weight in the total sealant mix.

    b. A higher concentration (%) of acrylate base material may be used to increase strength or offset dilution during injection.

    c. Note: If the acrylate base material is in a 40% solution, it must comprise 30% by weight of the total sealant mix to have 12% base material.

    d. Ability to tolerate some dilution and react in moving water during injection using a low VOID packer.

    e. Viscosity of approximately 2 centipoise, which can be increased with additives.

    f. Constant viscosity during the reaction period.

    g. Controllable reaction time from 10 seconds to 1 hour.

    h. Reaction (curing), which produces a homogeneous, chemically stable, non-biodegradable flexible gel.

    i. Ability to increase mix viscosity, density and gel strength by the use of additives.

4. Urethane base gel chemical sealing material:

    a. 1 part urethane prepolymer thoroughly mixed with between 5 and 10 parts of water by weight.

    b. The recommended mix ratio is 1 part urethane prepolymer to 8 parts of water (11% prepolymer).

    c. Liquid prepolymer having a solids content of 77% to 83%, specific gravity of 1.04 (8.65 pounds per gallon), and a flash point of 20ºF.

    d. Liquid prepolymer having a viscosity of 600 to 1200 centipoise at 70ºF that can be pumped through 500 feet of 1/2-inch hose with a 1000 psi head at a flow rate of 1 ounce per second.

    e. Water used to react the prepolymer should have a pH of 5 to 9.

f. Cure time of 80 seconds at 40ºF, 55 seconds at 60ºF, and 30 seconds at 80ºF when 1 part prepolymer is reacted with 8 parts of water only.

g. Higher water ratios give longer cure times.
h. Cure time that can be reduced to 10 seconds for water temperatures of 40ºF to 80ºF when 1 part prepolymer is reacted with 8 parts of water containing a sufficient amount of gel control agent additive.

i. Relatively rapid viscosity increase of the prepolymer/water mix.

j. Viscosity increases from about 10 to 60 centipoise in first minute for 1 to 8 prepolymer/water ratio at 50ºF.

k. Reaction (curing) which produces a chemically stable and nonbiodegradable, tough, flexible gel.

l. Ability to increase mix viscosity, density, gel strength and resistance to shrinkage by the use of additives to the water.

5. Urethane base foam chemical sealing material:

a. Approximately 1 part of urethane prepolymer thoroughly mixed with 1 part of water by weight (50% prepolymer).

b. A liquid prepolymer having a solids content of 82% to 88%, specific gravity of 1.1 (9.15 pounds per gallon), and a flash point of 20ºF.

c. A liquid prepolymer having a viscosity of 300 to 500 centipoise at 72º F, that can be pumped through 500 feet of 1/2-inch hose with a 500 psi head at a flow rate of 1 ounce per second.

d. A cure time of 15 minutes of 40ºF, 8.2 minutes at 70ºF, and 4.6 minutes at 100ºF when the prepolymer is reacted with water only.

e. A cure time of 5.5 minutes at 40ºF, 8.2 minutes at 70ºF, and 2.6 minutes at 100ºF when the prepolymer is reacted with water containing 0.4% accelerator.

f. During injection, foaming, expansion, and viscosity increase occur.

g. Physical properties of the cured foam of approximately: 14 pounds per cubic foot density, 80 to 90 psi tensile strength, and 700% to 800% elongation when mixture of 50% prepolymer and 50% water undergoes a confined expansion to five times its initial liquid volume.

PART 3 EXECUTION

3.01 INTENT:

A. It is the intent of the sewer pipe joint sealing work to seal sewer pipe joints that have leakage rates of 1/4 gallon per minute or more utilizing the internal joint sealing method.

B. It is realized that this method may only be used on sewer pipe sections in sound physical condition.

C. Longitudinally cracked or broken pipe will not be sealed. When bell cracks or chips are evident from pipe section offset, sealing may be undertaken where the offset is small enough to allow proper seating of the sealing packer on both sides of the joint to be sealed.

3.02 EQUIPMENT:

A. The basic equipment shall consist of a closed-circuit television system, necessary chemical sealant containers, pumps, regulators, valves, hoses, etc., and joint sealing packers for the various sizes of sewer pipes.

B. The packer shall be cylindrical and have a diameter less than the pipe size and have cables attached at each end to pull it through the line.

C. The packer device shall be constructed in a manner to allow a restricted amount of sewage to flow.

D. Generally, the equipment shall be capable of performing the specified operations in lines where flows do not exceed the maximum line flows for joint testing/sealing.

3.03 JOINT SEALING PROCEDURE:

A. Joints showing visible leakage or joints that have failed the joint test specified shall be sealed as specified.

B. Joint sealing shall be accomplished by forcing chemical sealing materials into or through faulty joints by a system of pumps, hoses, and sealing packers.

C. Jetting or driving pipes from the surface that could damage or cause undermining of the pipelines shall not be allowed.

D. Uncovering the pipe by excavation of pavement and soil (which would disrupt traffic, undermine adjacent utilities and structures, and cause further damage to the pipe lines being repaired) shall not be allowed.

E. The packer shall be positioned over the faulty joint by means of a measuring device and the closed-circuit television camera in the line.

F. It is important that the procedure used by the Contractor for positioning the packer be accurate to avoid overpulling the packer and thus not effectively sealing (grouting) the intended joint.

G. The packer ends (end elements, sleeves) shall be expanded using controlled pressure.

H. The expanded ends shall seal against the inside periphery of the pipe to form a VOID area at the faulty joint, now completely isolated from the remainder of the pipeline.

I. Into this isolated area, sealant materials shall be pumped through the hose system at controlled pressures that are in excess of groundwater pressures.

J. The pumping unit, metering equipment, and the packer device shall be designed so that proportions and quantities of materials can be regulated in accordance with the type and size of the leak being sealed.

