

**TECHNICAL SPECIFICATIONS FOR
CONSTRUCTION OF
FIRE STATION 109 MODIFICATIONS**

PREPARED FOR:



LAKE COUNTY
FLORIDA

**Lake County Board of County Commissioners
Lake County Fire Rescue
315 W. Main Street
Tavares, Florida 32778**

August, 2010

1010003.001

**FIRE STATION 109
TECHNICAL SPECIFICATIONS**

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SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Contractor use of site and premises.
- B. Work Sequence.
- C. Work covered by the contract documents.
- D. Construction Limitations.
- E. Alternate.

1.2 CONTRACTOR USE OF SITE AND PREMISES

- A. Limit use of site and premises to allow:
 - 1. Owner occupancy.
 - 2. The contractor's activities relating to the work.

1.3 WORK SEQUENCE

- A. The contractor shall determine the sequence of work and coordinate work with the owner/owner's representative and engineer.

1.4 WORK COVERED BY THE CONTRACT DOCUMENTS

- A. The scope of work consists of constructing and coordinating all construction and providing a complete system as shown on the plans and described in the contract documents.

All surficial elements disturbed by the construction (driveways, signs, fences, landscaping, mail boxes, etc.) will be repaired or replaced with like kind to original or newer condition to the satisfaction of the Engineer and/or Construction Manager. It is the contractor's responsibility to become familiar with the site and incorporate this work into the bid.

- B. The work will be performed under a single contract. The contractor will provide all labor, materials, supplies, equipment, utilities, and miscellaneous items for a complete facility as shown and described in the contract documents.

1.5 CONSTRUCTION LIMITATIONS

- A. Contractors shall limit construction operations to areas shown on or noted on the drawings.
- B. Contractors shall limit days of operation to Monday through Friday unless otherwise approved.
- C. Contractors shall limit time of operation from dawn to dusk as published by U.S. Naval Observatory.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

Section 01010 – Summary of Work

SECTION 01019 - CONTRACT CONSIDERATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Application for Payment
- B. Change Procedures
- C. Alternates.
- D. Special Provisions

1.2 RELATED SECTIONS

- A. Section 01027 - Application For Payment.
- B. Section 01028 - Change Order Procedures.

1.3 APPLICATIONS FOR PAYMENT

- A. Submit four (4) copies of each application on EJCDC 1910-8-E.
- B. Payment Period: Monthly.
- C. Waiver of Lien.

1.4 CHANGE PROCEDURES

- A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by EJCDC Article 9.5 by issuing supplemental instructions on Work Change Directive.
- B. The Engineer may issue a Notice of Change which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within five (5) days.
- C. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation.
- D. Stipulated Sum/Price Change Order: Based on Notice of Change and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Engineer.
- E. Work Change Directive: Engineer may issue a directive, on Work Change Directive signed by the Engineer, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute the change.
- F. Change Order Forms: EJCDC 1910-8-B Change Order.

- G. Execution of Change Orders: Contractor shall prepare and Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

1.5 ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work as required.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01027 - APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparation and submittal of Application for Payment.

1.2 RELATED SECTIONS

- A. Document - Agreement: Contract Sum/Price.
- B. Document EJCDC No. 1910-8 - General Conditions: Final Payment.
- C. Section 01028: Procedures for changes to the Work.
- D. Section 01300 - Submittals: Submittal procedures.
- E. Section 01700 - Contract Closeout: Closeout Procedures

1.3 FORMAT

- A. EJCDC 1910-8-E - Application for Payment.

1.4 PREPARATION OF APPLICATIONS

- A. Present required information in typewritten form or on electronic media printout. Forms on electronic media can be provided by Engineer upon request.
- B. Execute certification by signature of authorized officer of the corporation.
- C. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of Work.
- D. Prepare Application for Final Payment as specified in Section 01700.
- E. Application Form: EJCDC 1910-8-E.

1.5 SUBMITTAL PROCEDURES

- A. Submit four (4) copies of each Application for Payment.
- B. Payment Period: Monthly submit request to the Engineer on a Wednesday and it will go to the County Commission for approval two weeks from Wednesday.
- C. Submit under transmittal letter specified in Section 01300.

1.6 SUBSTANTIATING DATA

- A. When Engineer requires substantiating information, submit data justifying dollar amounts in question.
- B. Provide one copy of data with cover letter for each copy of submittal. Show Application number and date, and line item by number and description.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01028 - CHANGE ORDER PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Submittals.
- B. Documentation of change in Contract Sum/Price and Contract Time.
- C. Change procedures.
- D. Work Directive Change.
- E. Stipulated Price change order.
- F. Execution of change orders.

- G. Correlation of Contractor submittals.

1.2 RELATED SECTIONS

- A. Document EJCDC No. 1910-8-B - General Conditions: Governing requirements for changes in the Work, in Contract Sum/Price, and Contract Time.
- B. Section 01027 - Applications for Payment.
- C. Section 01300 - Submittals: Construction Progress Schedule.
- D. Section 01700 - Contract Closeout: Project Record Documents.

1.3 SUBMITTALS

- A. Submit name of the individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. Change Order Forms: EJCDC 1910-8-B Change Order.
- C. Work Change Directive Forms: EJCDC 1910-8-F Work Change.

1.4 DOCUMENTATION OF CHANGE IN CONTRACT SUM/PRICE AND CONTRACT TIME

- A. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.
- B. On request, provide additional data to support computations:
 - 1. Quantities of products, labor, and equipment.
 - 2. Taxes, insurance and bonds.
 - 3. Overhead and profit.
 - 4. Justification for any change in Contract Time.
 - 5. Credit for deletions from Contract, similarly documented.

- C. Support each claim for additional costs with additional information:
 - 1. Origin and date of claim.
 - 2. Dates and times work was performed, and by whom.
 - 3. Time records and wage rates paid.
 - 4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.5 CHANGE PROCEDURES

- A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by EJCDC 1910-8-B Paragraph 9.5 by issuing supplemental instructions on EJCDC No. 1910-8-F.
- B. The Engineer may issue a Proposal Request Notice of Change which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within five (5) days.
- C. The Contractor may propose a change by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01600.

1.6 WORK CHANGE DIRECTIVE

- A. Engineer may issue a document, signed by the Engineer, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
- B. The document will describe changes in the Work, and will designate method of determining any change in Contract Sum/Price or Contract Time.
- C. Promptly execute the change in Work.

1.7 STIPULATED PRICE CHANGE ORDER

- A. Based on Notice of Change and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Engineer.

1.8 EXECUTION OF CHANGE ORDERS

- A. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

1.9 CORRELATION OF CONTRACTOR SUBMITTALS

- A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum/Price. Change orders must be executed by the Board of County Commissioners before the change order items can be included in the application for payment. Applications for payment submitted with extra items not approved with a change order will be returned or modified by the Engineer to omit these items.
- B. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust time for other items of work affected by the change, and resubmit.

C. Promptly enter changes in Project Record Documents.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01039 - COORDINATION AND MEETINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Coordination.
- B. Field engineering.
- C. Alteration project procedures.
- D. Cutting and patching.
- E. Preconstruction conference.
- F. Progress meetings.

1.2 COORDINATION

- A. The Contractor shall coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements installed by others using the site at the same time.
- B. The Contractor shall verify that utility and traffic requirement characteristics of operating equipment are compatible. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. The Contractor shall coordinate space requirements. Follow routing shown for pipes as closely as practicable. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. The Contractor shall coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion.
- E. After Owner occupancy of premises, the contractor shall coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING

- A. The Contractor will employ a Land Surveyor registered in the State of Florida to perform all vertical & horizontal control work. The control will be done in an agreed upon manner prior to the layout. The Contractor will pay for any restaking necessary.
- B. The Contractor shall locate and protect survey control and reference points.
- C. The Contractor will provide field engineering services. Establish vertical and horizontal control utilizing recognized engineering survey practices. The contractor will perform all construction staking.

1.4 ALTERATION PROJECT PROCEDURES

- A. Materials: As specified in product Sections; match existing products and work for patching and extending work.

- B. Remove, cut, and patch work in a workmanlike manner to minimize damage and to provide a means of restoring finishes to original condition.
- C. Refinish visible existing surfaces to remain to specified conditions for each material, with a neat transition to adjacent finishes.
- D. Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.
- E. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Engineer.
- F. Where a change of plane of 1/4 inch in 10 feet or more occurs, submit recommendation for providing a smooth transition for Engineer review and request instructions from Engineer.
- G. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
- H. Finish surfaces as specified in individual product Sections.

1.5 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to remove and replace defective and non-conforming Work.
- C. Execute work by methods which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
- D. Cut rigid materials using masonry saw or core drill.
- E. Restore Work with new products in accordance with requirements of Contract Documents.

1.6 PRECONSTRUCTION CONFERENCE

- A. Engineer will schedule a conference after signing of contract.
- B. Attendance Required: Owner, Engineer, Contractor and Utility Representatives.
- C. Agenda:
 - 1. Designation of personnel representing the parties in Contract, and the Engineer.
 - 2. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
 - 3. Scheduling.
 - 4. Use of premises by Owner and Contractor.
 - 5. Owner's requirements for partial occupancy.
 - 6. Temporary facilities provided by Contractor.
 - 7. Survey layout.
 - 8. Schedules.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Inspection and acceptance of areas put into service during construction period.

1.7 PROGRESS MEETINGS

- A. Contractor shall schedule and administer meetings throughout progress of the Work at maximum monthly intervals.
- B. Attendance Required: Job superintendent, major Subcontractors and suppliers as necessary, Owner, Engineer, as appropriate to agenda topics for each meeting.
- C. Agenda:
 - 1. Review of Work progress.
 - 2. Field observations, problems, and decisions.
 - 3. Identification of problems which impede planned progress.
 - 4. Review of submittals schedule and status of submittals.
 - 5. Maintenance of progress schedule.
 - 6. Corrective measures to regain projected schedules.
 - 7. Coordination of projected progress.
 - 8. Maintenance of quality and work standards.
 - 9. Effect of proposed changes on progress schedule and coordination.
 - 10. Other business relating to Work.

