

# ATTACHMENT-A, ADDENDUM-4

## TECHNICAL SPECIFICATIONS FOR Spirit-Of-The-Wild WMA Trail Improvements



FFWCC Project No. FWC 15/16-026-13

Prepared By:

**AECOM**

AECOM TECHNICAL SERVICES, INC.

7800 Congress Avenue, Suite 200

Boca Raton, FL 33487, USA

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**SECTION****DESCRIPTION**

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**DIVISION 1: GENERAL REQUIREMENTS**

01010	Summary of Work
01015	Definitions and Standards
01050	Field Engineering
01065	Permits and Fees
01200	Project Meetings
01300	Submittals
01310	Construction Progress Schedules
01380	Construction Photographs
01410	Testing and Quality Control
01700	Contract Closeout

**DIVISION 2: EARTHWORK**

02110	Clearing and Land Preparation
02200	Earthwork
02230	Roadway Excavation, Backfill and Compaction
02240	Soil Stabilization
02401	Dewatering
02436	Environmental Protection
02735	Gravel Roadway
02922	Hydroseeding

**ATTACHMENTS**

Attachment A – Limited Geotechnical Exploration  
Attachment B – NRCS Soil Survey

**END OF DIRECTORY**

SECTION 01010 SUMMARY OF WORK

PART 1 - GENERAL

1.1 **SUMMARY:** Spirit-of-the-Wild WMA (SOWWMA) is located in Hendry County, as shown in Figure 1. The SOWWMA has three roads in which the general public has year-round access (Figure 2) (FWC, 2016). After completion of the wetland restoration project (WRP) in 2009, the area is much wetter during most of the rainy season which creates issues with vehicular access on the unimproved trails. The trail system on the SOWWMA is composed of unimproved two-track dirt trails established years ago by the previous land owner. Vehicular access to the eastern portion of the area has become difficult to impossible on these trails especially during the rainy season when they are inundated with water (FWC, 2016).

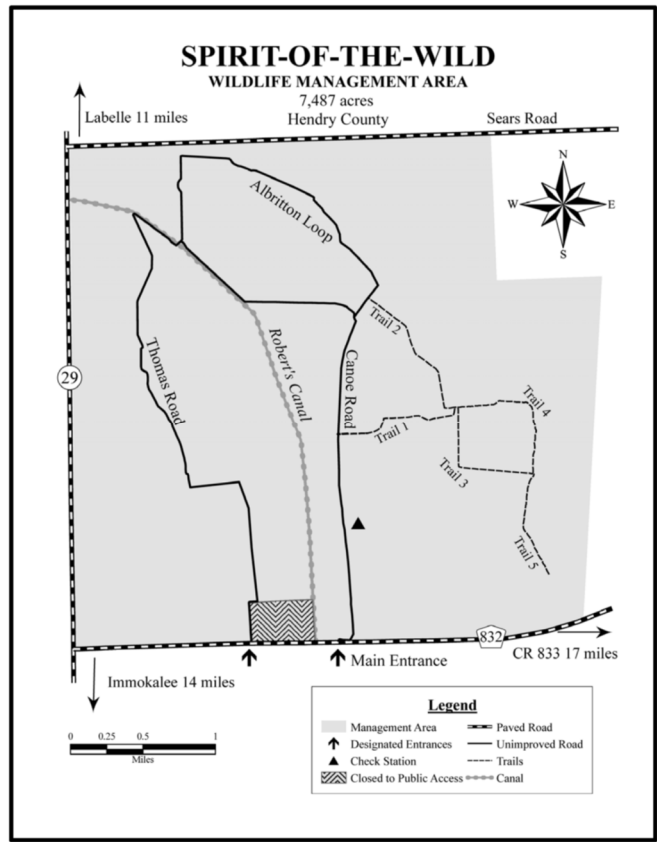


Figure 1. SOWWMA Site Location (FWC 2016)

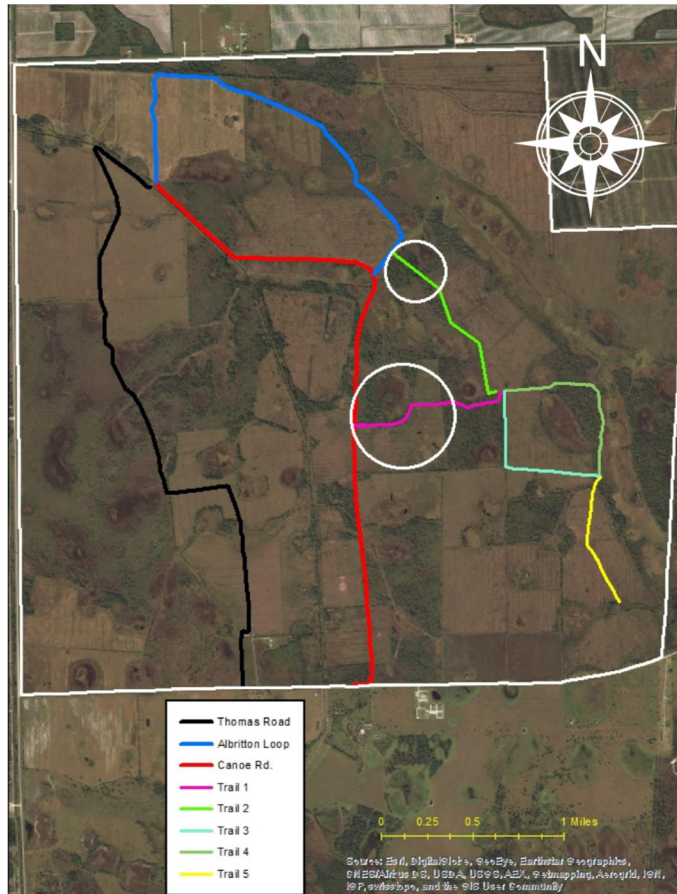


Figure 2. SOWWMA Roads and Trails (FWC 2016)

1.2 PROJECT DESCRIPTION:

A. The main objective of this project is to improve 0.6 miles of Trail 1 and 0.3 miles of Trail 2 as shown in Figure 2 above. The trails will be improved to road status while maintaining the current natural sheet flow, to provide year-round access for two-wheel drive vehicles. Once improvements are completed, these portions of trail will be reclassified as roads. Part of the scope is to obtain the necessary permits for which it will be necessary to establish the extent of wetland jurisdiction, biological indicators of seasonal high water, and to draft a narrative that covers the ecological site condition. Impacts and/or compensatory mitigation for wetlands and/or listed species are not anticipated or included in our scope of work.

1. Trail 1
  - An approximately 3,235 linear feet of gravel road in varying width.
  - There will be 7 water crossing.
2. Trail 2
  - An approximately 1,655 linear feet of gravel road in varying width.
  - There will be 2 water crossing.

1.3 CONTRACTOR'S USE OF PREMISES: See General Terms & Conditions.

- A. During construction activities, the CONTRACTOR shall be responsible for maintaining all access roads in good condition, including grading and drainage.
- B. In addition he Contractor shall comply with all General Terms and Conditions in front end documents.

1.4 OWNER'S USE OF PREMISES:

- A. Partial Occupancy: The OWNER reserves the right to occupy and to place and install equipment in areas of the Project, prior to Substantial Completion provided that such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the Work.

1.5 WORK SEQUENCE, COORDINATION ACTIVITIES AND SCHEDULED DATES:

- A. General: The CONTRACTOR will coordinate its work with other adjacent CONTRACTORS, landowners and OWNER activities, with specific attention to access and staging areas. Construction sequence shall be determined by CONTRACTOR subject to the following needs for continuous access and operation by others.
  - 1. Public access shall not be granted during construction.
- B. Suggested Construction Sequence: A suggested sequence of construction has been prepared by the Design Engineer and is presented in the Contract Documents. CONTRACTOR may suggest modifications to the sequence provided the access and operation requirements are satisfied and compliance with the overall contract period is achieved.
- C. Scheduled Events: Schedule the Work to conform to the following events and dates, and to provide for coordination with the work performed by others.
  - 1. The work shall be completed by TBD.

1.6 COPIES OF DOCUMENTS: See General Terms & Conditions

1.7 LIST OF DRAWINGS:

- A. Contract Drawings:
  - Sheet G-001 - COVER, INDEX SHEET AND LOCATION MAP
  - Sheet G-002 - GENERAL NOTES
  - Sheet G-003 - SYMBOLS, LEGEND, AND ABBREVIATIONS
  - Sheet G-004 - KEY PLAN
  - Sheet C-100 – TRAIL 1 PLAN AND PROFILE STA. 0+00 TO 5+00
  - Sheet C-101 – TRAIL 1 PLAN AND PROFILE STA. 5+00 TO 10+00
  - Sheet C-102 – TRAIL 1 PLAN AND PROFILE STA. 10+00 TO 15+00
  - Sheet C-103 – TRAIL 1 PLAN AND PROFILE STA. 15+00 TO 20+00
  - Sheet C-104 – TRAIL 1 PLAN AND PROFILE STA. 20+00 TO 25+00
  - Sheet C-105 – TRAIL 1 PLAN AND PROFILE STA. 25+00 TO 30+00

Sheet C-106 – TRAIL 1 PLAN AND PROFILE STA. 30+00 TO 32+00  
Sheet C-107 – TRAIL 2 PLAN AND PROFILE STA. 0+00 TO 4+50  
Sheet C-108 – TRAIL 2 PLAN AND PROFILE STA. 4+50 TO 9+00  
Sheet C-109 – TRAIL 2 PLAN AND PROFILE STA. 9+00 TO 13+50  
Sheet C-110 – TRAIL 2 PLAN AND PROFILE STA. 13+50 TO 18+00  
Sheet C-200 – TRAIL 1 - CROSS SECTIONS 1 OF 6  
Sheet C-201 – TRAIL 1 - CROSS SECTIONS 2 OF 6  
Sheet C-202 – TRAIL 1 - CROSS SECTIONS 3 OF 6  
Sheet C-203 – TRAIL 1 - CROSS SECTIONS 4 OF 6  
Sheet C-204 – TRAIL 1 - CROSS SECTIONS 5 OF 6  
Sheet C-205 – TRAIL 1 - CROSS SECTIONS 6 OF 6  
Sheet C-206 – TRAIL 2 - CROSS SECTIONS 1 OF 3  
Sheet C-207 – TRAIL 2 - CROSS SECTIONS 2 OF 3  
Sheet C-208 – TRAIL 2 - CROSS SECTIONS 3 OF 3  
Sheet C-300 – TYPICAL SECTION, GEOWEB AND SILT FENCE  
DETAILS

B. Survey Drawings:

TOPOGRAPHIC SURVEY – Sheet 1 of 5  
TOPOGRAPHIC SURVEY – Sheet 2 of 5  
TOPOGRAPHIC SURVEY – Sheet 3 of 5  
TOPOGRAPHIC SURVEY – Sheet 4 of 5  
TOPOGRAPHIC SURVEY – Sheet 5 of 5

C. Reference Materials:

1. Geotechnical investigation for this project included:
  - Hand Auger Boring Logs With Locations
  - Grain Size Analysis Report

END OF SECTION

## SECTION 01015 DEFINITIONS AND STANDARDS

### **PART 1 - GENERAL**

#### 1.1 SCOPE:

- A. Definitions:
  - 1. A substantial amount of specification language constitutes definitions for terms found in other areas of Contract Documents including drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated.
  - 2. Certain terms used in the Contract Documents are defined in the General Terms & Conditions. Definitions and explanations are not necessarily either complete or exclusive but are general for the work.
- B. General Requirements: General requirements are the provisions or requirements of Division 1 sections which apply to the entire work of the Contract.