3.04 JOINT SEALING VERIFICATION:

A. Upon completing the sealing of each individual joint, the packer shall be deflated until the VOID pressure meter reads zero pressure, and then reinflated and the joint retested as specified.

B. Should the VOID pressure meter not read zero, the Contractor shall clean his equipment of residual grout material or make the necessary equipment repairs/adjustments to produce accurate VOID pressure readings.

C. Joints that fail to meet the specified test criteria shall be resealed and retested until the test criteria can be met in order to receive a payment.

3.05 RESIDUAL SEALING MATERIAL:

A. Residual sealing materials that extend into the pipe, reduce the pipe diameter, or restrict the flow shall be removed from the joint.

B. The sealed joints shall be left reasonably “flush” with the existing pipe surface.

C. If excessive residual sealing materials accumulate in the line (and/or if directed by the Owner’s Representative) the manhole section shall be cleaned to remove the residual materials.

3.06 RECORDS:

A. Complete records shall be kept of joint sealing performed in each manhole section.

B. The records shall identify the manhole section in which the sealing was done, the location of each joint sealed, and the joint sealing verification results.

3.07 GUARANTEE:

A. All sewer pipe joint sealing work performed shall be guaranteed against faulty workmanship and/or materials for a period of one year after the completion of the work.

B. Prior to the expiration of the guarantee period and initial retest, an area consisting of specific manhole sections shall be selected by the Engineer/Owner.

C. Manhole sections to be retested shall be randomly selected throughout the project area and shall be representative of the majority of the sealing work originally performed.

D. The initial test area shall consist of at least 5%, but not exceed 10%, of the linear feet contained in the original project.

E. Within the initial retest area, the Contractor shall retest all previously sealed joints as specified.

F. Any joints failing the retest shall be resealed. If the failure rate of the retested joints is less than 5% of the joints retested, the work shall be considered satisfactory and no further retesting will be required.

G. Payment for retesting the initial area shall be at the unit price bid for each item of work required (e.g.: cleaning, TV inspection, testing, etc.).

H. No compensation shall be provided for resealing (grouting) joints that fail.

I. If, in the retest area, the failure rate of the retested joints exceeds 5% of the joints retested, an additional retest area of equivalent size shall be selected and all previously sealed joints shall be retested.

J. Additional testing and sealing, if necessary, will continue until a failure rate of less than 5% is met.

K. Any additional testing/sealing required beyond the initial retest area shall be accomplished at no cost to the owner.

L. Should as much as 25% of the original project be retested and fail to meet the 5% requirement, the Contractor will be required to provide the same number of crews as utilized in the original project so that the retesting will proceed at a more rapid rate.

3.08 TESTING

A. Air testing laterals is accomplished by isolating the area to be tested with the packer and applying positive pressure into the isolated VOID area.

B. A sensing unit is used for continuous monitoring of the VOID pressure.

C. This sensing unit is located within the VOID area and accurately transmits pressure readout to the control panel.

D. The test procedure consists of applying air pressure into each isolated VOID area.

E. To isolate a VOID, the lateral sealing packer is positioned straddling the lateral.

F. The operator inflates the packer ends to isolate the lateral and inserts an inflatable inversion tube.

G. Once the designated pressure in the isolated VOID is displayed on the meter of the control panel, the application of air pressure is stopped and a twenty-second waiting period commences.

H. The VOID pressure is observed during this period.

I. If the VOID pressure drop is greater than that allowed in the following Air Test Table, the lateral is considered to have failed the air test and is grouted.

AIR TEST TABLE

Initial VOID Pressure	VOID Pressure After 20 seconds
12 - 11	4.8 - 4.4
11 - 10	4.4 - 4.0
10 - 9	4.0 - 3.6
9 - 8	3.6 - 3.2
8 - 7	3.2 - 2.8
7 - 6	2.8 - 2.4
6 - 5	2.4 - 2.0

J. After completing the air test for each individual lateral, the lateral packer is deflated, with the VOID pressure meter continuing to display VOID pressure.

K. If the VOID pressure does not drop to approximately zero, the equipment is adjusted to provide a zero VOID pressure reading at the monitor.

3.09 SEALING

A. Sealing begins if the lateral does not pass the air test as described above.

B. The lateral packer remains in position, maintaining the isolated VOID.

C. Chemical grout sealant is pressure injected through the lateral packer into the annular space between the inversion tube and the lateral pipe.

D. Under pressure, the grout material is then forced out into the soil through leaking joints and pipe defects.

E. The amount of chemical grout pumped is based on the number of pump strokes delivered to each lateral.

F. The number is recorded on the sealing log.

3.10 RETEST

A. Upon completion of the lateral sealing procedure the lateral is air tested a second time to verify the sealing of the connection.

B. The air test is the same as outlined above.

C. If the lateral fails the air test a second time, the grouting procedure is repeated.

D. This sequence of air testing, grouting, and subsequent air testing is repeated until either the lateral is sealed or it is determined that the grout consumption is too high and may result in the blockage of the lateral pipe.

E. The final determination to stop subsequent attempts to seal a lateral will be made jointly between the Owner’s Representative and the Contractor.

3.11 VERIFY FLOW

A. Lateral flow is verified after the successful sealing of each lateral.

B. With the lateral packer in position, the inversion tube is retracted and air pressure is injected into the lateral.

C. Should a pressure build in the lateral and not drop to approximately zero in a few seconds, the packer is moved off the connection and the connection is viewed with a television camera.

D. With the camera viewing the connection point, an attempt is made to obtain a water flush by the occupant.

E. If no water is viewed during this procedure, it is assumed the building sewer is blocked with grout and the responsibility to clear the lateral will be the Client's.