PART 2 -PRODUCTS

Not Used

PART 3 -EXECUTION

Not Used

END OF SECTION

SECTION 01090 - REFERENCE STANDARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance.
- B. Schedule of references.

1.2 RELATED SECTIONS

- A. Document EJCDC No. 1910-8 - General Conditions: Reference Standards.

1.3 QUALITY ASSURANCE

- A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date for receiving bids.
- C. Obtain copies of standards when required by Contract Documents.
- D. Maintain copy at jobsite during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- F. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.4 SCHEDULE OF REFERENCES

AA	Aluminum Association 818 Connecticut Avenue, N.W. Washington, DC 20006	ACOE	Army Corps of Engineer Jacksonville, Florida
AABC	Associated Air Balance Council 1000 Vermont Avenue, N.W. Washington, DC 20005	AGC	Associated General Contractors of America 1957 E Street, N.W. Washington, DC 20006
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W. Washington, DC 20001	AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219	AISC	American Institute of Steel Construction 400 North Michigan Avenue Eighth Floor Chicago, IL 60611
		AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, DC 20036

AITC	American Institute of Timber Construction 333 W. Hampden Avenue Englewood, CO 80110	IEEE	Institute of Electrical and Electronics Engineers 345 East 47th Street New York, NY 10017
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018	MIL	Military Specification Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017	NEMA	National Electrical Manufacturers' Association 2101 'L' Street, N.W. Washington, DC 20037
ASPA	American Sod Producers Association 4415 West Harrison Street Hillside, IL 60162	NFPA	National Fire Protection Association Battery March Park Quincy, MA 02269
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103	PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077
AWS	American Welding Society 550 LeJeune Road, N.W. Miami, FL 33135	PCI	Prestressed Concrete Institute 201 North Wells Street Chicago, IL 60606
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235	SJI	Steel Joist Institute 1205 48th Avenue North Suite A Myrtle Beach, SC 29577
CLFMI	Chain Link Fence Manufacturers Institute 1101 Connecticut Avenue, N.W. Washington, DC 20036	SJRWMD	St. Johns River Water Mgmt District 618 E. South Street Suite 200 Orlando, Florida 32801
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Road Schaumburg, IL 60195	SSPC	Steel Structures Painting Council 4400 Fifth Avenue Pittsburgh, PA 15213
EJCDC	Engineers' Joint Contract Documents Committee American Consulting Engineers Council 1015 15th Street, N.W. Washington, DC 20005	SWFWMD	Southwest Florida Water Mgmt Dist 2379 Broad Street Brooksville, Florida 33512
FDEP	Florida Dept of Environmental Protection 3319 Maguire Boulevard, Suite 232 Orlando, Florida 32801	TCA	Tile Council of America, Inc. Box 326 Princeton, NJ 08540
FDOT	Florida Department of Transportation 550 S. 14th Street Leesburg, Florida 34748	UL	Underwriters' Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062
ICBO	International Conference of Building Officials 5360 S. Workman Mill Road Whittier, CA 90601		

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Proposed products list.
- D. Shop drawings.
- E. Product data.
- F. Manufacturers' instructions.
- G. Manufacturers' certificates.

1.2 RELATED SECTIONS

- A. Section 01400 - Quality Control.
- B. Section 01700 - Contract Closeout: Closeout Procedures, Project Record Documents, Warranties.

1.3 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Engineer accepted form.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- C. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- G. Provide space for Contractor and Engineer review stamps.
- H. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.4 PROPOSED PRODUCTS LIST

- A. Immediately after the Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product confirming those shown on the bid document.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 SHOP DRAWINGS

- A. Submit the number of opaque reproductions which Contractor requires, plus four (4) copies which will be retained by Engineer.
- B. After review, reproduce and distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 - Contract Closeout.

1.6 PRODUCT DATA

- A. Submit the number of copies which the Contractor requires, plus four (4) copies which will be retained by the Engineer.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01700 - Contract Closeout.

1.7 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, adjusting, finishing and cleaning and protecting in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents and promptly notify the Engineer.

1.8 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificate to Engineer for review, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01400 - QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance and control of installation.
- B. References.
- C. Field Samples
- D. Inspection and testing laboratory services.
- E. Manufacturer's field services and reports

1.2 RELATED SECTIONS

- A. Section 01090 - Reference Standards.
- B. Section 01300 - Submittals: Manufacturer's Instructions and Certificates.
- C. Section 01600 - Material and Equipment.

1.3 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.4 REFERENCES

- A. Conform to reference standard by date of issue current on date for receiving bids.
- B. Obtain copies of standards when required by Contract Documents.
- C. Should specified reference standards conflict with Contract Documents, request clarification by Engineer before proceeding.
- D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5 FIELD SAMPLES

- A. Install field samples at the site as required by individual specifications section for review.
- B. Acceptable samples represent a quality level for the work.
- C. Where a field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Engineer.

1.6 INSPECTION AND TESTING LABORATORY SERVICES

- A. Contractor will employ and pay for services of an independent firm to perform inspection and testing.
- B. The independent firm will perform inspections, tests, and other services specified in individual specification Sections and as required by the Engineer.
- C. Reports will be submitted by the independent firm to the Engineer and the Lake County Inspector, in triplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - 1. Notify Engineer and independent firm 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- E. Retesting required because of non-conformance to specified requirements shall be performed by they same independent firm on instructions by the Engineer. Payment for retesting will be charged to the Contractor by deducting inspection or testing charges from the Contract Sum/Price.

1.7 MANUFACTURER'S FIELD SERVICES AND REPORTS

- A. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer is subject to approval of Engineer.
- B. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.
- C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
- D. Submit report in duplicate within 15 days of observation to Engineer for review.

PART 2 - PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of contract and other Division 1 specification Sections apply to this Section.
- B. Section 01700 - Contract Closeout: Final Cleaning.

1.2 GENERAL REQUIREMENTS

- A. Specified provisions provided by contractor:
 - 1. Temporary sanitary facilities.
 - 2. Temporary barriers, barricades, and similar devices as necessary for safety and protection of construction personnel and public.
 - 3. Temporary tree and plant protection.
 - 4. Temporary fire protection, dust control, erosion and sediment control, and other necessary temporary controls.
 - 5. Temporary water.

PART 2 - PRODUCTS

2.1 MATERIALS

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

2.2 TEMPORARY WATER

- A. Provide, maintain, and pay for water service required for construction operations. Notify utility owner prior to withdrawal of water from City system. Cross-connection protection will be required as per FDEP regulations for tapping any existing watermain.
- B. Extend branch piping with outlets located so water is available by hoses with threaded connections.

2.3 CONSTRUCTION

- A. Provide scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, chutes, and other such devices and equipment necessary to facilitate execution and inspection of Work.
- B. Provide backhoes, cranes, hoists, rigging, or apparatus as necessary to facilitate execution of Work.

2.4 TEMPORARY BARRIERS AND CLOSURES

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

- B. Tree and Plant Protection (reference FAR 52.236-9):
 - 1. Preserve and protect existing trees and plants.
 - 2. Consult with Engineer; remove agreed-on roots and branches that interfere with construction.
 - 3. Protect areas within drip line from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
- C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

2.5 ACCESS ROADS AND APPROACHES

- A. Construct and maintain temporary roads and approaches to serve construction area.
- B. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
- C. Consult authority having jurisdiction in establishing public thoroughfares to be used for site access haul routes.
- D. Keep streets, drives, and walks adjacent to site and haul routes clean and free of dirt, debris, and litter caused by construction operations.
- E. Construct, maintain and obtain all permits required for all temporary access roads or improved areas required for construction, as required at sole discretion of the contractor.

2.6 TEMPORARY CONTROLS

- A. Temporary Fire Protection:
 - 1. Comply with local fire protection code and governing authorities.
- B. Dust Control:
 - 1. Execute Work by methods to minimize raising dust from construction operations.
 - 2. Provide positive means to prevent airborne dust from dispersing into atmosphere.
- C. Provide temporary erosion and sediment controls. All Work shall be in accordance with the latest edition of the State of Florida Standard Specification for Road and Bridge Construction for Soil Erosion and Sediment Control.
- D. Water Control:
 - 1. Grade site to drain. Maintain excavations free of water. Provide, operate and maintain pumping equipment.
 - 2. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

2.7 PROJECT OFFICES

- A. Offices and storage facilities for the contractors and subcontractors shall be optional on the site as necessary for the proper conduct of the Work. After consulting with the Engineer, these shall be located so that they cause no interference to any Work performed on the site.

- B. Removal of Temporary Offices and Storage Facilities: Upon completion of the project, or as directed by the Engineer, remove the temporary offices and storage facilities, and leave the premises in the condition required by the contract.

2.8 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures.
- B. At end of construction, return facilities to same or better condition than originally found.

2.9 FENCING

- A. Construction: Contractor's option.
- B. Contractor shall provide temporary fence in cases where an existing fence must be removed during construction. Contractor shall replace any permanent fence that was removed from site or damaged.

2.10 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where deemed necessary by contractor and where specified in individual specification Sections.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
- C. Provide security and facilities to protect Work, and existing facilities, and Owner's operations from damage or theft.
- D. Any damage to finished work prior to final acceptance will be the contractors responsibility and the work will be subject to removal and replacement at the contractors sole expense.

2.11 PARKING

- A. Provide temporary parking areas to accommodate construction personnel.
- B. When site space is not adequate, provide additional off-site parking.
- C. Do not allow vehicle parking on existing pavement.

2.12 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly conditions.

2.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified conditions.

- E. Remove construction debris from existing underground utilities encountered during construction prior to substantial completion inspection.

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01570 - TRAFFIC REGULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Construction Parking Control.
- B. Fire Hydrants.
- C. Detours.
- D. Flagmen.
- E. Flares and Lights.
- F. Haul Routes.
- G. Stockpile Material and Equipment.
- H. Traffic Signs and Signals.
- I. Removal.

1.2 RELATED SECTIONS

- A. Section 01010 - Summary of Work

1.3 MEASUREMENT AND PAYMENT

- A. Payment for this section is included in the total bid price.

1.4 REFERENCES

- A. FDOT Manual on Traffic Control and Safe Practices.
- B. FDOT Roadway and Traffic Design Standards, Index No. 600-699.
- C. FDOT Standard Specifications for Road & Bridge Construction, - Section 102 Maintenance of Traffic.