#### 1.2 FORMAT AND SPECIFICATION EXPLANATIONS:

- A. Format Explanation: The format of principal portions of these specifications can be described as follows, although other portions may not fully comply and no particular significance will be attached to such compliance or noncompliance.
  - 1. Sections and Divisions: For convenience, basic unit of specification text is a "section", each unit of which is named and numbered. These are organized into related families of sections, and various families of sections are organized into "divisions", which are recognized as the present industry consensus on uniform organization and sequencing of specifications. The section title is not intended to limit meaning or content of section, or to be fully descriptive of requirements specified therein, or to be an integral part of text.
  - 2. Section Numbering: Used for identification and to facilitate cross-references in contract documents. Sections are placed in numeric sequence; however, numbering sequence is not complete, and listing of sections in Table of Contents at beginning of Contract Documents must be consulted to determine numbers and names of specification sections in these Contract Documents.
  - 3. Page Numbering: Numbered independently for each section. Section number is shown with page number at bottom of each page to facilitate location of text.
  - 4. Parts: Each section of these specifications generally has been subdivided into three (3) basic parts for uniformity and convenience (Part 1 "General", Part 2 "Products", and Part 3 "Execution"). These parts do not limit the meaning of text within. Some sections may not contain all three parts when not applicable, or may contain more than three parts to add clarity to organization of section.

5. Imperative Language: Used generally in specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by the CONTRACTOR. For clarity of reading, at certain locations contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by the CONTRACTOR or, when so noted, by others.
  6. Specialists, Assignments: In certain instances, specification text requires that specific work be assigned to specialists or expert entities who must be engaged for performance of those units of work. These must be recognized as special requirements over which the CONTRACTOR has no choice or option. These assignments must not be confused with, and are not intended to interfere with, normal application of regulations, union jurisdictions and similar conventions. Nevertheless final responsibility for fulfillment of the entire set of requirements remains with the CONTRACTOR.
  7. Trades: Except as otherwise specified or indicated, the use of titles such as "carpentry" in specification text, implies neither that the work must be performed by an accredited or unionized tradesperson of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by tradespersons of that corresponding generic name.
- B. Specification Content: Because of methods by which this project specification has been produced, certain general characteristics of contents and conventions in use of language are explained as follows:
1. Specifying Methods: The techniques or methods of specifying requirements varies throughout text, and may include "prescriptive", "compliance with standards", "performance", "proprietary", or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work.
  2. Overlapping and Conflicting Requirements: Where compliance with two (2) or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, notify the Construction Manager (CM) for a decision as specified in the General Terms & Conditions.
  3. Abbreviations: Throughout the Contract Documents are abbreviations implying words and meanings which will be appropriately interpreted. Specific abbreviations have been established, principally for lengthy technical terminology, and in conjunction with coordination of specification requirements, with notations on drawings and in schedules. These are normally defined at first instance of use. Organizational and association names and titles of general standards are also abbreviated.
- 1.3 DRAWING SYMBOLS: Except as otherwise indicated, graphic symbols used on Drawings are those symbols recognized in the construction industry for purposes indicated.
- 1.4 INDUSTRY STANDARDS - APPLICABILITY: Applicable standards of construction



industry have the same force and effect, and are made a part of Contract Documents by reference, as if copied directly into the Contract Documents, or as if published copies were bound herewith. Referenced standards referenced directly in the Contract Documents or by governing regulations have precedence over non-referenced standards which are recognized in industry for applicability to work.

END OF SECTION

## SECTION 01050 FIELD ENGINEERING

### **PART 1 - GENERAL**

- 1.1 The CONTRACTOR shall engage a licensed engineer of the discipline required, registered in the State of Florida, to perform engineering services for temporary facilities including the design of, earth and water retaining systems, forms, temporary erection supports, and similar items provided by the CONTRACTOR as part of its means and methods of construction.

The CONTRACTOR shall engage a professional surveyor and mapper registered in the State of Florida to perform the necessary layout, survey control and monumentation.

The CONTRACTOR shall provide one set of As-Built Drawings depicting horizontal control in NAD83 / Florida East (ftUS) 901 and all elevations reference North American Vertical Datum of 1988 (NAVD 88), reference national geodetic survey (n.g.s.) benchmark "w 519", elevation = 26.68 feet.

### **PART 2 - CONTRACTOR CONSTRUCTION STAKING**

- 2.1 DESCRIPTION: In connection with this WORK, CONTRACTOR shall:

- A. Perform all construction layout and reference staking necessary for the proper control and satisfactory completion of the WORK.
- B. Run a level circuit between vertical control points indicated to check plan benchmarks and establish new benchmarks where necessary.

- 2.2 CONSTRUCTION REQUIREMENTS:

- A. The CONTRACTOR's personnel performing the construction staking shall work under the direct supervision of a Florida registered engineer or Florida licensed land surveyor. Submit name and address of individual responsible for surveying to the Construction Manager (CM) prior to start of survey activities.
- B. The CONTRACTOR shall be solely and completely responsible for the accuracy of the line and grade of all features of the Work. Any errors or apparent discrepancies found in previous surveys, plans, or specifications shall be called to the attention of the CM by the CONTRACTOR for correction or interpretation prior to proceeding with the WORK.
- C. Field notes shall be kept in standard, bound field notebooks in a clear, orderly, and neat manner consistent with standard engineering practices.
- D. The CONTRACTOR shall be responsible for the placement and preservation of adequate ties and reference to all control points, whether established by him or found on the project, necessary for the accurate reestablishment of all base lines or centerlines shown on the Plans. All land ties (i.e. section corners, fractional section corners, and similar items) that may be lost or destroyed during construction shall be carefully referenced and replaced.

- E. The supervision of the CONTRACTOR's construction engineering personnel shall be the responsibility of the CONTRACTOR; any deficient engineering layout or construction work which may be the result of inaccuracies in his staking operations or of his failure to report inaccuracies found in work previously done by the Design Engineer shall be corrected at the expense of the CONTRACTOR.
- F. Station Identification: On linear elements of construction (such as levees, canals, and similar items) the CONTRACTOR shall place temporary identifying signs at the start and end of trails under construction.
- G. In order to expedite the commencement of construction operations, the staking operation may commence prior to the issuance of the Notice to Proceed. The CONTRACTOR shall obtain written approval of the CM prior to commencing staking.

### 2.3 RECORDS AND SUBMITTALS:

- A. Submittal:
  - 1. Provide CM a copy of the designs described in Paragraph 1.1 signed and sealed by the licensed engineer.
  - 2. Provide CM the data required for the individual responsible for layout and records as required in Paragraph 2.2 A.
- B. Records: At the end of the Project, submit to the CM a certified site survey showing coordinates and elevations of the completed Work. Submit a copy of the field notes required in Paragraph 2.2 C. These are part of the record documents required in SECTION 01700.

### **PART 3 - EXECUTION**

(Not Used)

END OF SECTION

## SECTION 01065 PERMITS AND FEES

### **PART 1 - GENERAL**

- 1.1 Unless otherwise specified, the CONTRACTOR shall obtain and pay for any permits and licenses related to his work as provided for in the General Terms & Conditions, except as otherwise provided herein.
- 1.2 The CONTRACTOR will be issued copies of all permits obtained by the OWNER at the pre-construction conference. A copy of the permits shall be posted at the site at all times during construction. The CONTRACTOR shall be responsible for familiarizing himself with the permits and shall abide by the permit conditions at all times.
- 1.3 Work shall be conducted, and shall result in construction of the improvements of this project, in full accordance with the conditions of the permits granted for the project.

END OF SECTION

## SECTION 01200 PROJECT MEETINGS

### **PART 1 - GENERAL**

#### 1.1 SUMMARY:

- A. CONTRACTOR shall schedule and administer progress meetings with their own staff and/or other CONTRACTORS, construction foremen's meetings, and specially called meetings with these parties throughout progress of Work. CONTRACTOR shall:
  - 1. Prepare agenda for meetings.
  - 2. Distribute written notice of specially called meetings minimum of one working day in advance of meeting date.
  - 3. Make physical arrangements for meetings.
  - 4. Preside at meetings.
  - 5. Record minutes; include significant proceedings and decisions.
  - 6. Prepare formal minutes and distribute within two working days after each meeting to the following:
    - a. Meeting participants.
    - b. Parties affected by decisions made at meeting.
    - c. Construction Manager (CM) and Owner - furnish both with three copies of minutes.
- B. Representatives of CONTRACTOR, Subcontractors, and Suppliers attending meetings shall be qualified and authorized to act on behalf of entity each represents.
- C. Owner and CM may attend meetings.

#### 1.2 PRECONSTRUCTION CONFERENCE:

- A. CM will schedule and conduct preconstruction conference.
- B. Within 20 days after Effective Date of Contract, but before CONTRACTOR starts Work at site.
- C. Location: At location to be selected by CM.
- D. Attendance.

1. CONTRACTOR's Project Manager.
  2. CONTRACTOR's Resident Superintendent.
  3. CONTRACTOR's "hands-on" person[s] designated by CONTRACTOR to submit Shop Drawings to CM.
  4. SUBCONTRACTORS' or suppliers' representatives. CONTRACTOR may desire to invite or CM may request.
  5. CM's representatives.
  6. Owner's representatives.
  7. Local utility representatives, if applicable.
- E. Suggested format includes, but not be limited to following:
1. Project Safety.
  2. Presentation of preliminary progress schedule in accordance with Section 01310 "Construction Progress Schedules" and preliminary schedule of Shop Drawing and sample submissions in accordance with Section 01300 "Submittals" of Contract Documents.
  3. Check of required bonds and insurance policies prior to Notice to Proceed.
  5. Liquidated damages.
  6. Procedures for handling submittals such as substitutions and Shop Drawings.
  7. O&M submittal procedures.
  8. Training requirements.
  9. Direction of correspondence and coordinating responsibility.
  10. Weekly and monthly progress meetings.
  11. Equal opportunity requirements.
  12. Laboratory and field testing requirements.
  13. Provisions for inventory of material stored on-site or off-site if off-site storage is authorized.
  14. Schedule of values, application for progress payment, and progress payment procedures.
  15. Change Order procedures.

16. Posting of Owner's sign.
17. CONTRACTOR's proposed Environmental Management and Erosion Control Plan.
18. CONTRACTOR's proposed Health and Safety Plan.
19. CONTRACTOR's proposed Quality Control Plan.

1.3 PROGRESS MEETINGS WITH CM:

- A. In addition to other regular project meetings for other purposes (as indicated elsewhere in the Contract Documents), hold general progress meetings twice each month with times coordinated with preparation of payment requests. Meeting dates shall be established by the CM. Require every entity involved in the planning, coordination or performance of work to be properly represented at each meeting. Include (when applicable):
  1. Consultants
  2. Separate CONTRACTORs (if any)
  3. Principal Subcontractors
  4. Suppliers/manufacturers/fabricators
  5. Special supervisory personnel and others with an interest or expertise in the progress of the work.
- B. Suggested format includes, but not limited to following:
  1. Review each entity's present and future needs including interface requirements
  2. Construction sequence, coordination and shutdown requirements
  3. Construction schedule and progress reporting
  4. On-site witness testing by independent subconsultants and approval/regulatory agencies
  5. Deliveries
  6. Access
  7. Site utilization
  8. Temporary facilities and services
  9. Hours of work
  10. Safety, hazards and risks

11. Housekeeping
12. Submittals
13. Change managements (request for quotation, change directives, change orders)
14. Contract administration logs (request for information, etc.)
15. Documentation of information for payment requests
16. O&M submittal
17. Training

- C. Discuss whether each element of current work is ahead of schedule. Determine how behind-time work will be expedited and secure commitments from the entities involved in doing so. Discuss whether schedule revisions are required to ensure that current work and subsequent work will be completed within the Contract Time. Review everything of significance which could affect the progress of the work.
- D. Within two days after each progress meeting date, the CONTRACTOR will forward copies of the minutes-of-the-meeting, to the CM and Owner.
- E. Immediately following each progress meeting where revisions to the Progress Schedule/Critical Path Schedule have been made or recognized (regardless of whether agreed to by each entity represented), revise the Schedule. Reissue revised Schedule within 10 working days after meeting.
- F. At intervals matching the preparation of payment requests, revise and reissue the Schedule to show actual progress of the work in relation to the latest revision of the Schedule.