F. A notification form is attached to the door of each home or building for which laterals have been grouted.

G. This notification to the occupant states that the lateral servicing this listed address was grouted on this particular date and if any blockage of sanitary flow occurs, the occupant should call a given phone number.

H. The Owner is to supply these notification forms to the Contractor.

3.12 VIDEOTAPE

A. The complete procedure is videotaped during the air testing and sealing operation.

B. The videotapes are submitted to the Owner for review and permanent record.

C. The videotape displays the date, manhole numbers, footage to the lateral, and VOID pressure readout.

D. In addition, the data obtained during this operation is recorded on a lateral testing and sealing log provided by either the Owner or the Contractor.

END OF SECTION

SECTION 03100

CONCRETE FORMWORK AND ACCESSORIES

Part 1 GENERAL

1.01 SUMMARY

A. Furnish equipment, materials, and labor required for construction and removal of forms for the containment of concrete to be cast in place, as shown in the Drawings or as required for the completion of the project.

B. Provide equipment, materials, and labor required for joints in concrete, chamfer strips, and accessories as required for a complete installation as indicated in the Drawings and Specifications.

1.02 RELATED SECTION

A. General Conditions - Bidding and Contract Requirement

B. Site Work - Division 2.

C. Submittals - Division 2.

1.03 REFERENCES

A. The following codes and standards shall govern workmanship and materials unless modified more stringently in the Drawings and Specifications.

1. The Standard Building Code (latest edition).

2. ACI - 301 "Specifications for Structural Concrete for Buildings" (latest edition) is part of these specifications.

PART 2 PRODUCTS

2.01 WOOD FORM MATERIAL

A. Formwork shall conform to standards of ACI 301 and 347 unless otherwise noted.

B. Lumber shall have a minimum moisture content of nineteen (19%) percent.

C. Members that have bows, twists, knots, or other defects, which make it unsuitable for the intended purpose, shall be rejected.

1. Plywood shall be exterior DFPA, three-quarter (3/4) inch minimum thickness, with faces in good condition.

2. Lumber shall be #2 short leaf Southern Pine.

    a. Beam bottom forms shall be one and one-half (1-1/2) inch minimum thickness.

3. Rough hardware shall be galvanized including bolts, anchors, nails, plates, and inserts.

    a. Bolts shall be of this size and length as detailed and shall be three quarter (3/4) inch minimum diameter where not detailed.

    b. Bolts shall be provided with washers.

4. Ties shall be "snap" type, or threaded end, completely removable or other approved type.

2.02 FORM ACCESSORIES

A. Form accessories shall be of a commercially manufactured type.

1. Form ties shall be so constructed that the ends, or end fasteners, can be removed without causing appreciable spalling at the faces of the concrete.

2. After ends, or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than 2 inches from the formed face of the concrete that is exposed to wastewater or closed surfaces above the wastewater and not less that 3/4 inch from the formed face of other concrete.

3. Form ties in walls designed to retain liquids shall be provided with a water seal at mid-thickness of the wall.

2.03 CHAMFER STRIPS

A. Chamfer strips shall be polyvinyl strips designed to be nailed in the forms to provide a 3/4-inch chamfer at exposed edges of beams and interior rectilinear structural columns.

1. Chamfer strips shall not be used at corners of walls.

2.04 EXPANSION JOINT MATERIAL

A. Expansion joint filler shall be of closed cell Neoprene type, conforming to ASTM 1056, Type 1040 as manufactured by Williams Products, Inc., Troy, Michigan, or equal.

2.05 FORM COATING

A. Form coating shall be a coating that will effectively prevent absorption of moisture and prevent bond with concrete and will not stain concrete surfaces and shall be compatible with paint systems specified in Paint - Division 9.

2.06 WATERSTOPS

A. All joints subject to, or likely to be subject to internal or external liquid pressure shall have waterstops installed.

1. Plastic waterstops shall be manufactured from virgin polyvinyl chloride and shall not contain scrap or reclaimed material.

2. Properties of the PVC used shall conform to U.S. Army Corps of Engineers Specification CRD C572.

3. Waterstops shall be serrated type with a center hollow bulb.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. Forms shall be installed true to line and dimensions with snap ties and supports to maintain them in position, without bows or bulging during pouring, vibrating, and curing the concrete.

B. Dimensional tolerances of formwork shall be designed and installed assuring that the finished concrete will comply with dimensional tolerances of ACI 301 and the required tolerances to properly accommodate the equipment installation as verified from the manufacturer's shop drawings.

1. Embedded or cast-in anchors or inserts required for the performance of the work shall be furnished and the location carefully supervised.

2. No lumber shall be stored closer than four (4) inches to grade of floors.

a. Lumber stored outside shall be covered with visqueen or other suitable protection on top and sides.

b. Stack so as to allow proper air circulation.

3. Brace, plumb, and level members and secure with sufficient nails, spikes, and bolts to insure rigidity and safety under concrete placement.

a. No metal to remain within one (1) inch of the surface of the concrete after removal.

b. Wire ties are not permitted.

4. Unless otherwise indicated in the Drawings, exposed foundation sides and grade beams shall be formed.

   a. Forms shall be properly constructed, correctly aligned and of sufficient strength to retain wet concrete without excessive leaking, deflection or distortion.

   b. Temporary openings shall be provided for cleaning and inspection of the base of vertical forms and other places where necessary.

   c. Where required wood inserts, nailing blocks or other wood to be set in the forms shall be installed in an approved manner.

   d. The inside of the forms shall be coated with an approved oil, and dampened before the concrete is poured.

5. Wood or metal forms will be required on sides of foundations, walls, and walks.

   a. Joist forms shall be accurately laid out and securely anchored, and shall be carefully handled to insure continued true and accurate pours.

6. Provide and maintain forms and shoring and for safe practice in their use and removal.

7. Concrete on which forms have given way will be replaced or repaired at the discretion of the ENGINEER as soon as forms are removed.