PART 2 - PRODUCTS

2.1 SIGNS, SIGNALS, AND DEVICES

- A. Where City and/or County standards do not apply, safety precautions shall be taken in accordance with Index No. 600, F.D.O.T. Roadway and Traffic Design Standards.
- B. Traffic Control Signals: As approved by local jurisdictions.
- C. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.
- D. Flagman Equipment: As approved by local jurisdictions.

PART 3 - EXECUTION

3.1 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations and residents access to homes.
- B. Monitor parking of construction personnel's vehicles. Maintain vehicular access to and through parking areas.
- C. Prevent parking on or adjacent to access roads or in non-designated areas.

3.2 FIRE HYDRANTS

- A. Shall be accessible at all times.
- B. No material or obstruction shall be placed within 10 feet of any such hydrant.
- C. Adjacent premises must be given access as far as practicable.
- D. Notify Utility and Police Department twenty-four (24) hours in advance of taking any fire hydrant out of service.

3.3 DETOURS

- A. No street or roadway shall be closed, except when and where directed by the Engineer.
- B. All temporary detour route(s) shall be clearly indicated throughout their entire length.
- C. All barricades and obstructions shall be illuminated at night. All lights shall be kept burning from sunset to sunrise.
- D. All barricades shall be well built and designed so as not to be blown over by the wind.

3.4 FLAGMEN

- A. Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.5 FLARES AND LIGHTS

- A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.6 HAUL ROUTES

- A. Consult with authority having jurisdiction in establishing public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

3.7 STOCKPILED MATERIAL AND EQUIPMENT

- A. Material stored along the street or roadway must be placed so as to cause as little obstruction to the public as possible.
- B. Obstruction of gutters and ditches will not be permitted.

3.8 TRAFFIC SIGNS AND SIGNALS

- A. This project shall be "signed" according to the State of Florida Department of Transportation "Manual on Traffic Control and Safety Practices".
- B. At approaches to site and on site, install at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
- C. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.
- D. Relocate as Work progresses, to maintain effective traffic control.

3.9 TEMPORARY STRIPING

- A. Provide temporary striping as directed by the Engineer.
- B. Remove temporary striping prior to placement of permanent thermoplastic or traffic striping.

3.10 REMOVAL

- A. Remove equipment and devices when no longer required.
- B. Repair damage caused by installation.

END OF SECTION

SECTION 01600 - MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Substitutions.

1.2 RELATED SECTIONS

- A. Information for Bidders: Product and materials suppliers.
- B. Section 01400 - Quality Control.

1.3 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. Provide interchangeable components of the same manufacturer, for similar components.

1.4 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.5 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated products, place on sloped supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection.
- D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

- E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

1.6 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

1.7 SUBSTITUTIONS

- A. Engineer will consider requests for Substitutions only within 15 days after date established in Notice to Proceed.
- B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that the Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty for the Substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 - 5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
 - 1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.
 - 3. The Engineer will notify Contractor, in writing, of decision to accept or reject request.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 01700 - CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Project record documents.
- D. Warranties.

1.2 RELATED SECTIONS

- A. Section 01740 – Warranties and Bonds.

1.3 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed. Work has been inspected, and that Work is complete in accordance with Contract Document and ready for Engineer's inspection.
- B. Provide submittals to Engineer that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, sum remaining due, and final release of lien.

1.4 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean site; sweep paved areas, rake clean landscaped surfaces.
- C. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
- B. Store Record Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.

- D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and Modifications.

- E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 2. Field changes of dimension and detail.
 - 3. Details not on original Contract Drawings.

- F. Delete Engineer title block from all documents.

- G. Submit documents to Engineer with claim for final Application for Payment.

1.6 WARRANTIES

- A. Provide duplicate notarized copies.

- B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.

- C. Provide Table of Contents and assemble in three D-side ring binder with durable plastic cloth cover.

- D. Submit prior to final Application for Payment.

- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

END OF SECTION

SECTION 01740 - WARRANTIES AND BONDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Form of submittal.
- B. Preparation of submittal.
- C. Time and schedule of submittals.

1.2 RELATED SECTIONS

- A. Document - Invitation to Bid - Instructions to Bidders: Bid Bonds.
- B. Document EJCDC No. 1910-8 - General Conditions: Performance Bond and Labor and Material Payment Bonds, Warranty, and Correction of Work.
- C. Section 01700 - Contract Closeout: Contract closeout procedures.
- D. Individual Specifications Sections: Warranties required for specific products or Work.

1.3 FORM OF SUBMITTALS

- A. Bind in commercial quality, 8-1/2 x 11 inch three-ring side binders with hardback, cleanable, plastic covers.
- B. Label cover of each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible principal.
- C. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification Section in which specified, and the name of the product or work item.
- D. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

1.4 PREPARATION OF SUBMITTALS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item or work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

1.5 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
- B. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
- C. For items of Work when acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

END OF SECTION

SECTION 02110 - SITE CLEARING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Remove surface debris.
- B. Remove paving and road bed materials.
- C. Clear site of plant life and grass.
- D. Remove trees and shrubs.
- E. Remove root system of trees and shrubs.
- F. Topsoil excavation.
- G. Remove existing stormwater pipe, including mitered end sections.
- H. Remove existing concrete and asphalt, etc. as required by the plans.

1.2 RELATED SECTIONS

- A. Section 00500 - Standard Form of Agreement Between Owner & Contractor - Articles - Progress Payments

1.3 LUMP SUM PRICE - MEASUREMENT AND PAYMENT

- A. Site Clearing:
 - 1. Basis of Measurement: Lump Sum.
 - 2. Basis of Payment: Includes clearing site, loading and removing waste materials from site. Removing other items as required by the plans.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable City and County codes for disposal of debris.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify that existing plant life designated to remain, is tagged or identified.

3.2 PROTECTION

- A. Locate, identify, and protect utilities that remain.
- B. Protect trees, plant growth, and features designated to remain. Cut lines for removal and match lines shall be square with longitudinal direction of road, sidewalk, etc.

- C. Protect bench marks and existing structures from damage or displacement.

3.3 CLEARING

- A. Clear areas required for access to site and execution of Work.
- B. Remove paving, and other designated items.
- C. Remove trees and shrubs as required to construct project; remove all underbrush. Notify engineer after initial clearing to identify all trees to remain. Remove stumps and main root ball.
- D. Clear undergrowth and deadwood, without disturbing subsoil.

3.4 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.

3.5 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Stockpile in area designated on site to depth not exceeding 8 feet. Protect from erosion. Remove excess topsoil not being reused, from site.

END OF SECTION

SECTION 02205 - SOIL MATERIALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Subsoil and topsoil materials.

1.2 RELATED SECTIONS

- A. Section 00500 - Standard Form of Agreement Between Owner & Contractor - Article 5 - Progress Payments -Article 5 - Final Payment
- B. Section 02222 - Excavating.
- C. Section 02223 - Backfilling.
- D. Section 02225 - Trenching.
- E. Section 02938 - Sodding.

1.3 REFERENCES

- A. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- B. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- C. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- D. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- E. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Materials Source: Submit name of imported materials suppliers. Provide materials from same source throughout the work. Change of source requires Engineer approval.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Subsoil Type S1: General Backfill.
- B. Topsoil Type S3: Select fill suitable for plant growth.
- C. Satisfactory Soil Materials: ASTM D2487 soil classification groups GW, GP, GM, SM, SW and SP.
- D. Unsatisfactory Soil Materials: ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

- E. Select Fill: Satisfactory soil material of clean sand and/or sand and gravel with a maximum 15 percent passing the U.S. Standard No. 200 sieve.
- F. General Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2 in. in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter.

2.2 SOURCE QUALITY CONTROL

- A. Testing will be performed under provisions of Section 01400.
- B. Tests and analysis of soil material will be performed in accordance with ANSI/ASTM D1557.
- C. If tests indicate materials do not meet specified requirements, change material and retest at no cost to Owner.

PART 3 - EXECUTION

3.1 STOCKPILING

- A. Stockpile materials on site at locations designated by Engineer.
- B. Stockpile in sufficient quantities to meet project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.2 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.
- B. If a borrow area is indicated, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 02211 - ROUGH AND FINISH GRADING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Removal of topsoil and subsoil.
- B. Cutting, grading, filling, and rough & finish contouring the site for roadways, stormwater retention areas, ditches, berms, and swales.

1.2 RELATED SECTIONS

- A. Section 1400 - Testing Laboratory Services: Testing Fill compaction
- B. Section 02110 - Site Clearing.
- C. Section 02222 - Excavating.
- D. Section 02223 - Backfilling.
- E. Section 02225 - Trenching: Trenching and backfilling for utilities.

1.3 LUMP SUM PRICE - MEASUREMENT AND PAYMENT

These items are included in Item 5, Grading

- A. Topsoil Fill:
 - 1. Basis of Measurement: Lump Sum (See Grading in Bid Schedule).
 - 2. Basis of Payment: Includes excavating existing soil, supplying soil materials, stockpiling, scarifying substrate surface, placing where required, and compacting.
- B. Subsoil Fill Type:
 - 1. Basis of Measurement: Lump Sum.
 - 2. Basis of Payment: Includes excavating existing subsoil, supplying subsoil materials, stockpiling, scarifying substrate surface, placing where required, and compacting.

1.4 REFERENCES

- A. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- B. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- C. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01300.
- B. Accurately record actual locations of utilities remaining, by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Article 3 of the General Conditions.
- B. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect utilities that remain, from damage.
- D. Protect above and below grade utilities that remain.
- E. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- F. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- G. Grades on subgrade & limerock shall be checked by grade hubs on each side of roadway with stringline from hub to hub. Grade hubs shall be set @ 50' stations minimum and shall be closer in curves and areas designated by engineer. Contractor shall furnish personnel to pull stringline.

3.3 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Stockpile in area designated on site to depth not exceeding 8 feet. Protect from erosion.
- C. Do not excavate wet subsoil.
- D. When excavating through roots, perform work by hand and cut roots with sharp axe.