#### 1.4 HEALTH AND SAFETY MEETING:

- A. Schedule Biweekly.
- B. Location: TBD at pre-construction meeting.
- C. Attendance.
  1. Resident superintendent.
  2. Subcontractor's foremen.
  3. CONTRACTOR's Health and Safety Manager
  4. Owner's Health and Safety Representative
  5. Engineer's Health and Safety Representative



D. Suggested Agenda.

1. Health and safety statistics.
2. Review Work progress since previous meeting.
3. New staff and training requirements.

**PART 2 - PRODUCTS**

(Not Used)

**PART 3 - EXECUTION**

(Not Used)

END OF SECTION

## SECTION 01300 SUBMITTALS

### **PART 1 - GENERAL**

#### 1.1 DESCRIPTION:

- A. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals.
  - 1. Shop Drawings, Product Data and Samples.
  - 2. Construction Photographs.
  - 3. CONTRACTOR's Responsibilities.
  - 4. Submission Requirements.
  - 5. Review of Shop Drawings, Product Data, Working Drawings and Samples.
  - 6. Distribution.
  - 7. General Procedures for Submittals.
  - 8. Certificate of Design.
  - 9. Certificates of Compliance.
  - 10. Schedules.
- B. Detailed submittal requirements will be specified in the technical specifications section.

#### 1.2 DEFINITIONS:

- A. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- B. Shop drawings, as defined in individual work Sections include, but are not necessarily limited to: custom-prepared data such as fabrication and erection/installation (working) drawings of concrete reinforcement, structural details and piping layout, scheduled information, setting diagrams, actual shopwork manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications as applicable to the work.

### 1.3 SUBMITTALS:

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by CM and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and CONTRACTOR's construction schedule.
  2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  3. Final Submittal: Submit concurrently with the first complete submittal of CONTRACTOR's construction schedule.
    - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
  4. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Submittal category: Action; informational.
    - d. Name of Subcontractor.
    - e. Description of the Work covered.
    - f. Scheduled date for CM's final release or acceptance.
    - g. Scheduled date of fabrication.
    - h. Scheduled dates for purchasing.
    - i. Scheduled dates for installation.
    - j. Activity or event number.

### 1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS:

- A. Engineer's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by CM for CONTRACTOR's use in preparing submittals.

1. CM will furnish CONTRACTOR one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.
  - a. CM makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on accepted submittal schedule.
  3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. CM reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
  5. The CONTRACTOR shall revise and resubmit rejected submittals and those requiring corrections or verification of information in a timely manner such that the overall progress of the Work is not impeded.
  6. Coordination of Submittal Times: The CONTRACTOR shall prepare and transmit each submittal sufficiently in advance of performing the related Work or other applicable activities, or within the time specified in the individual Sections of the Specifications, so that the installation will not be delayed by processing times, including rejection and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of Contract Time will be authorized because of the CONTRACTOR's failure to transmit submittals sufficiently in advance of the Work.
- C. All shop drawings shall be submitted using the transmittal form furnished by the CM.
- D. All shop drawings submitted by Subcontractors for approval shall be sent directly to the CONTRACTOR for checking. The CONTRACTOR shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.
- E. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on CM's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. CM will advise CONTRACTOR when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow 7 working days for review of each resubmittal.
  4. Sequential Review: Where sequential review of submittals by CM's consultants, Owner, or other parties is indicated, allow 21 working days for initial review of each submittal.
- F. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 6 by 8 inches on label or beside title block to record CONTRACTOR's review and approval markings and action taken by CM.
  3. Number of submittals required:
    - a. Shop Drawings: Unless otherwise stated in the respective Specifications Sections, submit six (6) copies.
    - b. Product Data: Unless otherwise stated in the respective Specifications Sections, submit six (6) copies.
    - c. Samples: Submit the number stated in the respective Specification Sections.
  4. Include the following information for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name of Engineer.
    - d. Name of Construction Manager.
    - e. Name of CONTRACTOR.
    - f. Name of Subcontractor.
    - g. Name of supplier.
    - h. Name of manufacturer.
    - i. Submittal number or other unique identifier, including revision identifier.

- (1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
  - j. Number and title of appropriate Specification Section.
  - k. Drawing number and detail references, as appropriate.
  - l. Location(s) where product is to be installed, as appropriate.
  - m. Other necessary identification.
5. Additional Paper Copies: Unless additional copies are required for final submittal, and unless CM observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to CM.
6. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. CM will return without review submittals received from sources other than CONTRACTOR.
- a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
    - (1) Project name.
    - (2) Date.
    - (3) Destination (To:).
    - (4) Source (From:).
    - (5) Name of Construction Manager.
    - (6) Name of CONTRACTOR.
    - (7) Name of firm or entity that prepared submittal.
    - (8) Names of Subcontractor, manufacturer, and supplier.
    - (9) Category and type of submittal.
    - (10) Submittal purpose and description.
    - (11) Specification Section number and title.

- (12) Specification paragraph number or drawing designation and generic name for each of multiple items.
- (13) Drawing number and detail references, as appropriate.
- (14) Indication of full or partial submittal.
- (15) Transmittal number.
- (16) Submittal and transmittal distribution record.
- (17) Signature of transmitter.

G. Options: Identify options requiring selection by CM.

H. Deviations and Additional Information: On an attached separate sheet, prepared on CONTRACTOR's letterhead, record relevant information, requests for data, revisions other than those requested by CM on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with acceptance notation from CM's action stamp.

J. Distribution: Furnish copies of final submittals to manufacturers, Subcontractors, suppliers, fabricators, and installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with acceptance notation from CM's action stamp.

#### 1.5 CONSTRUCTION PHOTOGRAPHS:

A. The CONTRACTOR shall provide construction photographs in accordance with requirements specified in Section 01380.

## **PART 2 - PRODUCTS**

### **2.1 SUBMITTAL PROCEDURES:**

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Statement of compliance with specified referenced standards.
    - d. Testing by recognized testing agency.
    - e. Application of testing agency labels and seals.
    - f. Notation of coordination requirements.
    - g. Availability and delivery time information.
  - 4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams showing factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  - 5. Submit Product Data before or concurrent with Samples.
  - 6. Submit Product Data in the following format:
    - a. Three paper copies of Product Data unless otherwise indicated. CM will return two copies.



- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
  2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 24 by 36 inches.
  3. Submit Shop Drawings in the following format:
    - a. PDF electronic file.
    - b. Two opaque (bond) copies of each submittal. CM will return one copy.
- D. CONTRACTOR's Construction Schedule: The progress schedule shall indicate the start and completion dates of the various stages of the Work and shall show an activity network for the planning and execution of the Work. Included with the progress schedule shall be a narrative description of the progress schedule. The progress schedule must be updated monthly by CONTRACTOR, submitted as part of each Application for Payment and shall be acceptable to CONSULTANT.
- E. Application for Payment and Schedule of Values: Comply with requirements specified in front end documents from FWC.
- F. Inspection and Test Reports: Classify each inspection or test report as a "shop drawing" or "product data" depending upon whether the report is specifically prepared for this project, or a standard publication of workmanship testing at the point of production. Process inspection and testing reports accordingly.
- G. Survey Data: Where required in the individual specification sections, submit survey for property, field measurements, quantitative records of actual work, damage surveys, and other similar data. None of the specified copies will be returned to the CONTRACTOR.

- H. Closeout Submittals: Refer to individual specification sections and section 01700 Contract closeout, for closeout submittal requirements and project record documents.
- I. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of CMs and owners, and other information specified.
- J. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- K. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- L. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- M. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- N. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- O. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- P. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

## 2.2 DELEGATED-DESIGN SERVICES:

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of CONTRACTOR by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to CM.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to

CONTRACTOR to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

### **PART 3 - EXECUTION**

#### **3.1 CONTRACTOR'S REVIEW:**

- A. Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents prior to submission to the CM. Mark with approval stamp before submitting to CM.
- C. CONTRACTOR review shall verify the following:
  1. Field measurements
  2. Field construction criteria
  3. Catalog numbers and similar data
  4. Conformance with the Specifications
- D. If a shop drawing shows any deviation from the requirements of the Contract Documents, the CONTRACTOR shall make specific mention of the deviations in the Transmittal Form furnished by the CM and provide a description of the deviations in a letter attached to the submittal.
- E. The review and approval of shop drawings, samples or product data by the CM shall not relieve the CONTRACTOR from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the CONTRACTOR and the CM will not have responsibility for any such errors and omissions.
- F. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item by the CM. Any fabrication performed, materials purchased or on-site construction accomplished which does not conform to accepted shop drawings and data shall be at the CONTRACTOR's own risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity with the requirements of the Contract.
- G. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of CONTRACTOR's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 CONSTRUCTION MANAGER'S ACTION:

- A. The CM's review is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the CONTRACTOR from compliance with the contract plans and specifications or from departures therefrom. The CONTRACTOR remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- B. Submittals will be reviewed for the CONTRACTOR's approval stamp. Submittals not stamped by the CONTRACTOR will be returned without any action.
- C. The review of shop drawings, data, and samples will be general. They shall not be construed:
  - 1. as permitting any departure from the Contract requirements;
  - 2. as relieving the CONTRACTOR of responsibility for any errors or omissions, including details, dimensions, and materials;
  - 3. as approving departures from details furnished by the CM, except as otherwise provided herein.
- D. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which the CM finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the CM may return the reviewed drawings without noting an exception.
- E. Submittals will be returned to the CONTRACTOR under one of the action codes indicated below and defined on the transmittal form furnished by the CM.
  - 1. Marking: No Exception Taken.
    - a. When submittals are marked as "No Exception Taken," Work covered by submittal may proceed provided it complies with Contract Documents. Acceptance of Work depends on that compliance.
  - 2. Marking: Make Corrections Noted.
    - a. When submittals are marked as "Make Corrections Noted," Work covered by submittal may proceed provided it complies with CM's notations or corrections on submittal and with Contract Documents. Acceptance of Work depends on that compliance. Resubmittal not required.
  - 3. Marking: Amend and Resubmit.

- a. When submittals are marked as “Amend and Resubmit,” do not proceed with Work covered by submittal. Do not permit Work covered by submittals to be used at Project site or elsewhere where Work is in progress.
  - b. Revise submittal or prepare new submittal in accordance with CM's notations in accordance with resubmittal requirements of this section. Resubmit without delay. Repeat if required to obtain different action marking.
4. Marking: Rejected; See Remarks.
- a. When submittals are marked as “Rejected; See Remarks,” do not proceed with Work covered by submittal. Work covered by submittal does not comply with Contract Documents.
  - b. Prepare new submittal for different material or equipment supplier or different product line or material of same supplier complying with Contract Documents.
5. Marking: For Information Only.
- a. When submittals are marked as “For Information Only,” the CM will review the submittal but take no action.
  - b. It will be recorded as “For Information Only”. Work covered by this submittal may proceed provided it complies with the Contract Documents.
6. Marking: Not Required for Review.
- a. When submittals are marked as “Not Required for Review,” the CM has not reviewed the submittal and it is being returned.
  - b. Work covered by this submittal may proceed provided it complies with the Contract Documents.
- F. Resubmittals will be handled in the same manner as first submittals. On resubmittals the CONTRACTOR shall direct specific attention, in writing, on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the CM, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the CONTRACTOR. The CONTRACTOR shall make corrections to any Work done in relation to revisions which are not specifically pointed out to the CM which are deemed, by the CM, not to be in accordance with the Contract Documents.
- G. Partial submittals may not be reviewed. The CM will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the CONTRACTOR, and will be considered "Rejected" until resubmitted. The CM may at his option provide a list or mark the submittal directing the CONTRACTOR to the areas that are incomplete.