8. The ENGINEER shall be notified at least twenty four (24) hours prior to placing concrete in order that forms and reinforcing steel may be inspected.

9. Masonry installed after concrete - Anchor exterior wall masonry, which is installed after concrete is poured, in one of the two following methods:

   a. Provide one (1) inch deep by three (3) inch wide concrete lugs around perimeter.

   b. Provide continuous perimeter dovetail anchor slots for example H + B #305 galvanized steel with matching #303 by five and one-half (5-1/2) inch crimped twelve (12) gauge galvanized steel brick anchors.

1) Anchors shall be spaced not over sixteen (16) inch on-center vertically and forty eight (48) inch on-center horizontally.

2) These dovetail anchors shall also be used wherever masonry passes in front of concrete columns or beams (interior and exterior).

3) Nail-on anchors will not be accepted.

4) No anchors are required where concrete is poured after masonry.

10. Remove forms and shoring in a manner as to insure the safety of the structure and personnel.

a. No forms or shoring shall be removed until members supported have acquired sufficient strength to support their weights and loads to be imposed thereon, and in no case earlier than seven (7) days

b. Removal of forms - Pinch bars, wrecking bars or other metal tools shall not be placed against as cast concrete finish surfaces to wedge forms loose, only wooden wedges shall be used.

1) Wedging shall be done carefully and gradually.

2) Driving accomplished only by light tapping.

3.02 WATERSTOPS

A. Waterstops shall be continuous PVC waterstops and shall be joined by heating the ends with a thermostatically controlled electric splicing iron as recommended by the manufacturer.

B. The position and shape of the waterstop shall be maintained unchanged before, during, and after the concrete placing operation.

3.03 CONSTRUCTION JOINT

A. The pacing of concrete shall be carried on continuous between construction joints and the work shall be executed so that these joints will occur in the locations designed in the Drawings.

1. If the CONTRACTOR proposes different locations, or additional intermediate construction joints, he shall submit to the ENGINEER marked up prints of the CONTRACTOR Drawings showing location, extent and type of joints proposed.

2. These submittals shall be made well in advance of construction, and the proposed joints shall be incorporated in the work only if the changes are acceptable to the ENGINEER.

3. Submit drawings in accordance with the Special Conditions.

4. Installation of additional intermediate joints shall not relieve the CONTRACTOR of his responsibilities to produce a watertight and/or structurally adequate component.

3.04 EXPANSION JOINTS

A. Reinforcement or other fixed items embedded or bonded into the concrete shall not be run continuously through expansion joins.

1. A neat chamfered edging shall be provided to finish edges around expansion joints.

B. Thoroughly clean expansion joints shall be located a minimum distance of five feet from the corner of intersecting walls, including corners, unless specific requests are formally made and accepted by the ENGINEER.

END OF SECTION

SECTION 03210

REINFORCING STEEL

PART 1 GENERAL

1.01 SUMMARY

A. Furnish equipment, materials, and labor required for the supply, forming, and placement of reinforcing steel as specified in the Drawings or as required for the project.

1.02 RELATED SECTIONS

A. General Conditions - Bidding and Contract Requirement

B. General Requirements - Division 1

C. Site Conditions - Division 1

D. Submittals - Division 1

E. Concrete Form Work and Accessories - Division 3

F. Cast in Place Concrete - Division 3

1.03 REFERENCES

A. The following codes and standards shall govern workmanship and materials unless modified more stringently in the Drawings and Specifications.

1. The Standard Building Code (latest edition).

2. ACI - 301 "Specifications for Structural Concrete for Buildings" (latest edition) is part of these specifications.

3. Reinforcing shall conform to the requirements of ACI - 301, 315, 80, and 318 (latest editions).

4. Welding certificate conforming to AWS D1.4 - 79.

1.04 SUBMITTALS

A. Submit reinforcing steel shop drawings to the ENGINEER for approval.

1. Check and approve steel shop drawings prior to submittal to the ENGINEER.

2. The CONTRACTOR's stamp and signature is required on shop drawings prior to submittal.

1.05 MEASUREMENT AND PAYMENT

A. Measurement and payment will be included in the lump sum prices for the appropriate work items, as shown in the Bid Schedule, as required for those items which price and payment shall constitute full compensation for furnishing materials and performing work in connection herewith and as specified in the scope of work under this section.

1.06 TESTS AND CERTIFICATES

A. The cost of the initial steel testing and subsequent tests during the progress of the work ordered by the ENGINEER shall be paid for by the CONTRACTOR, including retesting of rejected material.

PART 2 PRODUCTS

A. Reinforcing steel shall conform to ASTM A-615 New Domestic Billet, Grade 60.

B. Steel shall have a 305 deformation.

C. Provide clean steel free from loose scale of flake rust or coating that destroys or reduces the bond to the concrete.

1. Keep steel clean until used or wire brushed before placing.

D. Welded Wire Mesh Reinforcement shall be ASTM Specification A-185 and A-82 hot dipped galvanized wire.

E. Metal Accessories - Spacers, ties, chairs, and devices necessary for proper placing, spacing, supporting, and fastening or reinforcement shall be supplied and placed as required by the Manual of Standard Practice for Detailing Concrete Structures (ACI 315-80).

1. Provide plastic coated feet on chairs, spacers, and bolsters.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. Bars shall be accurately fabricated, carefully placed as indicated in the Drawings, securely supported and fastened to prevent movement or displacement during the pouring of the concrete.

B. Placement of reinforcing shall conform to the requirements of "CRSI Recommended Practice for Placing of Reinforcing Bars".

C. Splices shall be in accordance with ACI Code, except liquid retention structures shall conform to requirements shown in the Drawings.