3.4 FILLING

- A. Fill areas to contours and elevations with approved materials.
- B. Place fill materials on continuous layers and compact in accordance with Schedule at end of Section.
- C. Maintain optimum moisture content of fill materials to attain required compaction density.
- D. Make grade changes gradual. Blend slope into level areas.
- E. All excess cut material shall be placed on college property adjacent to the project at a location specified by the college. Stock pile shall not exceed 10' in vertical height.

3.5 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 1/10 foot.

3.6 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01400.
- B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.7 SCHEDULES

- A. Subsoil Fill:
 - 1. Fill Type S1: Maximum 12 inches compacted depth.
 - 2. Compact to minimum 95 percent of maximum density.
- B. Topsoil Fill (Beneath Slab):
 - 1. Fill Type S3: Maximum 12 inches compacted depth.
 - 2. Compact to minimum 98 percent of maximum density.

END OF SECTION

SECTION 02222 - EXCAVATING

PART 1- GENERAL

1.1 SECTION INCLUDES

- A. Excavating for paving, landscaping.
- B. Excavating for utilities.

1.2 RELATED SECTIONS

- A. Section 01400 - Quality Control
- B. Section 02223 - Backfilling.
- C. Section 02225 - Trenching.

1.3 LUMP SUM PRICE - MEASUREMENT AND PAYMENT

These items are included in Item 5, "Grading".

- A. Excavation of Subsoil Materials:
 - 1. Basis of Measurement: Lump Sum (See Grading in Bid Schedule).
 - 2. Basis of Payment: Includes general excavation to required elevations, loading and placing materials in stockpile to be included in other prices.
 - 3. Over Excavation: Payment will not be made for over excavated work nor for replacement materials.

1.4 FIELD MEASUREMENTS

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

1.5 DEFINITIONS

- A. Utility: Any buried pipe, conduit, or cable.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.2 EXCAVATION

- A. Underpin adjacent structures which may be damaged by excavation work.
- B. Machine slope banks to angle of repose or less, until shored.

- C. Do not interfere with 45 degree bearing splay of foundation.
- D. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- E. Hand trim excavation. Remove loose matter.
- F. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.
- G. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- H. Correct areas over-excavated in accordance with section 02223.
- I. Stockpile excavated material in area designated on site.

3.3 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01400.
- B. Provide for visual inspection of bearing surfaces.

3.4 PROTECTION

- A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.
- B. Adhear to F.S. 553 Trench Safety Act Requirements.
- C. Protect all shrubs, plants, fences, mail boxes, signs, driveways and other items within the work area. Contractor shall replace "in kind" items which have to be destroyed.

3.5 NOTICE AND MARKING REQUIREMENTS

- A. No excavator shall commence or perform any excavation in any public or private street, alley, right-of-way dedicated to the public use, or gas utility easement without first obtaining information concerning the possible location of gas pipelines in the area of the proposed excavation from any person having the right to bury gas pipelines within the public or private street, alley, right-of-way, or gas utility easement, such information may be requested by telephone, letter, telegraph, or messenger or in person, at the prework conference for the job requiring the proposed excavation, or by calling a utility notification center operating in the area.
- B. The excavator shall notify the utility owner in the manner prescribed in Section 01039 so that the utility owner receives notification at least 48 hours, excluding Saturdays, Sundays and legal holidays, prior to starting excavation.

END OF SECTION

SECTION 02223 - BACKFILLING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Site structure backfilling to subgrade elevations.
- B. Site filling and backfilling.
- C. Consolidation and compaction as scheduled.
- D. Fill for over-excavation.

1.2 RELATED SECTIONS

- A. Section 01400 - Testing Laboratory Services: Compaction testing.
- B. Section 02222 - Excavating.
- C. Section 02225 - Trenching.

1.3 LUMP SUM PRICE - MEASUREMENT AND PAYMENT

- A. Fill Type S1:
 - 1. Basis of Measurement: Lump Sum (See Grading in Bid Schedule).
 - 2. Basis of Payment: Includes supplying fill materials, stockpiling, scarifying substrate surface, placing where required, and compacting to be included in other prices to be included in line items.

1.4 REFERENCES

- A. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- B. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- C. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- D. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- E. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify subdrainage, dampproofing or waterproofing installation has been inspected.

3.2 PREPARATION

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with Type S1 fill and compact to density equal to or greater than requirements for subsequent fill material.
- C. Scarify and proof roll subgrade surface to a depth of 12 inch to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 BACKFILLING

- A. Backfill areas to contours and elevations with clean fill in accordance with Fill Type S-1.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.
- C. Soil Fill Type S1: Place and compact material in continuous layers not exceeding 12 inches compacted depth. Compaction densities shall be 95% of modified proctor maximum dried density.
- D. Employ a placement method that does not disturb or damage other work.
- E. Maintain optimum moisture content of backfill materials to attain required compaction density.
- F. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise.
- G. Make gradual grade changes. Blend slope into level areas.
- H. Leave fill material stockpile areas free of excess fill materials.
- I. Remove all limerock from areas to be backfilled.

3.4 TOLERANCES

- A. Top Surface of Backfilling Under Paved Areas: Plus or minus 0.08 feet from required elevations.
- B. Top Surface of General Backfilling: Plus or minus 0.08 feet from required elevations.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01400.
- B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.6 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of the General Conditions.
- B. Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 02235 - CONCRETE GUTTER, CURB ELEMENTS AND SIDEWALKS

PART 1- GENERAL

1.1 Section Includes

- A. Cast in Place concrete for gutters, curbs and sidewalks.
- B. Form Work
- C. Control, expansion and contraction joints associated with concrete work.

1.2 Related Sections:

- A. Section 02230 - Subbase Preparation
- B. Section 02231 - Limerock Base
- C. Section 02510 - Asphaltic Concrete
- D. Section 03000 – Concrete (Sitework)
- E. Section 03100 – Concrete Formwork
- F. Section 03200 – Concrete Reinforcement.

1.3 Measurement and Payment

- A. Curb and gutter, sidewalk
 - 1. Basis of Measurement: By the linear foot or square yard as per bid schedule unit.
 - 2. Basis of Payment: Includes concrete, placement (by forms or machine) and finishing.

1.4 References

- A. Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

1.5 Submittals

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide design mix of concrete.

1.6 Project Record Documents

- A. Submit under provisions of Section 01700.

1.7 Quality Assurance

- A. Perform work in accordance with FDOT Standard Specifications of Road and Bridge Construction.
- B. Maintain one copy of each document on site.

- C. Acquire concrete from same source throughout project.

1.8 Field Samples

- A. Provide under provisions of Section 01400.

1.9 Coordinate work under provisions of Section 01039.

PART 2 - PRODUCTS

2.1 Materials:

- A. Concrete: All work under this Section shall be of Class I Concrete.
- B. Reinforcement: Any steel reinforcement required by the plans shall conform to the requirements of Section 03200.
- C. Joint Materials: Joint materials for the various items shall be in accordance with FDOT Specifications.
- D. Batch Time: Wet batches of concrete may be transported in either agitating or nonagitating trucks. Bodies of nonagitating trucks shall be smooth, motor-tight metal containers with round internal corners and shall be capable of discharging the concrete at a satisfactory controlled rate without segregation. Covers shall be provided when needed for protection.

When nonagitating trucks are used the elapsed time between the addition of water to the mix and depositing the concrete in place shall not exceed 45 minutes except that when a retardant admixture is used such elapsed time shall not exceed 75 minutes. When the hauling is done in truck agitators such elapsed time shall not exceed 90 minutes.

2.2 FORMS

- A. Form Materials: Forms for this work shall be made of either wood or metal. They shall be straight, free from warp or bends, and of sufficient strength, when staked, to resist the pressure of the concrete without deviation from line and grade. For all items constructed on a radius, the Contractor will be required to use flexible forms, unless otherwise permitted by the Engineer.
- B. Depth of Forms: Forms shall have a depth equal to the plan dimensions for the depth of concrete being deposited against them.
- C. Machine Placement: Placing of these items by machine methods may be allowed with the approval of the Engineer provided that an acceptable finished product, true to line, grade, and cross section, is consistently produced.

2.3 EXCAVATION

- A. Excavation shall be to the required depth, and the foundation material upon which these items are to be placed shall be compacted as specified in Section 2230.

2.4 PLACING CONCRETE

- A. The concrete shall be placed in the forms and tamped and spaded to prevent honeycomb and until the top of the structure can be floated smooth and the edges rounded to the radius shown on the plans.

2.5 JOINTS

- A. Contraction Joints: Except for machine place items, at the option of the Contractor, joints may be formed by the use of dummy joints (either formed or sawed) or by the use of sheet metal templets. If sheet metal templets are used they shall be of the dimensions, and shall be set to the lines, shown on the plans. The templets shall be held firmly during the placing of the concrete and shall be left in place until the concrete has set sufficiently to hold its shape but shall be removed while the forms are still in place. The concrete then shall be struck with a joint tool to provide a contraction joint at the point the templet was used. If templets are not used, contraction joints shall be sawed a maximum of 12 hours after the placing of concrete.

For machine placed items, unless an alternate method is approved by the Engineer, contraction joints shall be sawed. The joints shall be sawed as soon as the concrete has hardened to the degree that excessive raveling will not occur and before uncontrolled shrinkage cracking begins, but shall not exceed 12 hours. Any concrete that has cracked in locations other than saw, contraction, or construction joints will be removed and replaced at the contractors expense.

Contraction joints shall be spaced at intervals of 5 feet except where a lesser interval is required for closure, but no section shall be less than 4 feet in length.

- B. Expansion Joints: Expansion joints shall be constructed at all inlets, at all radius points, and at other locations indicated on the plans. They shall be located at intervals of 500 feet between other expansion joints or ends of a run. The joint shall be 1/2 inch in width.

2.6 FINISHING

- A. Repair of Minor Defects: The forms shall be removed within 24 hours after the concrete has been placed, and minor defects then filled with mortar composed of 1 part portland cement and 2 parts fine aggregate. Plastering will not be permitted on the face of the curb, and any rejected curb, curb and gutter, or valley gutter shall be removed and replaced without additional compensation.
- B. Final Finish: All exposed surfaces shall be given a finish while the concrete is still green and shall have a consistent shape and finish throughout the project. In general, only a brush finish will be required. For any surface areas, however, which are too rough or where other surface defects make additional finishing necessary, the Engineer may require that the curb be rubbed to a smooth surface with a soft brick or wood block, with water used liberally. Also, if necessary further to provide a suitable surface, the Engineer may require additional rubbing, using a thin grout or mortar, or the replacement of poorly finished curbing at the Contractor's expense.
- C. Shape and Dimensions: Curb and gutter shall be checked for uniform shape and dimension by the use of a template made to FDOT Specifications.