- H. When the shop drawings have been completed to the satisfaction of the CM, the CONTRACTOR shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the CM.
- I. Material and equipment delivered to the Site will not be paid for until the pertinent shop drawings have been reviewed and accepted by the Engineer.

3.3 CERTIFICATE OF DESIGN:

- A. If specifically specified in other Sections of these Specifications, the CONTRACTOR shall submit the applicable Certificate of Design for each item required, completely filled in and signed and sealed by a registered professional engineer.

3.4 CERTIFICATES OF COMPLIANCE:

- A. Certificates of Compliance as specified in the specifications shall include and mean certificates, manufacturer's certificates, certifications, certified copies, and letters of certification and certificate of materials.
- B. The CONTRACTOR shall be responsible for providing Certificates of Compliance as specified in the technical specifications. Certificates are required for demonstrating proof of compliance with specification requirements and shall be executed in six (6) copies unless otherwise specified. Each certificate shall be signed by an official authorized to certify on behalf of the manufacturing company and shall contain the name and address of the Supplier, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Supplier from furnishing satisfactory material, if after tests are performed on selected samples, the material is found not to meet the specific requirements.

END OF SECTION

## SECTION 01310 CONSTRUCTION PROGRESS SCHEDULES

### **PART 1 - GENERAL**

#### 1.1 DESCRIPTION:

- A. Section includes administrative and procedural requirements for planning, monitoring and documenting the progress of construction during performance of the Work.
- B. CONTRACTOR shall prepare and submit to Construction Manager (CM) for review within 30 days after Notice to Proceed, a construction progress schedule.
- C. No work shall be done between 7:00 p.m. and 6:00 a.m. nor on Sundays or legal holidays without written permission of Owner. However, emergency work may be done without prior permission.
- D. The CONTRACTOR has the obligation and responsibility at all times to plan and monitor all of its activities, anticipating and scheduling its staff, materials, plant and Work methods in a manner that is likely to ensure completion of the Work in accordance with the terms and conditions of the Contract and at a rate that will allow it to be completed within the Contract Time.

#### 1.2 FORM OF SCHEDULES:

- A. Prepare schedules in form of a horizontal bar chart.
  - 1. Provide separate horizontal bar for each trade or operation.
  - 2. Horizontal Time Scale: Identify first work day of each week.
  - 3. Scale and spacing to allow space for notations and future revisions.
- B. Format of Listings: Chronological order of start of each item of work.
- C. Identification of Listings: By major specification section numbers.
- D. Computer scheduling software: Use Microsoft Project, operating system.

#### 1.3 CONTENT OF SCHEDULES:

- A. Construction Progress Schedule:
  - 1. Show complete sequence of construction by activity.
  - 2. Show dates for beginning and completion of each major element of construction and installation dates for major items of equipment. Elements shall include, but not be limited to, the following:

- a. Shop drawing receipt from supplier/manufacturer submitted to CM, review and return to supplier/manufacturer.
  - b. Material and equipment order, manufacturer, delivery, installation, and checkout.
  - c. Performance tests and supervisory services activity.
  - d. Piping, duct work, and wiring installation.
  - e. Construction of various facilities.
  - f. Backfilling, grading, seeding, sodding and landscaping.
  - g. Final cleanup.
  - h. Allowance for inclement weather.
  - i. Demolition.
3. Show projected percentage of completion for each item as of first day of each month.

1.4 SCHEDULE REVISIONS:

- A. Every 30 days CONTRACTOR shall revise construction schedule to reflect changes in progress of work.
- B. Indicate progress of each activity at date of submittal.
- C. Show changes occurring since previous submittal of schedule.
  1. Major changes in scope.
  2. Activities modified since previous submittal.
  3. Revised projections of progress and completion.
  4. Other identifiable changes.
- D. Provide a narrative report as needed to define:
  1. Problem areas, anticipated delays, and impact on schedule.
  2. Corrective action recommended and its effect.
  3. Effect of changes on schedules of other CONTRACTORS.
- E. Recovery Schedule:
  1. When periodic update indicates the Work is 14 or more calendar days behind the current



accepted schedule, submit a separate recovery schedule indicating means by which CONTRACTOR intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required achieving compliance, and dating by which recovery will be accomplished.

2. If, at any time, the Work is behind schedule with respect to the progress schedule currently in force, and if the CM believes there is a risk of the Work not being completed within the Contract Time as a result of such delay, the CONTRACTOR shall take all necessary measures to make up for such delay either by increasing staff, plant or facilities, or by amending its Work methods, whichever is applicable, with no change to the Contract Price.

#### 1.5 SUBMITTAL REQUIREMENTS:

- A. For initial submittal of construction schedule and subsequent revisions thereof, furnish six copies of schedule to CM.
- B. Format for Submittals: Submit required submittals in the following format:
  1. Working electronic copy of schedule file, where indicated.
  2. PDF electronic file.

#### 1.6 CONTRACTOR'S LOOK-AHEAD SCHEDULES

- A. The CONTRACTOR shall provide short interval "look ahead" schedules bi-weekly, identifying Work that has been performed during the past two weeks and activities that are planned for the next four weeks. The short interval schedule shall be consistent with the progress schedule currently in force.
- B. The Look-Ahead Schedules shall generally reflect the Work associated with the Detailed Progress Schedule. The activities in the Look-Ahead Schedules shall be identified by the same number coding as the Detailed Progress Schedule and revised as necessary.
- C. The final format of the look-ahead schedules will be determined by the CM and Owner.

### **PART 2 - PRODUCTS**

(Not Used)

### **PART 3 - EXECUTION**

(Not Used)

END OF SECTION

## SECTION 01380 CONSTRUCTION PHOTOGRAPHS

### **PART 1 - GENERAL**

#### 1.1 DESCRIPTION:

- A. Provide construction photographs pertinent to the Contract work during the Contract period as specified.
  - 1. Section includes administrative and procedural requirements for the following:
    - a. Preconstruction photographs.
    - b. Periodic construction photographs.
    - c. Final completion construction photographs.

#### 1.2 SUBMITTALS:

- A. Submit the following shop drawings in accordance with Section.
- B. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation of construction. Include same information as corresponding photographic documentation.
- C. Digital Photographs: Submit image files within three days of taking photographs.
  - 1. Digital Camera: Minimum sensor resolution of 8 megapixels.
  - 2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
  - 3. Identification: Provide the following information with each image description in file metadata tag:
    - a. Name of Project and Owner's project number.
    - b. Name and contact information for photographer.
    - c. Name of Engineer and Construction Manager.
    - d. Name of CONTRACTOR.
    - e. Date photograph was taken.

- f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
- g. Unique sequential identifier keyed to accompanying key plan.

1.3 QUALITY ASSURANCE:

- A. Comply with the requirements specified in Section 01410.
- B. Photographer to use techniques, material and equipment capable of producing photographs of high quality and resolution.
- C. Photographer to be available on call on one day notice when requested by Engineer and be prepared to respond on shorter notice in unusual or unexpected conditions.
- D. Dates for photography at site to be coordinated with Engineer and Engineer to be present during photographic periods at site unless approved otherwise by Engineer.
- E. Photographer to make and retain detailed records of all photographs by photographer under this Contract:
  - 1. The records to be in sufficient detail to support any attestation that may be required of photographer.
  - 2. Photographer to retain such records for a period not less than two years from the final acceptance of entire work under this Contract.

1.4 USAGE RIGHTS:

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

**PART 2 - PRODUCTS**

2.1 PHOTOGRAPHIC MEDIA:

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

**PART 3 - EXECUTION**

3.1 CONSTRUCTION PHOTOGRAPHS:

- A. Photographer: Engage a qualified photographer to take construction photographs.
- B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
1. Date and Time: Include date and time in file name for each image.
  2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Construction Manager.
- D. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Construction Manager.
1. Flag construction limits before taking construction photographs.
  2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
  3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- E. Periodic Construction Photographs: Take 20 photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- F. Construction Manager-Directed Construction Photographs: From time to time, Construction Manager will instruct photographer about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.
- G. Final Completion Construction Photographs: Take 20 color photographs after date of Substantial Completion for submission as project record documents. Construction Manager will inform photographer of desired vantage points.
1. Do not include date stamp.

END OF SECTION

## SECTION 01410 TESTING AND QUALITY CONTROL

### **PART 1 - GENERAL**

#### **1.1 CONTRACTOR QUALITY CONTROL:**

- A. The CONTRACTOR shall provide and maintain an effective quality control program that fulfills the requirements of the GENERAL TERMS & CONDITIONS.
1. Establish a quality control system to perform sufficient inspection of all items of Work, including that of Subcontractors, to insure conformance to the Specifications and Drawings with respect to the materials, workmanship, construction, equipment performance, and identification.
  2. The CONTRACTOR's job supervisory staff may be used for quality control, supplemented as necessary by additional personnel for surveillance or special technicians to provide capability for the controls required by the Technical Specifications. The CONTRACTOR's quality control plan must clearly identify the quality control leader and personnel organizational system. The leader must have the authority to direct the removal and replacement of work.
  3. After the Contract is awarded and before construction begins, the CONTRACTOR shall meet with the Construction Manager (CM) or its representative to discuss quality control requirements. The meeting shall develop mutual understanding relative to details of the system, including the CONTRACTOR's forms to be used for recording the quality control operations, inspections, administration of the system, and the interrelationship of CONTRACTOR and CM inspection.
  4. All compliance inspections shall be recorded on appropriate forms, including but not limited to the specific items required in each section of the Technical Specifications. Those forms, including record of corrective actions taken, shall be furnished to the CM. The CM's quality control representative shall maintain a check off list of all deficiencies which are not corrected the same day as they are discovered.
  5. Should recurring deficiencies in an item or items indicate that the quality control system is not adequate; the CONTRACTOR shall take such corrective actions as may be directed by the CM.
  6. CONTRACTOR shall submit his written quality control plan for review, describing the activities and listing that inspection and testing activities that the CONTRACTOR will perform prior to beginning the Work. The CONTRACTOR's Quality Control Plan shall describe how he will communicate timely notification to allow for test and inspection activities

Performed by the CM, or its representatives, for on and off-site construction activities.

1.2 TESTING LABORATORY SERVICES:

- A. All tests which require the services of a laboratory to determine compliance with the Contract Documents shall be performed by an independent commercial testing laboratory acceptable to CM. The laboratory shall be staffed with experienced technicians, properly equipped, ACI certified, and fully qualified to perform the tests in accordance with the specified standards.

1.3 TESTING LABORATORY SERVICES FURNISHED BY CONTRACTOR:

- A. All testing laboratory services in connection with tests (which are identified as the CONTRACTOR's responsibility in the Contract Documents) shall be performed and paid for by the CONTRACTOR, and a certified copy of the results will be furnished to the CM within 5 days of the test.
- B. The CONTRACTOR is also responsible for testing and inspection services required achieving an effective quality control program, to assure that the work strictly complies with the contract requirements. CONTRACTOR shall pay all costs for such services. CONTRACTOR shall also pay for any tests performed by CM which do not meet Specifications, as described below.

1.4 TRANSMITTAL OF TEST REPORTS:

- A. Written reports of test and engineering data furnished by CONTRACTOR shall be submitted as specified in SECTION 01300.