1. Securely wire wall dowels at foundations to the footing steel.

2. Where stub columns are poured (as in the case of stem walls) the dowels shall be of a length sufficient to satisfy requirements of ACI Code and to provide a minimum distance of 36-diameter lap where the main column is joined to the stub column.

3. Place and support mesh by means of chairs or other approved devices, so that it maintains its proper position in the slab during the pouring operations.

D. Size stirrups and column ties for bars designated in the Drawings and fabricate to provide a clearance of 1 1/2 inches between the outside of the tie and the surface of the concrete.

E. Unless shown otherwise in the Drawings, maintain the following minimum concrete cover:

1. Bottom of suspended slabs: 3/4-inch

2. Top of slabs: 1-inch

3. Walls, beams and columns: 2-inches

4. Formed concrete contacting soil: 2-inches

5. Concrete placed against soil: 3-inches

F. See Drawings for special requirements for liquid retention structures.

G. Support column and beam reinforcing from formwork with plastic accessories.

H. Support slab reinforcing on non-metallic slab bolsters.

3.02 INSPECTION

A. Notify the ENGINEER of the time when steel will be ready for inspection at least 24 hours in advance.

1. Allow sufficient time for necessary correction before scheduled pour.

B. Correct incorrect or improperly placed steel and re-inspect by the ENGINEER prior to placing concrete.

C. Place no concrete except where the ENGINEER has inspected and approved the reinforcing steel.

   1. Cost of reinspection shall be paid by the CONTRACTOR.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Furnish equipment, materials, and labor required for the supply, casting, finishing, curing, and testing of cast-in-place concrete, as specified in the Drawings and Specifications, or as required for the complete project.

1.02 RELATED SECTIONS

A. General Conditions - Bidding and Contract Requirement

B. Summary of Work - Division 1

C. Site Conditions - Division 2

D. Concrete Formwork and Accessories - Division 3

E. Reinforcing Steel - Division 3

F. Submittals - Division 1

G. Guarantees - Division 1

1.03 REFERENCES

A. The latest edition of the following codes and standards shall govern workmanship and materials unless modified more stringently herein.

1. The Standard Building Code.

2. ACI 301 "Specifications for Structural Concrete for Buildings" is part of these specifications, except as modified here in or in the Drawings.

    a. Construct concrete decks with a maximum of 1/8-inch deviation using a 10-foot long straightedge placed in any direction on the surface.

3. ACI 211.1, 308, 309, 318, and 347.

    a. SFBC shall govern where provisions of the ACI conflict.

4. ASTM C33, C94, C143, C150, D544 and D1190-52T.

1.04 MEASUREMENT AND PAYMENT

A. Measurement and payment will be included in the lump sum prices for the appropriate work items, as shown in the Bid Schedule, as required for those items which price and payment shall constitute full compensation for furnishing materials and performing work in connection herewith and as specified in the scope of work under this section.

1.05 TESTS AND CERTIFICATES

A. TESTS

1. Make tests in accordance with the recommendations of ASTM.

    a. Do not exceed maximum concrete slumps as specified above.

    b. Make five cylinders for each test required.

    c. Take samples for the test from the mixer at the 1/4 and 3/4 points in the load.

2. The ENGINEER may order core borings or other special tests during the progress of the work.

3. Removed and replaced at no cost to the OWNER concrete failing indicated tests.

4. CONTRACTOR to pay the cost of testing.

    a. Propose a testing agency for approval by the ENGINEER.

B. SLUMP TESTS

1. Perform slump tests in accordance with ASTM C143 (latest edition) by testing agency.

    a. Make tests for each 10 cubic yards, or fraction thereof, of each pour.

    b. In the event the slump exceeds the specified requirements, the batch shall be rejected.

C. AIR TESTS

1. Testing agency shall test the air content of the freshly mixed concrete in accordance with ASTM C231 or C173 (latest edition) for each 10 cubic yards, or fraction thereof, of each pour.

a. In the event the percentage of air content is not within the limits in the specifications for entrained air content, the batch shall be rejected.

D. STRENGTH TESTS

1. Testing agency shall mold 5 specimens for each increment of 50 yards or less of each day's pour or as directed by the ENGINEER.

a. Maintain records for each specimen as to location, pour, and date.

b. Test specimens - one at 3 days, one at 7 days, two at 28 days, and one at 45 days, if the 28-day tests fail to meet the specified strengths.

2. Cooperate with the ENGINEER or persons employed by the testing agency for testing in making, storing and curing of the test cylinders.

PART 2 PRODUCTS

2.01 CEMENT

A. Use Domestic Portland cement conforming to ASTM C150 (latest edition), Type I, except Type II shall be used for liquid retention structures.

1. Only one domestic brand shall be used throughout the duration of the project.

2.02 AGGREGATES

A. Aggregates shall meet the requirements of ASTM C33.

1. Do not use aggregates taken from salt water.

B. Provide clean, hard, sharp, natural sand having a fineness modulus between 2.5 and 3.0 as fine aggregate.

C. Provide clean gravel of crushed stone, graduation no. 57 as coarse aggregates.

2.03 WATER

A. Provide potable water, free from deleterious amounts of oils, acids, alkalis, organic matter, or other harmful matter.

2.04 EXPANSION MATERIALS

A. Pre-molded joint fillers shall conform to ASTM D544 Type V, equal to Celete 2 "Flexcell", 1/2 inch thick (or as shown in the Drawings), by width as indicated in the details.

B. Poured in place shall conform to ASTM D1190-52T, equal to Servicized Products Corp., hot poured "Paraplastic."

2.05 SLEEVES, HANGERS AND INSERTS

A. Inserts, hangers, sleeves, anchors, ties, bolts, dowels, thimbles, nailers, ground, or other devices required for the attachment or passage of other work shall be located by the CONTRACTOR from the Drawings in confirmation with the shop drawings or as approved by the ENGINEER.