2.7 CURING

- A. General: The concrete shall be continuously cured for a period of at least 72 hours. Curing shall be commenced after finishing has been completed and as soon as the concrete has hardened sufficiently to permit application of the curing material without marring the surface. Any curing material removed or damaged during the 72 hour period shall be replaced immediately.

After forms are removed, the surfaces exposed shall be cured by placing a berm of moist earth against them or by any use of the methods described below, for the remainder of the 72 hour curing period.

- B. **Wet Burlap Method:** Burlap shall be placed over the entire exposed surface of the concrete, with sufficient extension beyond each side to insure complete coverage. Adjacent strips shall be overlapped a minimum of 6 inches. The burlap shall be held securely in place such that it will be in continuous contact with the concrete at all times and no earth shall be permitted between the burlap surfaces at laps or between the burlap and the concrete. The burlap shall be saturated with water before being placed and shall be kept thoroughly wet throughout the curing period.
- C. **Membrane Curing Compound Method:** Clear membrane curing compound or white-pigmented curing compound shall be applied by a hand sprayer in a single coat continuous film at a uniform coverage of at least 1 gallon to each 200 square feet. Any cracks, checks, or other defects appearing in the coating shall be recoated immediately. The curing compound shall be thoroughly agitated in the drum prior to application, and during application as necessary to prevent settlement of the pigment.
- D. **Polyethylene Sheeting Method:** Polyethylene Sheeting shall be placed over the entire exposed surface of the concrete, with sufficient extension beyond each side to insure complete coverage. Adjacent strips shall be overlapped a minimum of 6 inches. The sheeting shall be held securely in place such that it will be in continuous contact with the concrete at all times.
- E. **Backfilling and Compaction:** After the concrete has set sufficiently, but not later than 3 days after pouring, the spaces in front and back of the curb shall be refilled to the required elevation, with suitable material, which shall be placed and thoroughly compacted in layers not thicker than 6 inches.
- F. **Surface Requirements:** The gutter section of curb and gutter shall be tested with a 10 foot straightedge laid parallel to the center line of the roadway, and while the concrete is still plastic. Straight-edging shall be done along the edge of the gutter adjacent to the pavement or along other lines on the gutter cross section, as directed by the Engineer. Irregularities in excess of 1/4 inch shall be immediately corrected.
- G. **Method of Measurement:** The quantities to be paid for under this Section shall be the plan quantity in feet of Concrete Curb, Concrete Curb and Gutter, Concrete Traffic Separator, Special Concrete Gutter, Concrete Valley Gutter, and Concrete Shoulder Gutter. Any additions or deletions thereto, as authorized by the Engineer, shall be determined by final measurement as measured along the face of the completed and accepted curb.

2.8 FINAL DRESSING

- A. **General:** As a final grading operation, the surface of the earthwork shall be shaped to conform to the lines, grades, and cross-sections shown in the plans or as directed. For cuts or fills, where plant growth will be established, no final machining will be permitted. Slopes shall be left in a roughened condition conforming to lines, grades, and cross-sections shown in the plans or as directed. Hand dressing will not be required except as necessary in confined areas where equipment operation is restricted.

Unless otherwise indicated, lateral ditches shall be dressed to the grade and cross-section shown in the plans, for a distance of 300 feet from the center line of the road, measured at right angles to the center line. In Sections of lateral ditches beyond this 300 feet distance, no dressing of the lateral ditches will be required provided all the material is removed within the lines and grades shown in the plans. The Contractor shall maintain and keep open and free from leaves, sticks, and other debris, all ditches dug by him, until final acceptance of the work.

No dressing of channels will be required provided that all material within the lines, grades, and cross-sections shown in the plans is removed.

- B. Construction Tolerances: In final shaping of the surface of earthwork, a tolerance of 0.1 feet above or below the plan cross-section will be allowed with the following exceptions:
1. The surface of shoulders shall be shaped to within 0.1 foot of the plan cross-section.
 2. Earthwork shall be shaped to match adjacent pavement, curb, sidewalk, structures, etc.
 3. Ditch bottoms shall be shaped so that no water will be impounded.
 4. When the work does not include construction of base or pavement, the entire roadbed (shoulder point to shoulder point) shall be shaped to within 0.1 foot above or below the plan cross-section.

The shoulder lines shall not vary horizontally more than 0.3 foot from the true lines shown in the plans.

- C. Operations Adjacent to Pavement: Extreme care shall be exercised when dressing areas adjacent to pavement areas, to avoid damage to such pavement. Final dressing and grassing of shoulder areas shall be completed prior to the placing of the friction course, if required. No manipulation of embankment material on a pavement surface will be permitted.

When shoulder dressing is underway, adjacent to a pavement lane being utilized to maintain traffic, extreme care shall be exercised to avoid interference with the safe movement of traffic. The contractor shall supply, install, and maintain as necessary, traffic control signs and/or flagmen for the safety of workers and traffic. All traffic safety shall apply as noted in Division 1 of these specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with FDOT Specifications.
- B. Notify Engineer minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

- D. Install construction joint devices in coordination with drawings. Set top to required elevations. Secure to resist movement by wet concrete.
- E. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- F. Place concrete continuously between predetermined expansion, control, and construction joints.
- G. Do not interrupt successive placement; do not permit cold joints to occur.
- H. Saw cut joints within 12 hours after placing. Use 3/16 inch thick blade, cut into 1/3 depth of slab thickness.

3.4 TOLERANCES

- A. New concrete shall match existing line and grade.
- B. Width of concrete shall be within 1/2" of specified width.
- C. Top surface of new concrete shall be within 0.02 ft from required elevations.

3.5 CONCRETE FINISHING

- A. Steel trowel to level then broom finish surfaces which are scheduled to be exposed.

3.6 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Protect concrete from vandalism, markings, and destruction. Any damaged concrete will be removed and replaced at the contractor's expense.

3.7 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed in accordance with FDOT Specifications and under provisions of Section 01400.
- B. Provide free access to Work and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to Engineer and testing firm two weeks prior to placement for review.
- D. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
- E. Four concrete test cylinders will be taken for every 50 or less cu yds of each class of concrete placed.
- F. One slump test will be taken for each set of test cylinders taken.

3.8 PATCHING

- A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

3.9 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

3.10 SCHEDULE - CONCRETE TYPES AND FINISHES

- A. 3,000 psi 28 day concrete.

END OF SECTION

SECTION 02512 - THERMOPLASTIC STRIPES & MARKINGS

PART 1- GENERAL

1.1 SECTION INCLUDES

- A. ReflectORIZED traffic stripings and markings.

1.2 MEASUREMENT & PAYMENT

- A. Stripings & markings applied:
 - 1. Basis of Measurement: L.F. or each
 - 2. Basis of Payment: Includes preparing surface, materials and application of materials.

1.3 REFERENCES

- A. Florida Department of Transportation, Standard Specifications for Road and Bridge Construction 2007.

1.4 PERFORMANCE REQUIREMENTS

- A. Application meeting the requirements of FDOT Section 710-4, "Application", and Section 710-5, "Tolerances in Dimensions and in Alignment".
- B. Temperature in accordance with FDOT Section 711-4.1.
- C. Thickness in accordance with FDOT Section 711-4.3
- D. Application of spheres in accordance with FDOT section 711-4.4.
- E. Protection of work in accordance with FDOT Section 711-6.

1.5 QUALITY ASSURANCE

- A. Perform and work in accordance with FDOT "Standard Specifications for Road & Bridge Construction".
- B. Obtain materials from same source throughout.

1.6 REGULATORY REQUIREMENTS

- A. Conform to FDOT safety and traffic control codes for work on public property.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Thermoplastic compound in accordance with FDOT Section 711-2.1
- B. Glass spheres in accordance with FDOT Section 711-2.2.
- C. Properties of finished work in accordance with FDOT Section 710.5.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify surface conditions under provisions of section 01039.
- B. Verify pavement is complete, cured and ready for application.
- C. Install in accordance with Section 711-4 "Application".

3.2 FIELD QUALITY CONTROL

- A. Field inspection in accordance with Section 01400.

3.3 PROTECTION

- A. Protect finished product in accordance with FDOT Section 711-6.

END OF SECTION

SECTION 02513 - TRAFFIC STRIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Traffic Striping (temporary)

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Traffic Striping Installed
 - 1. Basis of Measurement: L.S.
 - 2. Basis of Payment: Includes layout, paint, and installation.
- B. Traffic Striping Information Signs:
 - 1. Basis of Measurement: Unit
 - 2. Basis of Payment: Includes layout, paint and installation.

1.3 REFERENCES

- A. Florida Department of Transportation "Standard Specifications for Road and Bridge Construction 2007".
- B. Florida Department of Transportation, "Roadway and Traffic Design Standards 2006".
- C. Lake County Roadway Standards.

1.4 PERFORMANCE REQUIREMENTS

- A. When the work under this section has been completed to the satisfaction of the Engineer and Lake County, including any corrections, preliminary acceptance of the painting will be made, independent of other work under the contract, and the Contractor will be relieved of all maintenance of the painting.

1.5 QUALITY ASSURANCE

- A. Perform all work in accordance with FDOT "Standard Specifications for Road and Bridge Construction", Section 710-5.

1.6 REGULATORY REQUIREMENTS

- A. Conform to all FDOT safety and traffic control codes for work within public rights-of-way.

PART 2 - PRODUCTS

- A. The materials used shall conform to the requirements of Section 971-12 "Two Reactive Component Materials for Traffic Stripes and Markings", and Section 971-13 "Fast Dry Solvent Traffic Paint", FDOT Specifications.
- B. The equipment used shall conform to the requirements of Section 710-3 "Equipment", FDOT Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify final paving has been completed under provisions of Section 01039.