**PART 2 - PRODUCTS**

(Not Used)

**PART 3 - EXECUTION**

(Not Used)

END OF SECTION

## SECTION 01700 CONTRACT CLOSEOUT

### **PART 1 - GENERAL**

#### 1.1 SUMMARY:

- A. This SECTION includes administrative and procedural requirements for Contract Closeout including, but not limited to, the following:
  - 1. Inspection procedures
  - 2. Project record document submittal
  - 3. Operation and maintenance manual submittal
  - 4. Submittal of warranties
  - 5. Final cleaning
  - 6. CONTRACTOR's Certification
- B. Closeout requirements for specific construction activities are included in the appropriate Sections.
- C. Related Work Specified Elsewhere:
  - 1. Prerequisites to Substantial Completion and Final Acceptance.
  - 2. SECTION 01300 – Submittals

#### 1.2 SUBSTANTIAL COMPLETION:

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, the CONTRACTOR shall satisfy the following:
  - 1. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents. Submit on CD in PDF format, and in hardcopy form.
  - 2. Obtain and submit releases enabling the CM unrestricted use of the Work and access to services and utilities.
  - 3. Submit record drawings, maintenance manuals, project photographs, damage or settlement surveys, property surveys, and similar record information as specified in Paragraph 1.4. All drawings shall be scanned and submitted on CD in PDF format, and in hard copy form, 24 inch by 36 inch plan size. Other documents shall be scanned and submitted on CD in PDF format along with the originals.
  - 4. The CONTRACTOR shall provide one set of As-Built Drawings depicting all NAVD 88 elevations.
  - 5. Provide as-built surveys of canal cross-section certified by a Professional Land Surveyor. This includes verifying proper embankment slopes and removal of excess material.
  - 6. Complete final cleanup requirements, including touch up painting.

7. Touch up and otherwise repair and restore marred, exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, the CM will either proceed with inspection or advise the CONTRACTOR of unfilled requirements. The CM will prepare the Certificate of Substantial Completion following inspection or advise the CONTRACTOR of work that must be completed or corrected before the certificate will be issued.
  1. The CM will reschedule the inspection when in its opinion, the Work is substantially complete.

### 1.3 FINALACCEPTANCE:

- A. Preliminary Procedures: Submit certification by CONTRACTOR that Work has been completed in accordance with the Contract Documents to the knowledge of the CONTRACTOR. Before requesting final inspection, complete the following.
  1. Submit the final payment request with releases and supporting documentation. Include insurance certificates for products and completed operations where required.
  2. Submit a certified copy of the CM's final inspection list of items to be completed or corrected. The certified copy of the list shall state that each item has been completed.
  3. Submit consent of surety to final payment.
  4. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  5. Submit Release of Liens (from the Prime, and all Subcontractors, Vendors and Suppliers).
  6. Submit Maintenance Bond.
- B. Re-inspection Procedure: The CM will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed.
  1. Upon completion of re-inspection, the CM will advise the CONTRACTOR of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
  2. If necessary, re-inspection will be repeated.
- C. Return all keys furnished by the CM. The CONTRACTOR shall forfeit his key deposit for keys that are not returned.

### 1.4 RECORD DOCUMENT SUBMITTALS:

- A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the CM's reference during normal working hours.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop



Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Call attention to each entry by drawing a "cloud" around the areas affected.

- C. The CM will make electronic copies of whatever electronic versions of the bid plans exist, available to the CONTRACTOR for Record Drawing purposes. CONTRACTOR must obtain the concurrence of the CM as to form and content of record information provided in electronic format prior to proceeding, but in general, information similar to that shown below needs to be similarly provided.
1. Record information concurrently with construction progress.
  2. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work. Mark each document "PROJECT RECORD" in neat, large, printed letters.
  3. Mark as-built invert elevations for all water control structures, culverts, etc. Refer to SECTION 01050 Field Engineering for structures which require a permanent benchmark.
  4. Mark new information that is important to the CM that is not shown on Contract Drawings or Shop Drawings.
  5. Note related change-order numbers where applicable.
  6. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
  7. Include the following:
    - a. Where Submittals (like Shop Drawings) are used for mark-up, record a cross-reference at corresponding location on Drawings.
    - b. Field changes of dimension and detail.
    - c. Changes made by Change Order or other Modifications.
    - d. Details not on original Contract Drawings.
    - e. Record drawings shall include a plot of the actual excavation cross-sections plotted at the same station as and on top of the design cross-sections.
    - f. Give particular attention to concealed elements that would be difficult or expensive to locate at a later date.
    - g. GPS coordinates of major structures using the format lat/long DD (decimal/degree) NAD83.
  8. Record Specifications: Maintain one complete copy of the Contract Documents including addenda. Include with the Contract Documents one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.
  9. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
  10. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily

- discerned later by direct observation.
11. Note related record drawing information and Product Data.
  12. Upon completion of the Work, submit record Specifications to the CM for the CM's records on CD in MS Word format.
  13. Include the following:
    - a. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually installed, including optional and substitute items
    - b. Changes made by Addendum, Change Order, or other Modifications
    - c. Related Submittals
  14. Affix the CONTRACTOR's corporate seal on the cover sheet indicating the documents within are representative of the as-built condition of the project. The seal shall be signed by an officer of the company.
- D. Record Product Data: Provide one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.
1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
  2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
- E. Record Sample Submitted: Immediately prior to Substantial Completion, the CONTRACTOR shall meet with the CM's personnel at the Project Site to determine which Samples are to be transmitted to the CM for record purposes. Comply with the CM's instructions regarding packaging, identification, and delivery to the CM.
- F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion (unless otherwise specified), complete miscellaneous records and place in good order. Identify miscellaneous records properly, bind or file, and submit to the CM for the CM's records.
- G. Warranties and Bonds: Submit original documents as specified in GENERAL TERMS & CONDITIONS, SUPPLEMENTAL CONDITIONS, SECTION 01300, and technical specifications.

## **PART 2 - PRODUCTS**

(Not Used)

## **PART 3 - EXECUTION**

### **3.1 FINAL CLEANING:**

- A. General: The GENERAL TERMS & CONDITIONS require general cleaning during construction. Regular site cleaning is included in SECTION 02436.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.
    - a. Clean the site of rubbish, litter, and other foreign substances. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.
    - b. Remove temporary structures, tools, equipment, supplies, and surplus materials.
    - c. Remove temporary protection devices and facilities which were installed to protect previously completed Work.
- C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the CM's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.
  - 1. Where extra materials of value remain after completion of associated Work, they become the CM's property. Dispose of these materials of no value to the CM as directed by the CM.
- E. Repairs:
  - 1. Repair damaged protective coated surfaces.
  - 2. Repair roads and other items damaged or deteriorated because of construction operations, including those which have been damaged, but are not located within the project limits.
  - 3. Restore all ground areas affected by construction operations.

END OF SECTION

## SECTION 02110 CLEARING AND LAND PREPARATION

### **PART 1 - GENERAL**

#### 1.1 SCOPE:

A. Summary of Work: The CONTRACTOR shall include the removal of trees and other vegetation from areas where earthwork, road construction or other construction operations specified herein are to be performed. This section also includes land preparation activities for excavation and fill areas.

1. SECTION 02200 Earthwork

#### 1.2 APPLICABLE PUBLICATIONS: (Not Applicable)

#### 1.3 DEFINITIONS: (Not Applicable)

#### 1.4 SUBMITTALS:

A. Prior to beginning the work, CONTRACTOR shall submit a detailed plan for clearing and land preparation in conformance with SECTION 01300. The plan shall detail the sequence of work and describe the CONTRACTOR'S planned method of clearing and land preparation activities.

#### 1.5 QUALIFICATIONS: (Not Applicable)

#### 1.6 RESPONSIBILITIES:

A. The CONTRACTOR shall ensure the safe passage of persons around areas of clearing and land preparation. The CONTRACTOR shall conduct its operations to prevent injury to adjacent structures, vegetation designated to remain, other facilities and persons.

B. Traffic:

1. The CONTRACTOR shall conduct its operations and the removal of cleared materials to ensure minimum interference with existing access roads and other adjacent occupied or used facilities.
2. The CONTRACTOR shall not block or otherwise obstruct access roads or other occupied or used facilities without permission from the CM. Where blockage is allowed, the CONTRACTOR shall provide alternate routes around closed or obstructed traffic ways.

C. The CONTRACTOR may commence clearing or land preparation within portions of the project falling within the limits of temporary construction easements or utility right-of-way only with specific permission from the CM for each activity and location. All requirements under A and B above apply within these limits.

D. CONTRACTOR is advised that site access on the slopes will require caution due to the possible presence of a soft compressible layer of organic fibrous and non-fibrous peats and marls on the surface. These surface soils may be unstable under heavy

And/or repeated traffic loads especially when in a saturated condition. The CONTRACTOR shall visit site and become acquainted with ground conditions to be encountered prior to bidding the work.

1.7 CERTIFICATIONS AND TESTING: (Not Applicable)

1.8 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the CM as requested for inspection. The CONTRACTOR shall provide 48 hours' notice of its intention to begin new WORK activities.

1.9 WARRANTY: (Not Applicable)

## **PART 2 - PRODUCTS**

**(Not Applicable)**

## **PART 3 - EXECUTION**

3.1 GENERAL CLEARING:

- A. The CONTRACTOR shall remove the majority of the above grade non-native vegetative matter in the areas indicated on the plans. The CONTRACTOR shall complete the work of Clearing and Land Preparation as outlined below.
  1. Mowing or the use of a bush-hog may be required in areas of heavy grass, weeds, or woody-stalked vegetation.
  2. Completely remove all designated exotic/hazardous trees within the designated project boundaries.
  3. All woody debris that measures over three-quarters inch in diameter and longer than 18-inches shall be removed.
  4. All stumps shall be ground level to six inches below the surrounding ground level. Stumps on the slopes shall be cut flush with the natural angle of the existing grade and treated immediately with an herbicide approved by the CM. All seedlings within the project site shall be treated with the herbicide.
  5. All plant material (whole or chipped) will be removed from the project area and stockpiled at a location authorized by the CM. Disposal of the stockpile shall be accomplished at a maximum of every 15 workdays.
  6. Remove any garbage or other waste debris recovered during clearing.
  7. On completion of the clearing, remove all sticks, rubbish and other extraneous material and rake the ground surface in order to leave a smooth and clean appearance.
  8. Clearing and land preparation shall proceed sufficiently ahead of earthwork activities to minimize disruption and allow time for determination of the adequacy of the clearing procedure.
  9. All work shall be performed in accordance with approved principles of modern arboricultural methods.

10. All trees to remain in the project area, as designated by the CM, shall be protected from damage by tree barricades.
  11. All work shall be performed without damage to existing amenities, including trees and shrubs. The CONTRACTOR shall be responsible for repair and replacement of existing amenities to the satisfaction of the CM. The CONTRACTOR shall protect all vegetation, habitats, or amenities on the project location as indicated on the plans.
- B. The CONTRACTOR shall clear adjacent to cut or fill sections to a minimum distance of 10 feet outside of slope lines unless lesser distances are specified. Clearing in areas of native vegetation for levee construction or removal and canal excavation shall be limited to a distance of 10 feet outside of slope lines.
  - C. Burning is not permitted on site.
- 3.2 CLEARING WITHIN AREAS OF NATIVE VEGETATION:
- A. The CONTRACTOR shall remove exotic trees/plants, hazardous material, trash, and debris and leave the site clean with a smoothly raked finish grade. Every reasonable effort shall be made to protect native vegetation designated to remain, such as Coco Plum, Salt Bush, Pond Apples, Leather fern, etc. Areas disturbed by work operations, such as, but not limited to, access points beyond the limits of the right-of way, shall be restored to original or better condition, including, but not limited to, filling, grading, sodding, and seeding/mulching as direct by the CM.
- 3.3 ROADWAY CLEANING:
- A. The CONTRACTOR shall remove all brush, vegetation, and small trees ( $\leq 4$ " diameter) within the limits of the canal shown on the plans. Disposal shall be onsite at the spoil disposal locations indicated on the plans and in the Environmental Resource Permit.