B. BOLTS

1. Install stainless steel bolts of size and length specified as indicated in the Drawings.

2. Use 3/4-inch minimum size, with washers on both ends, where not indicated.

C. CHASES

1. Form chases with wood or metal forms or sleeves.

2. Remove wood.

3. Provide galvanized metal sleeves, if sleeves will not be removed.

4. Provide cast iron caulking sleeves where plumbing sleeves passes through exterior walls, slabs, or foundations.

D. OTHERS

1. Anchor bolts, ringlets, and inserts shall be of type, size, and spacing as required by the trades involved.

2. Use stainless steel on submerged applications and/or where corrosive environments exist as determined by the ENGINEER.

2.06 CURING COMPOUNDS

A. Do not use compound, which will interfere with adhesion or cause other deleterious reaction with indicated finish.

B. Provide curing compounds containing fugitive dye, fading not sooner than 7 days.

C. Use Castle Chemical Corp., Demicon Cure-Hard, Clear-Spread at 400 square feet per gallon or approved equal for slabs not receiving additional topping or finish.

D. Other Concrete - Use Lambert Corp. #64 Resin Base Clear; Master Builders Co. "Masterkure"; Sonneborn Chemical and Refining Corp., "Hydrocide Curing Compound Resin X Clear"; Guardian Chemical Co. "Clear Bond"; Karl E. Reynolds Curing Compound for curing, hardening, and sealing.

2.07 CONCRETE ADMIXTURES

A. Admixtures for concrete structures with liquid retention are listed below:

1. Air entrainment per ASTM C-260 6 plus or minus 1 percent.

2. Retarder per ASTM C-494 type D.

2.08 MISCELLANEOUS

A. Provide 0.006-inch polyethylene film vapor barrier.

B. Provide Wheeling galvanized Tensilform or equal by Granco or U.S. Steel for Metal decking.

PART 3 EXECUTION

3.01 PROPORTIONING AND MIXING

A. Use "ready-mixed" concrete in accordance with ASTM C-94.

B. Submit the proposed mix, as a shop drawing, together with slump and cylinder tests for approval.

C. Mix tests shall be by an independent testing laboratory.

D. Clearly indicate the proposed location in the project for each mix submitted.

1. See Submittals Division - 1.

E. Mixes for liquid retention structures shall have a minimum 28-day strength of 4,000 psi.

1. Other mixes shall be 3,000 psi unless otherwise noted.

2. Minimum cement content shall be 5.5 sacks per cubic yard for 4,000 psi and 5.0 sacks per cubic yard for 3,000 psi.

3. Maximum slumps shall be:

a. Footings: 3 inches

b. Slabs, Beams: 4 inches

c. Columns, Walls: 4 inches

4. Single pour, which involves two specified slumps, shall be governed by the lesser.

5. Maximum water/cement ratio for liquid retention structures shall be 0.41.

6. Place concrete within 1 1/2 hours after introduction of water to the mix. Under no conditions may additional water be added.

3.02 PLACING

A. Place concrete expeditiously in clean, damp forms that are not oily to the touch.

B. Spray forms with water immediately prior to placing concrete.

C. Secure reinforcement in position, have it inspected, and obtain approval before pouring concrete.

D. Do not rest runways for transporting concrete on reinforcing steel.

E. Concrete placing time shall be in strict accordance with ACI standards, latest edition.

F. Do not place concrete under water

G. Poured during daylight unless approved by the ENGINEER.

H. Where the reinforcing steel above the pour is coated with concrete while pouring below, concrete shall be removed from the reinforcing steel after the pour is complete.

I. SPECIAL

1. Flat, true surfaces are essential on concrete pours for floors.

2. A ten foot (10') straight edge placed in any position on the floor shall contact the floor in its entire length with a tolerance of 1/8 inch.

3. Provide smooth finished floor throughout with no discernible waves.

4. Grind pours not meeting these requirements, until they are acceptable.

5. Existing conditions do not relieve the CONTRACTOR from meeting these requirements.

J RECESSES

1. Lay out and form, as required, recesses for door operators, closer hardware, sensor plates, mats, and equipment.

K. BONDING AGENTS

1. Wherever a topping or other pour of less than 1 1/2 inches thickness is required, a two-part epoxy bonding agent shall be used of a manufacturer approved by the ENGINEER.

2. Do not use bonding agents for liquid retention structures slabs where grout is to be the "topping."

3. Clean existing slabs prior to the topping pour to assure a proper bond.

4. Use steam and/or solvents if required.

5. This requirement also applies to grout addition in liquid retention structures.

L. COMPACTION

1. Place concrete, except for footings, in layers not over 12 inches deep until compacted by internal vibrating equipment, supplemented by hand rodding and tamping as required.

   a. Do not use vibrators to move concrete laterally inside the forms.

   b. Internal vibrators shall maintain a speed of at least 5,000 impulses per minute when submerged in concrete.

   c. Maintain at least one spare vibrator, in working condition, at the site.

   d. Limit the duration of vibration to the time necessary to produce satisfactory consolidation without causing segregation but in no case less than 20 seconds per square foot of exposed surface.

   e. Move the vibrator constantly and placed in each specific spot only once.

   f. Provide consolidation methods and equipment conforming to ACI-309.

M. COLUMNS/WALLS

1. Place concrete in columns forms before the beam and slab steel is in place.

2. Place column/wall concrete without dropping more than 8 feet.

N. SLABS AND BEAMS

1. Clean slab and beam forms after placing wall concrete.

2. Do not place concrete in roof and wall beams or slabs until concrete in walls has been in place a minimum of four hours.

3. Place concrete for slabs and beams continuously and arrange work to assure joints will be located at the points specified.