3.2 INSTALLATION

- A. ALIGNMENT FOR STRIPES - Tack points shall be established by the Contractor, at appropriate intervals, for use in aligning stripes, and, if found to be necessary to achieve accuracy, a string line shall be set from such points.
- B. TOLERANCES IN DIMENSIONS AND IN ALIGNMENT - Tolerances will be allowed as set forth in Section 710-5 "Tolerances in Dimensions and in Alignment", FDOT Specifications. No tolerances greater than those set forth in Section 710-5 will be accepted.
- C. APPLICATION OF PAINT - Application of paint shall conform to the requirements of Section 711-4.4 "Glass Spheres", FDOT Specifications.
- D. PROTECTION OF NEWLY PAINTED STRIPES AND OF TRAFFIC - This section shall conform to the requirements of Section 710-7 "Protection of Newly Painted Stripes", FDOT Specifications.
- E. CORRECTIVE MEASURES - Any deviations from the plans and specifications which fail to meet minimum permissible tolerances and appearance requirements, or are marred or damaged by traffic or other causes shall be corrected at the Contractor's expense as required by Section 710-4.2 "Corrections for Deficiencies to Applied Traffic Stripes and Markings", FDOT Specifications.

3.3 FIELD QUALITY CONTROL

- A. Field inspections will be performed under the provisions of Section 01400.

END OF SECTION

SECTION 02609 - PIPE CULVERTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Concrete pipe culvert, joints and accessories.
- B. Bedding and slope protection at pipe end.

1.2 RELATED SECTIONS

- A. Section 02225 - Trenching.
- B. Section 02223 - Backfilling: Backfilling over piping granular pipe covering up to subgrade elevation underside of fill under paving slab.
- C. Section 02230 - Limerock Stabilized Subgrade.

1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Pipe Culvert:
 - 1. Basis of Measurement: By the total linear foot invert length of pipe.
 - 2. Basis of Payment: Includes excavating, hand trimming excavating, removing soft subsoil, bedding fill, compacting; pipe, fittings and accessories assembled.

1.4 REFERENCES

- A. ANSI/ASTM C14 - Concrete Sewer, Storm Drain, and Culvert Pipe.
- B. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- C. ANSI/ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- D. AASHO M294 - Corrugated polyethylene pipe.
- E. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- F. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- G. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.
- H. FDOT Standards Section 430 - Pipe Culverts and storm sewers.
- I. FDOT Standards - Section 941 - Concrete Pipe.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide data on pipe, fittings and accessories.

- C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01700.
- B. Accurately record actual locations of pipe runs, connections and invert elevations.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable code for materials and installation of work of this section.

1.8 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.9 COORDINATION

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate the work with adjacent earth work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS - CULVERT PIPE

- A. Joelson Concrete Pipe Company, Inc.
- B. Southern Culvert.
- C. Substitutions: Under provisions of Section 01600.

2.2 CULVERT PIPE

- A. Reinforced Concrete Pipe: ANSI/ASTM C76, Class III meeting the requirements of Section 941 FDOT Standards:
 - 1. Shape: Circular and elliptical with a nominal dimensions as indicated on plans.
- B. Reinforced Concrete Pipe Gaskets: Section 942, Pipe Gaskets, FDOT Standards.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

3.2 PREPARATION

- A. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

3.3 BEDDING

- A. Excavate culvert trench to accommodate bell and pipe wall thickness in accordance with Section 02225 for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Backfill around sides and to top of pipe with fill, tamped in place and compacted to 95 percent of modified proctor value.
- C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

- A. Install pipe and accessories in accordance with manufacturer's instructions
- B. Lift or roll pipe into position. Do not drop or drag pipe over prepared bedding.
- C. Shore pipe to required position; retain in place until after compaction of adjacent fills. Ensure pipe remains in correct position and to required slope.
- D. Lay pipe to slope gradients noted on drawings.
- E. Refer to Section 02225 for trenching requirements. Do not displace or damage pipe when compacting.

3.5 ERECTION TOLERANCES

- A. Maximum Variation From Intended Elevation of Culvert Invert: 1/4 inch.
- B. Maximum Offset of Pipe From True Alignment: 1 inch.
- C. Maximum Variation in Profile of Structure From Intended Position: 1 percent.

3.6 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01400.
- B. Request inspection prior to and immediately after placing cover over pipe.
- C. Compaction testing will be performed in accordance with ANSI/ASTM D1557.
- D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.7 PROTECTION

- A. Protect finished Work under provisions of Section 01500.
- B. Protect pipe from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 02936 - SEEDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Placing topsoil.
- C. Seeding, mulching and fertilizer.
- D. Maintenance.

1.2 RELATED SECTIONS

- A. Section 02223 - Backfilling: Rough grading of site.
- B. Section 02225 - Trenching: Rough grading over cut.
- C. Section 02938 - Sodding.

1.3 MEASUREMENT AND PAYMENT

- A. Grassed Areas:
 - 1. Basis of Measurement: Square Yard.
 - 2. Basis of Payment: Includes preparation of subsoil topsoil, placing topsoil, seeding, watering and maintenance to specified time limit.

1.4 SUBMITTALS

- A. Submit to engineer in accordance with Section 01300 Submittals: Fertilizer and Seed Mixture.

1.5 REFERENCES

- A. FS O-F-241 - Fertilizers, Mixed, Commercial.

1.6 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.7 MAINTENANCE DATA

- A. Submit under provisions of Section 01700.
- B. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height, types, application frequency, and recommended coverage of fertilizer.

1.8 QUALITY ASSURANCE

- A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

1.9 REGULATORY REQUIREMENTS

- A. Comply with FDOT Standard Specifications for Road & Bridge Construction, 1991 for fertilizer and herbicide composition.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
- B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.11 COORDINATION

- A. Coordinate work under provisions of the General Conditions.

1.12 MAINTENANCE SERVICE

- A. Furnish maintenance of seeded areas for three months from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SEED MIXTURE

- A. As per FDOT Standard Specifications for Road & Bridge Construction, 1991, Section 981.

2.2 SOIL MATERIALS

- A. Topsoil: Excavated from site and free of weeds.

2.3 FERTILIZER

- A. Fertilizer: In accordance with FDOT Standard Specifications for Road & Bridge Construction, 1991-Section 982.

2.4 ACCESSORIES

- A. Mulching Material: In accordance with FDOT Standard Specifications for Road & Bridge Construction, 1991, Section 981-3.
- B. Water: Clean, fresh, and free of substances or matter which could inhibit vigorous growth of grass in accordance with FDOT Standard Specifications for Road & Bridge Construction, 1991-Section 983.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that prepared soil base is ready to receive the work of this Section.

3.2 PREPARATION OF SUBSOIL

- A. All disturbed areas and spoil areas shall be treated under this section.
- B. Prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- C. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.
- D. Scarify subsoil to a depth of 3 inches where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

3.3 PLACING TOPSOIL

- A. Spread topsoil to a minimum depth of 4 inches over area to be seeded. Rake until smooth.
- B. Place topsoil during dry weather and on dry unfrozen subgrade.
- C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

3.4 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to roller compaction.
- C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.
- D. Mix thoroughly into upper 2 inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.5 SEEDING

- A. Apply seed in accordance with FDOT Standard Specifications for Road & Bridge Construction, 1991-Section 570.
- B. Do not seed areas in excess of that which can be mulched on same day.
- C. Seed and mulch all disturbed areas not to accept sod.

3.6 MAINTENANCE

- A. Mow grass at regular intervals.
- B. Neatly trim edges where necessary.
- C. Remove clippings after mowing and trimming.
- D. Water as necessary to prevent grass and soil from drying out.

- E. Roll surface to remove minor depressions or irregularities.
- F. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- G. Reseed areas which show bare spots.
- H. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

SECTION 02938 - SODDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Placing topsoil.
- C. Fertilizing.
- D. Sod installation.
- E. Maintenance.

1.2 RELATED SECTIONS

- A. Section 02225 - Trenching: Rough grading over cut.

1.3 REFERENCES

- A. ASPA (American Sod Producers Association) - Guideline Specifications to Sodding.
- B. FS O-F-241 - Fertilizers, Mixed, Commercial.

1.4 SUBMITTALS

- A. Submit to engineer in accordance with Section 01300, sod suppliers, sod grower, certification and type of sod.

1.5 QUALITY ASSURANCE

- A. Sod: Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.
- B. Submit sod certification for grass species and location of sod source.

1.6 QUALIFICATIONS

- A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of Florida.
- B. Installer: Company approved by the sod producer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
- B. Deliver sod on pallets. Protect exposed roots from dehydration.
- C. Do not deliver more sod than can be laid within 24 hours.

1.8 MAINTENANCE SERVICE

- A. Furnish service and maintenance of sodded areas for three months from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE SOD GROWERS

- A. Submit under provisions of Section 01600.

2.2 MATERIALS

- A. Sod: ASPA, Certified Field grown grade; cultivated grass sod; type Argentine Bahia; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq. ft.
- B. Topsoil: Excavated from site and free of weeds.
- C. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.

2.3 HARVESTING SOD

- A. Machine cut sod and load on pallets in accordance with ASPA Guidelines.
- B. Cut sod in area not exceeding 1 sq yd, with minimum 1/2 inch and maximum 1 inch topsoil base.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that prepared soil base is ready to receive the work of this section.

3.2 PREPARATION OF SOIL

- A. Prepare soil and eliminate uneven areas and low spots.
- B. Maintain lines, levels, profiles, and contours. Make changes in grade gradual. Blend slopes into level areas.
- C. Remove foreign materials, and undesirable plants and their roots. Do not bury foreign material beneath areas to be sodded.
- D. Remove contaminated soil.
- E. Scarify subsoil to a depth of 4 inches where topsoil is to be placed.
- F. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

3.3 PLACING TOPSOIL

- A. Spread topsoil to a minimum depth of 2 inches over area to be sodded.
- B. Place topsoil during dry weather.

- C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.
- E. Install edging at periphery of sodded areas in straight lines to consistent depth.
- F. After final grading and prior to fertilizing, apply rye/fescue seed on all areas with slopes 4:1 or steeper.