END OF SECTION

## SECTION 02200 EARTHWORK

### PART 1 - GENERAL

#### 1.1 SCOPE:

- A. Summary of Work: The CONTRACTOR shall furnish all labor, equipment, and materials for all excavating, trenching, filling, construction of embankment, backfilling, compacting, grading, and all related items of earthwork necessary to complete the WORK indicated or specified.
- B. Related work specified elsewhere:
  - 1. SECTION 02110 Clearing and Land Preparation
  - 2. SECTION 02230 Roadway Excavation, Backfill, and Compaction
  - 3. SECTION 02401 Dewatering
  - 4. SECTION 02735 Gravel Roadway

#### 1.2 APPLICABLE PUBLICATIONS:

- A. American Society of Testing Materials (ASTM):
  - 1. D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using the Standard Effort (12,400 ft-lbf/ ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - 2. D1556 – Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
  - 3. D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using the Modified Effort (56,000 ft-lbf/ ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  - 4. D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
  - 5. D2937 – Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method.
  - 6. D3740 – Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
  - 7. D4253 – Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
  - 8. D4254 – Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
  - 9. D4564 – Standard Test Method for Density and Unit Weight of Soil in Place by the Sleeve Method.
  - 10. D4914 – Standard Test Methods for Density and Unit Weight of Soil and Rock in Place by the Sand Replacement Method in a Test Pit.
  - 11. D5030 – Standard Test Method for Density of Soil and Rock in Place by the Water Replacement Method in a Test Pit.

12. D6938 – Standard Test Method for In-place Density and Water Content of Soil and Soil-Aggregate by Nuclear Method Shallow Depth.
  13. E329 – Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
- B. Florida Department of Transportation (FDOT):
1. Standard Specifications for Road and Bridge Construction (latest edition).
- C. American Association of State Highway Transportation Officials (AASHTO):
1. AASHTO T 27 – Sieve Analysis of Fine and Course Aggregates.
  2. AASHTO T 99 - Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop.
  3. AASHTO T 180 - Modified Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- D. Florida Method (FM) of Test:
1. FM T-1 011 – Florida Method of Test for Sampling Aggregates.
- E. Miscellaneous Project Data:
1. Subsurface soil data logs are provided for the CONTRACTOR’S reference.
  2. The geotechnical report for this project is titled “Limited Geotechnical Exploration” prepared by Universal Engineering Sciences dated March 20, 2015

### 1.3 DEFINITIONS [if applicable]:

- A. Select Backfill: Select backfill shall be clean, well-graded material free from debris, peat, roots, seeds of nuisance or exotic species, organic material, clods, and stones with a diameter greater than 3 inches (76 mm) in any direction. Select backfill shall have an average organic content of less than 5% with an individual organic content of less than 7%. Select backfill shall be placed where indicated on the Drawings. Select backfill is required where higher control of materials and placement is needed such as water retaining embankment cores, roadway embankments, and adjacent to structures. Select backfill may be material excavated for the WORK (native) or may be imported. The CONTRACTOR may blend native materials to achieve a material that meets the requirements for select backfill. Select backfill shall meet the following Unified Soil Classification System (ASTM D2487) designations:
1. Structure Backfill: SW, SP, SP-SM or SW-SM (These are coarse-grained soils with greater than 50% by dry weight retained on a No. 200 sieve; SP and SW have less than 5% finer than a No. 200 sieve; SP-SM and SW-SM have 5% to less than 12% finer than a No. 200 sieve.)



Select Backfill shall meet the following revised FDOT gradation limits (AASHTO T27 and FM 1-T 011):

<b>BACKFILL GRADATION LIMITS</b>	
<b>SIEVE SIZE</b>	<b>PERCENT PASSING (%)</b>
3 ½ inches [90 mm]	90-100
¾ inch [19 mm]	70-100
No. 4 [4.75 mm]	30-100
No. 40 [425 µm]	15-100
No. 100 [150 µm]	5-65
No. 200 [75 µm]	0-less than 12

- B. **Random Backfill:** Random backfill shall be clean, well-graded material, that is thoroughly mixed and free from debris, clods, seeds of nuisance or exotic species, and stones with a diameter in any direction greater than those specified in the below table. Random backfill shall have an organic content of less than 5% by weight. Tighter restrictions on stone size are considered in the top layer of fill, as per subsection 3.03 F. Final Dressing of Slopes, if the area is to be seeded, sodded, or landscaped. Random backfill shall be placed where indicated on the Drawings. Random backfill is required where stable backfill is needed to maintain slopes and grades, but shall not retain water or be adjacent to structures. Random backfill shall consist of material with a USCS (ASTM D2487) designation as defined for Structure Backfill in Part 1.03.1 of this SECTION.

Random backfill shall meet the below requirements with the largest particle diameter not exceeding 90% of the compacted layer thickness.

<b>RANDOM BACKFILL</b>		
<b>MAXIMUM PARTICLE SIZE</b>	<b>SURFACE DEPTH</b>	<b>MAXIMUM COMPACTED LIFT THICKNESS</b>
3 ½ inches	< 12 inches	6 inches
6 inches	12-24 inches	12 inches
12 inches	> 24 inches	12 inches

- C. **Unclassified Fill:** Unclassified Fill may be material used to bring areas to grade where there is no potential for slope erosion and the fill will not support a structure of critical function. Unclassified backfill shall be placed where neither select backfill nor

- random backfill are shown on the Drawing. Unclassified Backfill shall be free from seeds of nuisance or exotic species, and will be composed of material excavated for the WORK or imported material that can be compacted to the required density.
- D. Unified Soil Classification System (USCS): USCS is a two-letter classification system used to describe the texture and grain size of a soil. In the USCS system, letters are representative as follows: G stands for gravel, S stands for sand, M stands for silt, C stands for clay, O stands for organic, P stands for poorly graded, W stands for well graded, H stands for high plasticity, and L stands for low plasticity.
  - E. Excavation: Excavation shall be the removal of all materials within the defined configuration to the limits of excavation shown on the Project Drawings, excluding stripping material.
  - F. Unsuitable Fill: Soil that does not meet the requirements for fill (or backfill) addressed thus far in this SECTION shall be considered unsuitable fill soil.
  - G. Cohesionless materials: These materials include gravels, gravel-sand mixtures, sands, and gravelly sands and are generally exclusive of clayey and silty materials (clayey and silty materials are free-draining, so impact compaction does not produce a well-defined moisture-density relationship curve).
  - H. Cohesive materials: These materials include silts and clays and are generally exclusive of sands and gravel (sands and gravel are materials for which impact compaction produces a well-defined moisture-density relationship curve).

1.4 SUBMITTALS: (Not Applicable)

1.5 QUALIFICATIONS:

- A. Geotechnical Testing Agency Qualifications: The CONTRACTOR will engage and pay for an independent testing agency qualified according to ASTM E 329 to perform Quality Control. This Quality Control involves conducting soil materials and rock-definition testing during earthwork operations, as documented according to ASTM D 3740.
- B. Earthwork CONTRACTOR Qualifications: The CONTRACTOR shall use an adequate number of skilled laborers and installers who are thoroughly trained and have a minimum of 5 years of successful experience in the necessary crafts and are completely familiar with the code requirements, the contract provisions, and the methods needed for the proper performance of the WORK of this SECTION. The CONTRACTOR shall employ the adequate resources and equipment necessary to successfully perform the WORK of this SECTION on schedule.

1.6 RESPONSIBILITIES:

- A. The CONTRACTOR shall excavate any material encountered to the depth and grades required, shall backfill such excavations as required, and shall dispose of excess or unsuitable materials from excavation as approved by the Construction Manager (CM). The CONTRACTOR shall provide and place necessary borrow material to properly backfill excavations as indicated on the Drawings, specified herein, or as directed by the CM.
- B. Excavation, dewatering, sheeting, and bracing required shall be carried out so as to prevent any possibility of undermining or disturbing the foundations of any existing structure or WORK, and so that all WORK may be accomplished and inspected in the dry, except as directed by the CM. Aqueous construction may be performed only with prior written approval of the CM. Excavation and backfilling shall be in accordance with SECTION 125 of the latest edition of the FDOT Standard Specifications for Road and Bridge Construction.
- C. The CONTRACTOR shall furnish the services of a State of Florida licensed land surveyor for the field layout of all work indicated or specified in this section. The CONTRACTOR'S licensed land surveyor shall perform all initial site layouts and shall provide follow-up verification of all work underway at a frequency of no less than once a week.

1.7 CERTIFICATIONS AND TESTING: CONTRACTOR shall furnish, at his own expense, all field density testing required to establish and maintain individual Quality Control (QC) processes required or specified in this SECTION. Field density tests shall be in accordance with ASTM Standards (some referenced herein) appropriate to each type of material used in backfilling. Failure to meet the specified density will require the CONTRACTOR to re-compact and retest, at his own expense, those areas directed by the CM.

1.8 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the CM as requested for inspection. The CONTRACTOR shall provide 48 hours advanced notice of his intention to begin new WORK activities.

1.9 WARRANTY:

- A. The CONTRACTOR shall warrant the WORK against defects for one year from the date of Substantial Completion.

**PART 2 - PRODUCTS**

2.1 MATERIALS ENCOUNTERED:

- A. The CONTRACTOR shall excavate unsuitable materials such as asphalt/concrete, substructures, topsoil, grass, vegetation systems, and/or underground utilities.

- B. The CONTRACTOR shall consider all materials encountered in excavations as suitable for use in random fill, provided that they consist of two or more well-graded soils and achieve the required compaction as specified in this SECTION.
- C. The CONTRACTOR shall consider all materials encountered, regardless of type, character, composition and condition thereof unclassified other than as indicated in Article 1.03 Definitions. The CONTRACTOR shall estimate the quantity of various materials included prior to submitting the Bid Form. Rock encountered shall be handled by the CONTRACTOR at no additional cost to CM.

**PART 3 - EXECUTION:**

**3.1 SITE PREPARATION:**

- A. Clearing: The CONTRACTOR shall perform clearing as specified in SECTION 02110 - Clearing and Land Preparation.

**3.2 EXCAVATION AND TRENCHING:**

- A. Blasting: Blasting will not be permitted.
- B. Excavation for Structures: The CONTRACTOR shall perform excavation for structures as shown, required and specified below:
  - 1. Excavate area adequate to permit efficient erection and removal of forms.
  - 2. Trim to neat lines where details call for concrete to be deposited against earth.
  - 3. Excavate by hand in areas where confined space and access restricts the use of machines.
  - 4. Notify the CM immediately when excavation has reached the depth indicated on plans.
  - 5. Restore bottom of excavation to proper elevation with concrete in areas that are over excavated.
  - 6. Conform to the requirements of SECTION 125 of the latest edition of the FDOT Standard Specifications for Road and Bridge Construction..
- C. Demucking: The CONTRACTOR shall remove all organic soils from areas below structures, piping, and road sub-grades to the lines and grades as shown in the Drawings. Materials excavated shall not be used for backfill of structures or pipes and shall be placed in random fill zones only. Organic soils (including peat) shall be used in random fill in the top layer of the final dressing of the levee.
- D. Cross-Sections: For pay quantity and record purposes, the CONTRACTOR shall submit field measured cross-sections as required by the CM.

**3.3 EMBANKMENT:**

- A. Roadway Embankment: The CONTRACTOR shall construct embankments for roadways in accordance with the requirements of SECTION 120 of the latest edition of the FDOT Standard Specifications for Road and Bridge Construction.

34 BACKFILLING:

A.

B. **Unclassified Backfill:** The CONTRACTOR shall ensure that unclassified backfill be placed in 12 inch loose lifts to the lines and grades shown on the Drawings or as approved by the CM. The CONTRACTOR shall compact unclassified backfill to a density approximating the density of surrounding native material and in a manner that will prevent settlement of the completed area.

35 MAINTENANCE:

A. The CONTRACTOR shall protect newly graded areas from actions of the elements.

B. The CONTRACTOR shall fill, repair, and re-establish grades to the required elevations and slopes for any area that shows settling or erosion occurring prior to seeding.