4. Slope floor slabs with floor drains uniformly to the floor drain.

5. Place slabs on fill carefully to avoid damage to vapor barriers.

O. CONSTRUCTION JOINTS

1. Locate keyed construction joints as shown or near points of maximum potential movement and shear, subject to approval.

2. Locate construction joints at the underside of floor and roof members, tops of foundations and near the quarter point or third point of the span in slabs, beams or girders.

3. Locate construction joints for liquid retention structures as shown in the Drawings.

4. Install keyed construction joints, straight and smooth, in slabs on fill, at wall centerlines.

5. Cure keyed construction joints a minimum of 24 hours before fresh concrete is deposited.

6. Expansion joints in walkways on grade shall not exceed 20 feet on centers, unless otherwise noted, and at changes in directions.

7. Mark walks in 5'-0" sections, unless otherwise shown in the Drawings.

8. Mark and tool the walks before concrete has become set.

9. Make minimum walk thickness 4 inches.

3.03 FINISHING

A. Provide finishes for concrete surfaces as indicated below:

1. Smooth, double trowel floors and bottom slabs of liquid retention structures.

2. Broom finish exterior slabs and walkways, edges and joints tooled.

3. Smooth rub finish walls, columns, and beams of liquid retention structures

3.04 CURING

A. Water cure liquid retention structures in accordance with ACI-308 for a period of 14 days after pouring.

B. Cure other concrete by application of curing compounds as specified herein, applied in strict accordance with the manufacturer's recommendations.

1. Curing shall start as soon as possible after pouring.

3.05 TIME BETWEEN POURS

A. At least two hours shall elapse after depositing concrete in long or high columns and/or heavy walls before depositing in beams, girders or slabs supported thereon.

1. For short columns and low height walls, 10 feet or less, waiting time shall be at least 45 minutes prior to depositing concrete in beams, girders, brackets, column capitals or slabs supported thereon.

2. Consider beams, girders, brackets, column capitals, and haunches as part of the floor or roof system and place monolithically therewith.

3.06 VAPOR BARRIER

A. Use vapor barriers under slabs on grade utilizing maximum reasonable widths.

1. Lap joints a minimum of 6 inches and seal penetrations with pressure sensitive tape.

2. Do not apply vapor barriers under liquid retention structures.

3.07 INSPECTION

A. Obtain approval of the ENGINEER of the pour limits of each day prior to the start of pouring.

B. Do not cover reinforcing steel with concrete until the ENGINEER has given his approval to start pour for the limits of the day.

3.08 CONSTRUCTION AND EXPANSION JOINTS

A. Locate joints where shown in the Drawings.

   1. Make column joints horizontal and true.

   2. Form beam joints with plywood and slope from the vertical 12 inches to 1 inches away from the beam center at the top.

B. Make expansion joints straight and true and to details shown in the Drawings.

   1. Securely placed and located moisture stops and inserts for cover plates.

C. When construction joints become necessary at locations other than those shown in the Drawings, the ENGINEER's approval shall be obtained prior to installation of the joints or pouring of concrete.

D. For walls of liquid retention structures, 14 days shall elapse prior to pouring adjacent to existing hardened concrete at vertical construction joints, so initial drying shrinkage can occur with minimal restraint.

END OF SECTION

SECTION 04070

MASONRY GROUT

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope of Work: The work included in this Section consists of grouting the various items listed hereinafter and indicated in the Drawings.

B. Related Work Described Elsewhere:

1. Sanitary Sewer System: Division 2

2. Precast Concrete Manholes: Division 3

1.02 SUBMITTALS

A. Materials and shop drawings: Division 1: shop drawings, working drawings and samples for submittal requirements.

B. Submit manufacturer's literature for review on nonshrink grout data including: grout properties, mixing, surface preparation, and installation instructions.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver grouting materials and store in unbroken containers with seals and labels intact as packaged by the manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Nonshrink, Nonmetallic Grout: Sauereisen F-100 Level Fill, Master Builders Masterflow 713, Burke Non-Ferrous, Non-Shrink Grout or equal pre-mixed type.

B. Nonshrink Metallic Grout: Master Builders Embeco 636 Grout pre-mixed type.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean bonding surfaces of dust and oil.

3.02 INSTALLATION

A. Nonshrink Grout:

1. Use nonshrink, nonmetallic grout for grouting column base plates, anchor bolts, reinforcing bars, pipe sleeves, machinery supports, and pump base plates.

2. Mix and place nonshrink grout as recommended by the manufacturer.

3. Mix grout as close to the work area as possible and transported quickly to its final position in a manner which will not permit segregation of materials.

4. Cure nonshrink grout with water saturated burlap for at least 3 days.

5. Do not operated machinery set on grout pads until the grout has cured for at least 36 hours.

3.03 MEASUREMENT AND PAYMENT

A. No additional payment shall be made for the work previously specified.

B. The CONTRACTOR's Lump Sum Bid as set forth in the Proposal shall continue full compensation for the work involved in this section.

END SECTION

SECTION 04200

UNIT MASONRY

PART 1 GENERAL

1.01 SUMMARY

A. Furnish labor, materials, and equipment and perform functions required in the installation and maintenance of the work covered by this Section.

1. This work includes:

a. Unit masonry work.

b. Angles, sleeves, anchors, inserts, and ties required to be built into masonry work.

1.02 RELATED SECTIONS

A. Steel reinforcement: Division - 3

B. Concrete: Division - 3

C. Mortar for Engineered Masonry: Division - 4

1.03 REFERENCES

A. ACI 530, “Specifications for Masonry Structures”

B. National Concrete Masonry Association: Standard Specifications for the Design and Construction of Load Bearing Concrete Masonry, NCMA TR-75B.