3.4 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to installation of sod.
- C. Apply fertilizer no more than 48 hours before laying sod.
- D. Mix thoroughly into upper 2 inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.5 LAYING SOD

- A. Sod all areas disturbed during construction and all areas that were originally sodded such as lawns. Sod in lawns to match existing. This includes the area from the edge of pavement to the limits of construction.
- B. Moisten prepared surface immediately prior to laying sod.
- C. Lay sod immediately after delivery to site within 24 hours after harvesting.
- D. Lay sod tight with no open joints visible, and no overlapping; stagger end joints 6 inches minimum. Do not stretch or overlap sod pieces.
- E. Lay smooth. Align with adjoining grass areas.
- F. Place top elevation of sod 1/2 inch below adjoining edging, paving, curbs, or sidewalks.
- G. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.

3.6 MAINTENANCE

- A. Mow grass as necessary.
- B. Neatly trim edges where necessary.
- C. Immediately remove clippings after mowing and trimming.
- D. Water as necessary to prevent grass and soil from drying out until final acceptance.
- E. Roll surface to remove minor irregularities.
- F. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- G. Replace sod in areas which show deterioration or bare spots.

- H. Protect sodded areas with warning signs during maintenance period.

END OF SECTION

SECTION 03000 - CONCRETE (SITEWORK)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specifications apply to this section.

1.2 SUMMARY

- A. The work included under this section consists of furnishing all materials, forms, transportation and equipment, and perform all necessary labor to do all the plain and reinforced concrete work shown on the Drawings, or incidental to the proper execution of the work, or as herein specified.
- B. Related Sections: The following sections contain requirements that relate to this section.
 - 1. Section 01300: Submittals
 - 2. Section 01400: Quality Control
 - 3. Section 02609: Pipe Culverts
 - 4. Section 03200: Concrete Reinforcement

1.3 SUBMITTALS

- A. Submit to the Engineer in accordance with Section 01300 the following items:
 - 1. Concrete design mix for Class A and Class B concrete
 - 2. Reinforcing details with bar list
 - 3. Product data on cement and all concrete additives
 - 4. Product data on curing compounds

PART 2 - PRODUCTS

2.1 GENERAL

- A. Composition: Concrete shall be composed of cement, fine aggregate, coarse aggregate, and water, so proportioned and mixed as to produce a plastic workable mixture in accordance with all requirements under this section suitable to the specific conditions of placement.

2.2 MATERIALS

- A. Cement:
 - 1. Cement: Cement for all concrete shall be domestic Portland cement that conforms to the requirements of ASTM Designation C 150, Type I, Type II or Type III. Type III cement for high early strength concrete shall be used only for special locations and only with the approval of the Engineer. Type II cement shall be used in the construction of sanitary sewer manholes, wet wells, and communitor pits.
 - 2. Only one brand of cement shall be used in any individual structure unless approved by the Engineer. Cement which has become damaged, partially set, lumpy or caked shall not be used and the entire contents of the sack or container which contains such cement will be rejected. No salvaged or reclaimed cement shall be used.

- B. Fine Aggregate: Fine aggregate shall conform to the requirements of Section 902 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction and supplements thereto.
- C. Coarse Aggregate. Coarse aggregate shall conform to the requirements of Section 901 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, and supplements thereto, except that slabs shall not be used and the gradation shall be size 5 or size 9 as approved by the Engineer.
- D. Water: Water shall be taken from a potable water supply and shall be fresh, clean and free from injurious amounts of oil, acid, alkali or organic matter.
- E. Admixtures: No admixtures shall be used except by specific approval of the Engineer.
- F. Membrane Curing Compound: Should conform to Sections 03370.
- G. Separation Board: Separation board shall be closed cell, nonextruding, PVC foam Grade #327 with a 20 psi maximum compressive strength to compress to 75 percent of thickness.
- H. Membrane: Membrane shall be a 6 mil polyethylene film.
- I. Reinforcing Steel:
 - 1. Reinforcing steel shall conform to the requirements of ASTM Designation A615, Deformed Grade 60, except where otherwise indicated.
 - a) The name of the manufacturer of the reinforcing steel shall be called out in the shop drawings together with a sketch showing the pattern of the deformation, including the mill mark.
 - b) Bar reinforcement shall be accurately fabricated in accordance with the latest CRSI Manual of Standard Practice. The Contractor shall have prepared and shall submit to the Engineer in accordance with Section 01300, the necessary shop drawings and bar lists. The Contractor shall be responsible for errors made in shop drawings even though approved by the Engineer.
 - 2. Welded wire fabric for concrete reinforcement shall conform to the requirements of ASTM Designation A 185 and shall be formed with smooth cold drawn wire.
 - 3. Cold drawn wire for spirals shall be plain and shall conform to the requirements of ASTM Designation A 82 with a minimum yield strength of 70,000 psi.
 - 4. Bar Supports:
 - a) Bar supports for reinforcing steel shall conform to the requirements of CRSI Manual of Standard Practice, Chapter 3 and shall be of a height to furnish the concrete cover called for on Drawings. High chairs shall be furnished for bent or top bars in solid slabs. Bar supports to be in contact with exterior surfaces of concrete shall be Class C with plastic caps at least 1-inch in length on the leg tips, or Class E with stainless steel legs. Bar supports shall be spaced not more than 100 times the diameter of the bars to be supported, with not more than 1/4 spacing from the end of the supported bars to the first chair.

- b) Bar supports for slabs on grade shall be chairs or plain concrete blocks, 3-inches high by 4-inches square with tie wires embedded in support. Concrete strength shall be at 3,000 psi at time of use.

- J. Forms: Forms shall be of wood, steel or other approved materials, and as specified in Section 03100. The sheeting for all exposed surfaces shall be 5-ply plywood, unless otherwise specifically authorized. Forms of like character shall be used similarly exposed surfaces in order to produce a uniform appearance. Forming for exposed exterior concrete from 1-foot below finished exterior grade to top of structure shall be carefully fabricated so as to provide a smooth finish without defects. The type, size, shape quality and strength of all materials of which the forms are made, shall be subject to the approval of the Engineer. If it is his opinion that the interior surfaces of the forms are too irregular to produce the specified finish, they shall be lined with smooth, dense, moisture resistant hardboard or other material of which he approves.

- K. Nonshrink Grout: Nonshrink grout shall be nonmetallic, pre-mixed type and shall be Sauereisen F-100 Level Fill, Master Builders Master Flow 713, Burke Non-Ferrous, Non-Shrink Grout or approved equal.

2.3 CLASSIFICATION AND STRENGTH OF CONCRETE

- A. Class and minimum strength requirements for concrete shall be as tabulated below. Unless otherwise specified, Class B concrete shall be used.

- B. Strength Requirements: Concrete class and strength shall meet the minimum compressive strength requirements at the age of 7 and 28 days as shown in the following table. The compressive strengths shall be as determined by standard laboratory cylinder tests in accordance with the procedure set forth in ASTM Designation C 31 and C 39. (See Article 3.3 of this Section for quantity and testing of cylinders.)

Compressive Strength in Pounds Per Square Inch					
Class	For Design Purposes	3 Consecutive Cylinder Average		Low Cylinder	
		7 Days	28 Days	7 Days	28 Days
A	4000	2950	4250	2600	3750
B	3000	2100	3200	1850	2800
C	2500	1800	2700	1550	2300

2.4 PROPERTIES AND DESIGN OF CONCRETE MIX

- A. Tests and Design Mix:
 - 1. The Contractor, 30 days before the beginning of concrete work, shall advise the Engineer of the proposed sources of the materials, or ready mixed concrete, which the Contractor intends to use in the work.

 - 2. The source and manufacturer of material after once having been approved shall not be changed by the Contractor, except as approved by the Engineer and additional laboratory tests may be required by the Engineer's to prove conformance with specification requirements.

 - 3. If during the progress of the work, tests indicate that concrete is not being produced in accordance with these Specifications, the Engineer may order changes in the materials or their proportions so as to secure concrete as specified.

- B. Slump: Slumps shall be as low as possible consistent with proper placing. Low slump concrete shall be used for footing and slabs on grade. Medium slump concrete shall be used for walls, columns and suspended slabs. Concrete shall conform to the limits specified in the following schedule:

Class of Concrete	Medium Slump	Low Slump
A	4 to 5 in.	2 to 3 in.
B	4 to 5 in.	2 to 3 in.
C	5 to 6 in.	3 to 4 in.

PART 3 - EXECUTION

3.1 PREPARATION

A. Concrete Mixing:

1. Equipment: The concrete shall be ready-mixed and the equipment shall conform to the applicable requirements of ASTM Designation C 94.
2. Measurement: Equipment necessary to positively determine and control the actual amounts of all materials entering the concrete shall be provided by the Contractor or the concrete manufacturer. All materials shall be measured by weight, except that water may be measured by volume. A bag of cement weighs 94 pounds.

3.2 INSTALLATION

A. Forms:

1. Construction:
 - a) Forms shall be built true to line and grade, and shall be mortar tight and sufficiently rigid to prevent displacement or sagging between supports. Particular attention shall be given to adequacy of supports and shoring, which is the Contractor's responsibility. The surfaces of forms used for permanently exposed surfaces shall be smooth and free from irregularities, dents, sags, or holes. Forms for surfaces to receive stucco finish shall be suitable for its application. Bolts and rods used for internal ties shall be so arranged that, when the forms are removed, all metal is at least 1-1/2 inch from any concrete surface. Form ties shall be removed immediately after removal of forms, and holes shall be thoroughly plugged with grout within 24 hours after form removal and kept damp for 4 days to prevent shrinking.
 - b) Wire ties will not be permitted. All forms shall be so constructed that they can be removed without hammering or prying against the concrete. Unless otherwise indicated, suitable moldings shall be placed to level or round exposed edges at expansion joints or at any other corners that are to remain. Beams below grade shall have forms at both sides.
2. Coating: Prior to the placing of steel reinforcement or concrete, forms for exposed surfaces shall be coated with a nonstaining paraffin base oil or mineral oil. Forms for unexposed surfaces may be thoroughly wetted in lieu of oiling, immediately before the placing of concrete.