END OF SECTION

## SECTION 02230 ROADWAY EXCAVATION, BACKFILL AND COMPACTION

### **PART 1 - GENERAL**

#### 1.1 SCOPE:

- A. Summary of Work: The work specified shall consist of the excavation and embankment required for the construction of the roadway, ditches, and shoulders for improvement of the access site access and the temporary access road and includes the preparation of subgrades, the construction of embankments, and utilization or disposal of the materials excavated, and the compaction and dressing of excavated areas and embankments. All work shall be in accordance with the alignment, grades and sections as shown in the Drawings or as directed.

#### 1.2 APPLICABLE PUBLICATIONS:

- A. Florida Department of Transportation (FDOT):
  - 1. Standard Specifications for Road and Bridge Construction, latest edition, (FDOT)
- B. American Society of Testing Materials (ASTM):
  - 1. D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by Sand Cone Method
  - 2. D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by the Nuclear Methods (Shallow Depth)
- C. American Association of State Highway and Transportation Officials (AASHTO):
  - 1. T180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

#### 1.3 DEFINITIONS: (Not Applicable)

#### 1.4 SUBMITTALS: (Not Applicable)

#### 1.5 QUALIFICATIONS: (Not Applicable)

#### 1.6 RESPONSIBILITIES: (Not Applicable)

#### 1.7 CERTIFICATIONS AND TESTING: The CONTRACTOR shall provide to the Construction Manager (CM) three copies of certified test results for the tests required to be performed by the CONTRACTOR.

#### 1.8 TESTS: If the CM deems necessary, field density tests may be used in accordance with ASTM D1556, Test for Soil in Place by Sand Cone Method, or ASTM D2922. The areas to be tested shall be determined by the CM. Laboratory compaction tests shall be conducted in accordance with AASHTO T180. Cost of testing will be the responsibility of the CONTRACTOR. The CONTRACTOR shall make the site available for testing and cooperate

fully to allow tests to be taken. Failure to meet the specified density will require the CONTRACTOR to re-compact and retest those areas directed by the CM.

1.9 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the CM as requested for inspection. The CONTRACTOR shall provide 48 hours' notice of its intention to begin new WORK activities.

1.10 WARRANTY:

A. The CONTRACTOR shall warrant the WORK against defects for one year from the date of Substantial Completion.

## **PART 2 - PRODUCTS**

A. MATERIALS FOR BACKFILL: The CONTRACTOR shall use all suitable materials resulting from the excavation to the extent practicable in the construction of the roadway and such other phases as shown on the drawings or required for completion of the work, as directed by the CM. Materials shall conform to FDOT Section 120-7.2 and shall contain no muck, stumps, roots, brush, organic matter, rubbish or other material that will not compact into a suitable and enduring roadbed.

## **PART 3 - EXECUTION**

31 EMBANKMENT CONSTRUCTION: The CONTRACTOR shall construct by the dry fill method as specified by FDOT Specification Section 120-8.2.

32 COMPACTION: The CONTRACTOR shall compact each layer of material used in the formation of the embankments to a density of at least 95 percent of the maximum dry density as determined by AASHTO T180. Each layer shall be uniformly compacted using equipment which will achieve the required density, and as compaction operations progress, each layer shall be shaped and manipulated as necessary to assure uniform density throughout the embankment. The material being compacted shall be maintained within plus or minus 2 percent of its optimum moisture content during compaction.

33 FINAL DRESSING: As a final grading operation the CONTRACTOR shall shape the surface of the earthwork to conform to the lines, grades and cross sections shown on the drawings or as directed by the CM. The tolerances of 0.3 feet above or below the plan cross section will be permitted with the following exceptions:

A. The surface of shoulders and subgrade shall be shaped to within 0.1 foot of the drawing cross section.

B. Earthwork shall be shaped to match adjacent pavement, curb, sidewalk, etc.\_

END OF SECTION

## SECTION 02240 SOIL STABILIZATION

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Work Included: This Section includes providing all material, labor, tools and equipment for installation of Cellular Confinement System as shown in the Contract Documents and as specified in this Section.
- B. The Cellular Confinement System shall be used for load support.

#### 1.2 RELATED SECTIONS AND DIVISIONS

- A. The applicable provisions of the General Conditions shall govern the work in this Section.
- B. Section 01010 – Summary of Work
- C. Section 02110 – Clearing and Land Preparation
- D. Section 02200 - Earthwork
- E. Section 02436 Environmental Protection

#### 1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO)
  - 1. AASHTO M 218 - Steel Sheet, Zinc-Coated (Galvanized) for Corrugated Steel Pipe.
  - 2. AASHTO M 288 - Geotextile Specification for Highway Applications
- B. American Society of Testing and Materials (ASTM)
  - 1. ASTM D 1505 - Density of Plastics by the Density-Gradient Technique.
  - 2. ASTM D 1603 - Standard Test for Carbon Black in Olefin Plastics
  - 3. ASTM D 1693 - Environmental Stress-Cracking of Ethylene Plastics.
  - 4. ASTM D 5199 - Measuring Nominal Thickness of Geotextiles and Geomembranes.
  - 5. ASTM E 41 - Terminology Relating to Conditioning.

#### 1.4 SUBMITTALS

- A. Submit Manufacturer's shop drawings in accordance with Section 01300, including Manufacturer's product data, samples and section layout.
- B. Design Calculations and Drawings. Provide a complete set of design calculations including a description of the analysis performed to determine the load support and anchorage requirements.
  - 1. The calculations shall be submitted at the time of bid.
  - 2. Minimum overall design factor of safety shall be 1.4.



3. At a minimum; include design conditions, load support calculations, calculated factors of safety and friction angles.
  4. If required, provide a description of the recommended geotextile separation layer and include in the calculations.
  5. If required, provide calculations for the recommended anchorage system.
  6. The calculations shall be in Microsoft Excel converted to Adobe PDF format.
  7. Cross section drawings shall be in AutoCAD converted to Adobe PDF format.
- C. Manufacturer's Certificate of Analysis: Manufacturer shall supply certificate of analysis containing the following test results for the cellular confinement material used for project: Base Resin Lot Number(s), Resin Density per ASTM-1505, Production Lot Number(s), Material Thickness, Short Term Seam Peel Strength, and percentage of Carbon Black.
- D. Submit qualifications certifying the installer is experienced in the installation of the specified products.
- E. Submit qualifications of Manufacturer's field representative certifying the field representative is experienced in the installation of the specified products.
- F. No material will be considered as an equivalent to the Geoweb material specified herein unless it meets all requirements of this specification, without exception. Manufacturers seeking to supply what they represent as equivalent material must submit records, data, independent test results, samples, certifications, and documentation deemed necessary by the Engineer to prove equivalency. The Engineer shall approve or disapprove other Manufacturers materials in accordance with the General Conditions after all information is submitted and reviewed. Any substitute materials submitted shall be subject to independent lab testing at the Contractor's expense.

#### 1.5 QUALITY ASSURANCE AND CONTROL

- A. The cellular confinement system material shall be provided from a single Manufacturer for the entire project.
- B. The Manufacturer's Quality management system shall be certified and in accordance with ISO 9001:2008 and CE certification. Any substitute materials submitted shall provide a certification that their cellular confinement manufacturing process is part of an ISO program and a certification will be required specifically stating that their testing facility is certified and in accordance with ISO. An ISO certification for the substitute material will not be acceptable unless it is proven it pertains specifically to the Geoweb manufacturing operations.
- C. The Manufacturer shall provide certification of compliance to all applicable testing procedures and related specifications upon the customer's written request. Request for certification shall be submitted no later than the date of order placement. The Manufacturer shall have a minimum of 20 years of experience producing cellular confinement systems.
- D. Pre-Installation Meeting: Prior to installation of any materials, conduct a pre-installation meeting to discuss the scope of work and review installation requirements.

The pre-installation meeting shall be attended by all parties involved in the installation of the cellular confinement system.

E. Manufacturer's Field Representative Qualifications:

1. Manufacturer shall provide a qualified field representative on site at the start of construction to ensure the Geoweb system is installed in accordance with the Contract Documents.
2. Manufacturer's field representative shall have a minimum of 5 years installation experience with the specified products in the specified application.
3. Manufacturer of any substitute materials to be used shall certify that a representative can meet the above criteria and will be on site for initial construction start up. Manufacturers other than Presto shall be required to provide proof the representative meets these qualifications.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in Manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and Manufacturer.
- B. The materials shall be stored in accordance with Manufacturer's instructions. The materials shall be protected from damage and out of direct sunlight.
- C. The materials shall be delivered, unloaded and installed in a manner to prevent damage.

1.7 WARRANTY

- A. The Manufacturer shall warrant each Geoweb section that it ships to be free from defects in materials and workmanship at the time of manufacture. The Manufacturer's exclusive liability under this warranty or otherwise will be to furnish without charge to the original f.o.b. point a replacement for any section which proves to be defective under normal use and service during the 10-year period which begins on the date of shipment. The Manufacturer reserves the right to inspect any allegedly defective section in order to verify the defect and ascertain its cause.
- B. This warranty shall not cover defects attributable to causes or occurrences beyond the Manufacturer's control and unrelated to the manufacturing process, including, but not limited to, abuse, misuse, mishandling, neglect, improper storage, improper installation, improper alteration or improper application.
- C. In no event shall the Manufacturer be liable for any special, indirect, incidental or consequential damages for the breach of any express or implied warranty or for any other reason, including negligence, in connection with the cellular confinement system.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. Presto Geosystems, Website [www.prestogeo.com](http://www.prestogeo.com), or equivalent with prior owner approval.

2.2 GEOWEB CELLULAR CONFINEMENT SYSTEM

#### A. Manufacturing Certification

1. The manufacturer shall have earned a certificate of registration, which demonstrates that its quality-management system for its Geoweb cellular confinement system is currently registered to the ISO 9001:2008 and CE quality standards.

#### B. Base Materials

1. Polyethylene Stabilized with Carbon Black
  - a) Density shall be 58.4 to 60.2 lbs/ft<sup>3</sup> (0.935 to 0.965 g/cm<sup>3</sup>) in accordance with ASTM D 1505.
  - b) Environmental Stress Crack Resistance (ESCR) shall be 5000 hours in accordance with ASTM D 1693.
  - c) Ultra-Violet light stabilization with carbon black.
  - d) Carbon Black content shall be 1.5 to 2 percent by weight, through addition of a carrier with certified carbon black content.
  - e) Carbon black shall be homogeneously distributed throughout material.
  - f) The manufacturer must have an in-place quality control to prevent irregularities in strip material.

#### C. Cell Properties

1. Individual cells shall be uniform in shape and size when expanded.
2. Individual cell dimensions (nominal) shall be plus or minus 10%.
3. GW30V-Cell
  - a) Length shall be 11.3 inches (287 mm).
  - b) Width shall be 12.6 inches (320 mm).
  - c) Nominal area shall be 71.3 in<sup>2</sup> (460 cm<sup>2</sup>) plus or minus 1%.
4. Nominal cell depth shall be 6 inches (150 mm)

#### D. Strip Properties and Assembly

1. Perforated Textured Strip/Cell
  - a) Strip sheet thickness shall be 50 mils (1.27 mm), minus 5 percent, plus 10 percent in accordance with ASTM D 5199. Determine thickness flat, before surface disruption.
  - b) Polyethylene strips shall be textured surface with a multitude of rhomboidal (diamond shape) indentations.
  - c) Textured sheet thickness shall be 60 mils, plus or minus 6 mils (1.52 mm plus or minus 0.15 mm).
  - d) Indentation surface density shall be 140 to 200 per in<sup>2</sup> (22 to 31 per cm<sup>2</sup>).
  - e) Perforated with horizontal rows of 0.4 inch (10 mm) diameter holes.
  - f) Perforations within each row shall be 0.75 inches (19 mm) on-center.

- g) Horizontal rows shall be staggered and separated 0.50 inches (12 mm) relative to hole centers.
- h) Edge of strip to nearest edge of perforation shall be a minimum of 0.3 inches (8 mm).
- i) Centerline of spot weld to nearest edge of perforation shall be a minimum of 0.7 inches (18 mm).
- j) A slot with a dimension of 3/8 inch x 1-3/8 inch (10 mm x 35 mm) is standard in the center of the non-perforated areas and at the center of each weld.