C. Standard Building Code.

1.04 QUALITY ASSURANCE

A. Allowable Tolerances:

1. Plumb: ± 1/8 inch in 5’-0”, non-cumulative.

2. Horizontal Warp: ± 1/8 inch in 5’-0”, non-cumulative.

3. Level Courses in Wall Panels: ± 1/4 inch.

1.05 SUBMITTALS

A. Manufacturer's product data indicating compliance with specified requirements.

PART 2 PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C150-84, Type I, white or gray, as required.

B. Masonry Cement: ASTM C91-83a, Type II.

C. Sand: 100 percent passing a #8 sieve, and not more than 15 percent passing a #100 sieve, ASTM C144-81.

D. Water: County potable water.

E. Wall Reinforcement: Truss type welded wire masonry reinforcement, every second course, 9 gauge deformed wire, minimum weight for 8 inch wall 187lbs. per 1000 lineal feet, .048 sq. in. effective cross sectional steel area sized for width of block.

1. Comply with material requirements of ASTM Standard A 82 for high tensile steel.

F. Anchors: Galvanized steel, minimum 12 inch long.

G. Waterproofing: SEC #1, manufactured by SEC Manufacturing Co., or equivalent approved by Architect/ENGINEER.

H. Concrete Block: Hollow loadbearing blocks, ASTM C-90, Grade N, Type I, moisture content requirements as stipulated in the guide specifications of the Florida Concrete and Products Assoc., Inc., weight of concrete more than 100 lbs. per cubic foot, compressive strength minimum 2000 p. s. i., nominal 8 inches by 8 inches by 16 inches.

1. Use standard blocks specially designed for use at jambs, beams, as required.

PART 3 EXECUTION

3.01 MORTAR

A. ASTM C270, Type S, with compressive strength of 1800 p. s. i. at twenty-eight (28) days, except that Type M with 2500 p. s. i. shall be used for reinforced masonry, when required by code and where indicated in the Drawings.

1. Ingredients:

a. Portland cement, sand, hydrated lime and water, or masonry cement, sand, and water, with waterproofing added in accordance with the manufacturer's recommendations in mortar for exterior work.

B. Mix mortar with minimum amount of water for satisfactory workability, and only in quantity needed for immediate use.

1. The mason may adjust the consistency.

2. Do not use mortar after the cement has begun its initial set.

3. Retempering will not be permitted.

C. Pointing and Cleaning: On completion, point up exposed masonry, including joints at concrete columns and beams.

1. Fill holes and joints, remove loose mortar, cut out defective joints, and repoint only where necessary.

2. Masonry surfaces which are to be exposed, either painted or unpainted, shall be thoroughly cleaned free of mortar and stains and the joints pointed to obtain a level, smooth surface.

3.02 ERECTION

A. Protect masonry work from damage, both in appearance and structural stability.

1. When rain is imminent and the work discontinued, cover the top of exposed masonry with a strong waterproof membrane, well secured in place.

2. Replace walls damaged during construction by wind action or failure to provide adequate protection and bracing, at no expense to the OWNER.

B. Lay masonry in a common running bond, with vertical joints centered over masonry units below.

C. Do not step back unfinished work for joining with new work.

1. Complete the last course laid between columns or walls before interrupting the day's work.

2. Toothing may be restored to only when specifically approved by the ENGINEER.

3. Remove loose mortar before new work is started, and wet the exposed joint thoroughly before laying new work.

D. Built-In metal frames, vent blocks, access doors, and anchor bolts required by other trades as the work progresses.

1. Check with other trades for these items.

E. Bed each course solidly in mortar, under face shells and webs, with vertical joints slushed full and breaking halfway over units in the course next below, unless stacked bond is specified or noted in the Drawings.

1. Terminate walls under soffits of existing beams or slab construction slightly below the soffit and fill the remaining space with mortar after roof dead loads have been brought to bear on the structure.

2. Fill cavities with mortar in walls or partitions supporting plumbing fixtures or other items, voids at door jambs, and other spaces requiring grout fill, so that anchoring devices are in a solid field not less than 8 inches in every direction from their center.

3. Reinforce exterior walls by placing wall reinforcement as indicated in the Drawings.

4. Lap reinforcing sufficiently at splices (24 inches min.) to ensure continuity.

F. Where block walls abut the vertical surface of a concrete member, provide cast-in-place recessed reglets for dovetail, corrugated, galvanized, 1 inch wide by 1/8 inch thick anchors at the end of each wall reinforcement run.

1. Where new block walls abut existing or previously erected concrete or masonry walls, secure anchors to existing wall by breaking through the block or chipping a recess in concrete and filling the space with grout, to prevent horizontal movement.

G. Where walls with concrete filled voids are indicated, use regular concrete with pea rock aggregate and a compressive strength of 3000 psi at twenty-eight (28) days.

1. Comply with the requirements of Division 3.

H. Do not wet concrete masonry units before laying.

1. Erect masonry plumb, true to line, level, and accurately spaced, with each course breaking joints with course next below, unless a stacked pattern is indicated in the Drawings.

2. Keep bond pattern plumb throughout and corners and reveals plumb and true.

3. Use power drills and saws for penetration of plumbing and other pipes in exposed locations.

4. Fill chases and knockouts after other work is installed in them to restore the integrity of the wall.

I. For Exposed Masonry Finishes

1. Do not use cracked, spalled, or chipped blocks.

2. Use extra care to set blocks plumb, with even, uniform tooled joints, and to keep mortar smears from the face of the block.

3. Set courses level and line up the face of the units to provide a flat surface without warpage or breaks at the joints.

4. Strike the excess mortar from the joints with a trowel run parallel to the joint to avoid smearing the block face.

5. Joint thickness: 3/8-inch.

6. Keep setting mortar from the face of the block and wipe excess away before it sets.

    a. The blocks will remain exposed and painted in the finished condition.

    b. Replace blocks defaced by excessive mortar smears that interfere with the uniform texture and color of the wall.

END OF SECTION