3. Removal: Forms and/or form supports shall not be removed from any concrete until it has obtained sufficient strength to support itself and any live loads it may be subjected to, and then only with the approval of Engineer.
- B. Reinforcing Steel: When placed in the forms, reinforcement shall be clean and free of all rust, scale, dust, dirt, paint, oil or other foreign material and shall be accurately and securely positioned in the forms as shown on the Drawings before the placing of concrete. Reinforcing steel shall be wired or otherwise fastened together at intersections and shall be supported by concrete or metal supports, spacers or hangers. Bar supports where adjacent to the ground, shall be set on precast concrete pads, compressed in the subgrade. The Contractor shall obtain the Engineer's approval before fastening reinforcing steel at intersections by welding methods.
1. Splicing of reinforcement shall be held to a minimum and shall be placed at points of minimum stress. Bars shall be lapped at splices a minimum of 36 bar diameters unless otherwise shown on the Drawings or directed by the Engineer, and shall be rigidly wired or clamped.
 2. Wire fabric shall be straightened before placing and shall overlap one full space of mesh at ends and edges and shall be securely fastened. Fabric shall be supported so as to occupy its proper location in the concrete as shown on the Drawings. Fabric shall not cross any expansion joints.
- C. Embedded Items: In addition to steel reinforcement, pipes, inserts and other metal objects as shown, specified or ordered shall be built into, set in or attached to the concrete. All necessary precautions shall be taken to prevent these object from being displaced, broken or deformed. Before concrete is placed, care shall be taken to determine that all embedded parts are firmly and securely fastened in place as indicated. They shall be thoroughly clean and free from paint or other coating, rust, scale, oil, or any foreign matter. No wood shall be embedded in concrete. The concrete shall be packed tightly around pipes and other metal work to prevent leakage and to secure perfect adhesion. Drains shall be adequately protected from intrusion of concrete.
- D. Concrete:
1. General: Reinforcement shall be secured in position, inspected and approved before placing concrete. Runways for transporting concrete shall not rest on reinforcing steel. Concrete not placed within 90 minutes from the time mixing is started will be rejected and shall be removed from the job by the Contractor. Concrete shall be deposited as nearly as practicable in final position. Concrete shall not be allowed to drop freely more than five feet. All concrete shall be placed in daylight and (excepting seal concrete) shall be placed in the dry unless otherwise authorized by the Engineer in writing.
 2. Slabs Placed on Subgrade: Slab concrete placed on earth or fill subgrade shall be separated from direct contact with the subgrade by 6 mil polyethylene film or other approved material. Sidewalks and walkways will not require a separation sheet. Polyethylene film shall be lapped 4-inches on sides and 12 inches on ends.
 3. Compaction: Concrete shall be compacted by internal vibrating equipment, supplemented by hand rodding and tamping as required. Vibrators shall in no case be used to move the concrete laterally inside the forms. Internal vibrators shall maintain a speed of at least 5000 impulses per minute when submerged in concrete. (At least one spare vibrator in working condition shall be maintained at the site during concrete placing operations.) Duration of vibration shall be limited to time necessary to produce satisfactory consolidation without causing segregation. Vibrator shall be moved constantly and placed in each specific spot only once.

4. **Bonding:** Before depositing new concrete on or against concrete that has set, the surfaces of the set concrete shall be thoroughly cleaned so as to expose the coarse aggregate and be free of laitance, coatings, foreign matter and loose particles. Forms shall be retightened. The cleaned surfaces shall be dampened, but not saturated, and then thoroughly covered with a coat of cement grout of similar proportions to the mortar in the concrete. The grout shall be as thick as possible on vertical surfaces and at least 1/2-inch thick on horizontal surfaces. The fresh concrete shall be placed before the grout has attained its initial set.
5. **Protection:** Rainwater shall not be allowed to increase the ratio of mixing water nor to damage the surface finish. Concrete shall be protected from disfigurement, damage, vibration, internal fractures and construction overloads.

E. **Curing:**

1. All concrete, including gunite, shall be water cured by covering with a double thickness of clean burlap, cotton mats, or other approved material kept thoroughly saturated with water. The forms shall be kept wet until removed and upon removal, the curing specified herein shall be started immediately. Concrete shall be cured for a period of 7 days for normal Portland cement or 4 days for high early strength cement. Concrete poured in the dry shall not be submerged until it has attained sufficient strength to adequately sustain the stress involved nor shall it be subjected to flowing water across its surface until it has cured 4 days. Curing of gunite shall be started as soon as possible without damaging surface and not later than 2 hours after placing.
2. In lieu of wet burlap or cotton mats as specified above, concrete slabs may be covered with wet sand and kept moist for the specified curing period. The initial curing period of not less than 24 hours shall consist of the wet burlap or cotton mat methods, then the wet sand method may be utilized until the end of the curing period.
3. Concrete surfaces which will not be coated, painted, plastered, stuccoed, covered with tile or floor covering or requiring a bonding surface may be cured by means of a membrane curing compound in lieu of the wet cure method. The curing compound shall be applied immediately after a satisfactory surface finish has been completed or forms have been removed. The rate of application of membrane curing compound shall be at least one gallon to every 200 square feet of exposed surface to be cured. The membrane curing compound and impervious covering shall be continuous and without defects and shall retain the required moisture in the concrete. Membrane curing compound that becomes damaged by rain, foot traffic or other conditions without 5 days of application shall be reapplied.

F. **Finishes:**

1. As soon as forms can safely be removed, all irregular projections shall be chipped off flush with the concrete surfaces. All voids produced by spacers or any honeycombing shall be pointed up with grout and troweled flush with the concrete surface immediately after removal of forms and water cured to prevent shrinkage. Honeycombing shall be cut out to expose a sound concrete surface prior to pointing. The use of mortar pointing or patching shall be confined to the repair of small defects in relatively green concrete. Where in the opinion of the Engineer, substantial repairs are required, the defective concrete shall be cut out to sound concrete and repaired with gunite or the concrete shall be removed and reconstructed as directed.
2. Slabs shall be brought to a true and even finish by power or hand floating in a manner that will not bring excess fines to the surface. The consistency of the concrete shall be such that water does not accumulate at the surface. Unless otherwise shown on the Drawings, the surface shall be floated with a wood float and shall be steel troweled to a smooth finish. Troweling shall be the minimum to obtain a smooth, dense surface and shall not be done

until the mortar has hardened sufficiently to prevent excess fine material from being worked to the surface. If so directed, the surface shall be brushed lightly with a push broom so as to produce a nonslip surface.

3. Concrete surfaces that are not exposed in the completed work will require no special finish other than such pointing up and rubbing as is necessary to leave them smooth and impervious.
4. Other surfaces which will be exposed in the completed work shall be finished by being rubbed smooth with a float and water or a carborundum brick. The final surface shall be smooth and dense, without pits, irregularities, blow holes or bubbles.

G. Grout:

1. Grout for pointing and patching shall consist of cement and fine aggregate mixed in the proportions used in the concrete and a minimum amount of water to produce a workable grout.
2. Material for grouting column base plates, anchor bolts, reinforcing bars, pipe sleeves and pump base plates shall be of the nonshrink type and shall be mixed and placed as recommended by the manufacturer. Machinery set on grout pads shall not be opened until the grout has cured for at least 24 hours.

3.3 FIELD QUALITY CONTROL

- A. General: The quality of the concrete as to conformance to the specifications is the entire responsibility of the Contractor until it is accepted in place in the structure and verified by the final cylinder tests made by the laboratory. Arrangements for field testing shall be made by the Contractor with the laboratory as selected by the Owner.
- B. Compressive Tests: Standard laboratory compressive test cylinders will be obtained by the laboratory when concrete is discharged from the mixer at the site of the work. A set of 4 cylinders will be obtained for each 50 cubic yards or fraction thereof placed each day, for each type of concrete, or as requested by the local governmental agency having jurisdiction. The cylinders will be cured under laboratory conditions and will be tested one at seven (7) days, Two (2) at 28 days and one (1) held for later testing if required.
- C. Slump Tests: The laboratory employed by the Owner will make slump tests of Class A and Class B concrete as it is discharged from the mixer at the site of the work. Slump tests will be made for each 25 cubic yards or "pour" of concrete placed. Slump tests may be made on any batch and failure to meet specified slump requirements will be sufficient cause for rejection of that batch.
- D. Reports: Proper reports of all tests performed by the laboratory will be prepared by the laboratory and submitted promptly to the Engineer. Such reports shall be properly labeled so as to identify the portions of the project into which the materials have been placed, and the results of the test indicating whether or not the test met the requirements of these Specifications.

END OF SECTION

SECTION 03100 - CONCRETE FORMWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Section 03300 - Cast-In-Place Concrete: Supply of concrete accessories for placement by this section.

1.3 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement.
- B. Section 03300 - Cast-in-Place Concrete.

1.4 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.
- C. ACI 347 - Recommended Practice For Concrete Formwork.

1.5 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.6 FIELD SAMPLES

- A. Provide under provisions of Section 01400. Coordinate with requirements stated in Section 03300.

1.7 COORDINATION

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate this Section with other Sections of work which require attachment of components to formwork.
- C. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Engineer.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.3 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items which will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.

3.4 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 301.

END OF SECTION

SECTION 03200 - CONCRETE REINFORCEMENT

PART 1- GENERAL

1.1 SECTION INCLUDES

- A. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

1.2 RELATED SECTIONS

- A. Section 03100 - Concrete Formwork.
- B. Section 03300 - Cast-in-Place Concrete.

1.3 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements For Reinforced Concrete.
- C. ACI SP-66 - American Concrete Institute - Detailing Manual.
- D. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- E. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.
- F. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.
- G. CRSI 63 - Recommended Practice For Placing Reinforcing Bars.
- H. CRSI 65 - Recommended Practice For Placing Bar Supports, Specifications and Nomenclature.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 COORDINATION

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars, unfinished, Class I finish.
- B. Stirrup Steel: ANSI/ASTM A82, unfinished, Class I finish.
- C. Welded Steel Wire Fabric: ASTM A185 Plain Type; in coiled rolls; unfinished, Class I finish.

2.2 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.

2.3 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice.
- B. Locate reinforcing splices not indicated on drawings, at point of minimum stress.

PART 3 - EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Accommodate placement of formed openings.
- C. Conform to applicable code for concrete cover over reinforcement.

3.2 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01400.

END OF SECTION