#### E. Assembly of Cell Sections

- 1. Fabricate using strips of sheet polyethylene each with a length of 142 inches (3.61 m) and a width equal to cell depth.
- 2. Connect strips using full depth ultrasonic spot-welds aligned perpendicular to longitudinal axis of strip.
- 3. Ultrasonic weld melt-pool width shall be 1.0 inch (25 mm) maximum.
- 4. Weld spacing for GW30V-cell sections shall be 17.5 inches plus or minus 0.10 inch (445 mm plus or minus 2.5 mm).

#### F. Cell Seam Strength Tests

- 1. Minimum seam strengths are required by design and shall be reported in test results. Materials submitted with average or typical values will not be accepted. Written certification of minimum strengths must be supplied to the Engineer at the time of submittals.
- 2. Short-Term Seam Peel-Strength Test
  - a) Cell seam strength shall be uniform over full depth of cell.
  - b) Minimum seam peel strength shall be 480 lbf (2,130 N) for 6 inch (150 mm) depth.
- 3. Long-Term Seam Peel-Strength Test
  - a) Conditions: Minimum of 7 days in a temperature-controlled environment that undergoes change on a 1 hour cycle from room temperature to 130 degrees F (54 degrees C).
  - b) Room temperature shall be in accordance with ASTM E41.
  - c) Test samples shall consist of two, 4 inch (100 mm) wide strips welded together.
  - d) Test sample consisting of 2 carbon black stabilized strips shall support a 160 pound (72.5 kg) load for test period.

### 2.3 INTEGRAL COMPONENTS

#### A. ATRA® Clip

- 1. The ATRA Clip is a molded, high-strength polyethylene device available in standard (0.5 inch) and metric (10-12 mm) versions.

2. ATRA clips can be installed as an end cap on standard (0.5 inch) and metric (10-12 mm) steel reinforcing rods to form ATRA Anchors.
3. ATRA Clips can be used with tendons as load transfer restraint clips.

B. ATRA® Key

1. ATRA keys shall be constructed of polyethylene and provide a high strength connection.
2. ATRA keys shall be used to connect Geoweb panels together at each interleaf and end to end connection.

2.4 CELL INFILL MATERIALS

- A. Cell infill material shall be crushed aggregate with a maximum particle size of 2 inches (75 mm) with a fine content of less than 10%.
- B. Infill material shall be free of any foreign material.
- C. Clays, silts and organics are not acceptable infill material.
- D. Infill material shall be free-flowing and not frozen when placed in the Geoweb sections.

2.5 ADDITIONAL COMPONENTS

A. Geotextile

1. The geotextile separation layer shall be as specified in the Contract Documents.

B. Subbase Materials

1. The subbase materials shall be as specified in the Contract Documents.

C. Surface Wearing Course

1. The surface wearing course shall be as specified in the Contract Documents.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions are as indicated on the drawings. Notify the Engineer if site conditions are not acceptable. Do not begin preparation or installation until unacceptable conditions have been corrected.
- B. Verify layout of structure is as indicated on the drawings. Notify the Engineer if layout of structure is not acceptable. Do not begin preparation or installation until unacceptable conditions have been corrected.

3.2 INSTALLATION OF LOAD SUPPORT SYSTEMS

- A. Prepare subgrade and install the Geoweb load support system in accordance with Manufacturer's instructions.
- B. On-site time for installation assistance by the Manufacturer's field representative shall be 2 day(s) with one trip. All travel and expense costs for Manufacturer's field representative installation assistance shall be included in the base bid price.
- C. Subgrade Preparation

1. Excavate and shape foundation soils as indicated on the drawings.
2. Ensure foundation soil meets minimum strength requirements through proof rolling or other conventional method and is approved by the Engineer. If unacceptable foundation soils are encountered, excavate and replace with suitable quality material as directed by the Engineer.
3. Install geotextile separation layer on prepared surfaces ensuring required overlaps are maintained and outer edges of the geotextile are buried in accordance with the Manufacturer's recommendations.

#### D. Sub Base Preparation and Installation

1. It is the Contractor's responsibility to ensure that the subgrade soil meets the minimum strength requirements for installation of the subbase.
2. The contractor shall place additional subbase materials according to the drawings and to the required depth as specified in the Contract Documents.
3. Compact to a minimum 95 percent Standard Proctor.

#### E. Geoweb Section Placement and Connection

1. Place Geoweb sections and verify all sections are expanded uniformly to required dimensions and that outer cells of each section are correctly aligned. Interleaf or overlap edges of adjacent sections. Ensure upper surfaces of adjoining Geoweb sections are flush at joint and adjoining cells are fully aligned at the cell wall slot.
2. Connect the Geoweb sections with ATRA keys at each interleaf and end to end connection. Insert the ATRA key through the cell wall slot before inserting through the adjacent cell. Turn the ATRA key 90 degrees to lock the panels together.

#### F. Crushed Aggregate Infill Placement

1. Place the specified aggregate infill with suitable material handling equipment.
2. Infill material shall be free-flowing and not frozen when placed in the Geoweb sections.
3. Overfill cells with aggregate infill material. Limit the drop height of infill material to 3 feet (1 meter) to avoid damage or displacement of the cell wall.
4. Level surface approximately 2 inches (50 mm) above cell walls. Maintain the 2 inch wear surface over the Geoweb sections to prevent damage to the cell walls.
5. Compact infill to a minimum of 95 percent Standard Proctor.
6. Shape compacted surface to required elevation as indicated on the drawings.

#### G. Base Stabilization Wearing Surface

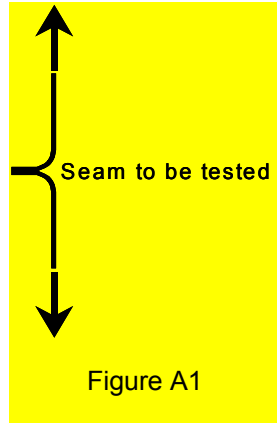
1. Ensure a minimum 2 in (50 mm) overfill is placed and compacted over the Geoweb sections prior to placing the wearing surface.
2. The wearing surface shall be as specified in the Contract Documents.

# Appendix A

## Short-Term Seam Strength Test Procedure

### Frequency of Test

The short-term seam peel strength test (referred to as the test in this section) shall be performed on a geocell section randomly taken directly from the production line each two hours.



### Test Sample Preparation

Randomly choose 10 welds within the selected section and cut those welds from the section such that 10 cm (4 in) of material exist on each side of the weld. The test sample shall have a general appearance as illustrated in Figure A1. Prior to testing, the test samples shall have air cool for a minimum of 30 minutes from the time the selected geocell section was manufactured.

### Short-term Seam Peel Strength Test

The apparatus used for testing the short-term seam peel strength shall be of such configuration that the jaws of the clamp shall not over stress the sample during the test period. Load shall be applied at a rate of 12 in (300 mm) per minute and be applied for adequate time to determine the maximum load. The date, time and load shall be recorded.

Short-term seam peel strength shall be defined as the maximum load applied to the test sample. Minimum required short-term seam peel strength shall be:

- 640 lbf (2840 N) for the 8 in (200 mm) depth cell
- 480 lbf (2130 N) for the 6 in (150 mm) depth cell
- 320 lbf (1420 N) for the 4 in (100 mm) depth cell

- 240 lbf (1060 N) for the 3 in (75 mm) depth cell.

### Definition of Pass / Failure

Two methods shall be used to determine acceptability of the manufactured geocell sections. The successful passing of the short-term seam peel test shall not be used to determine acceptability of the polyethylene for use in manufacturing of the geocell sections. Acceptability of the polyethylene shall be determined through tests conducted in Appendix B.

### The Tested Value

If more than one of the tested seam samples fails to meet the minimum peel strength, all sections manufactured after the previously successful test shall be rejected.

If all tested seam samples meet the minimum peel strength, all geocell sections manufactured since the last successful test shall be considered to have passed the test.

When one of the tested seam samples fails to meet the minimum peel strength, another 10 samples shall be randomly selected and cut from the previously selected section. If more than one of these samples fails, all sections manufactured after the previously successful test shall be rejected. Otherwise, all geocell sections manufactured since the last successful test shall be considered to have passed the test.

### Visual Failure Mode

After each sample is tested, the seam shall be examined to determine the failure mode. Two failure modes are possible.

- Material failure within and adjacent to the weld indicated by material strain and
- Weld failure resulting in complete separation of the seam and shows little or no material strain.

Upon examination, when the failure mode results in complete separation of the seam and indicates little or no material strain, product manufactured shall be rejected.

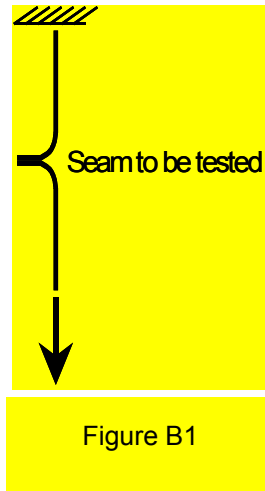
# Appendix B

## Long-Term Seam-Strength Test Procedure

### Frequency of Test

The long-term seam peel strength test (referred to as the test in this section) shall be performed:

1. on each new resin lot number if the geocell manufacturer extrudes the sheet or strip used to produce the geocell material.
2. on each new order of sheet and/or strip if the geocell manufacturer does not extrude the sheet and/or strip used to produce the geocell material.



### Test Sample Preparation

A test sample shall be made using two sets of two strips meeting all aspects of the material portion of this specification. Testing shall be done on non-perforated samples to obtain the true seam strength of the bond. One set of two strips are to be welded in welder position "A" and the other set of two strips are to be welded in welder position "B" producing two 1-cell long sections of geocell product. Welding should be done using a warm welder. The welded samples shall be labeled "A" and "B" and the weld seams of each sample shall be numbered consecutively from left to right starting with the number 1 (one) and corresponding to the welding head number.

The samples shall air cool for a minimum of 30 minutes. Randomly choose 10 welds from samples "A" and "B" and cut those welds from the geocell samples such that 4 in (10 cm) of material exist on each side of the weld. These

samples shall be cut to a width of 4 in (10 cm). Properly identify each weld using the sample letter and weld seam number.

These samples are now ready to be tested.

### Long-term Seam Peel Strength Test

The long-term seam peel strength test shall take place within an environmentally controlled chamber that undergoes temperature change on a 1-hour cycle from room temperature to 130°F (54°C). Room temperature shall be defined per ASTM E41.

Within the environmentally controlled chamber, one of the ends of the samples (10 samples in total) shall be secured to a stationary upper clamp. The jaws of the clamp shall be of such configuration that the grip does not over stress the sample during the test period. The sample shall be secured so that its axis is vertical and the welds being tested are horizontal as the sample hangs within the environmentally controlled chamber.

A weight of 160 lb (72.5 kg) shall be lifted via a hoist or lift platform and attached to the free lower end, of the sample. The weight shall be lowered in a way so that no impact load occurs on the sample being tested. The weight shall be sufficient distance from the floor of the chamber so that the weight will not touch the floor of the chamber as the sample undergoes creep during the test period. The date and hour the weight is applied shall be recorded.

The temperature cycle shall commence immediately within the environmentally controlled chamber. The test period for the applied load shall be 168 hours.

### Definition of Pass / Failure

If any of the 10 seams fail prior to the end of the 168-hour (7-day) period, the date and hour of the failure shall be recorded and the polyethylene resin and strip materials shall be considered unsuitable for geocell manufacturing.

END OF SECTION



## SECTION 02401 DEWATERING

### **PART 1 - GENERAL**

#### 1.1 SCOPE:

- A. Summary or Work: The CONTRACTOR shall furnish all labor, material and equipment necessary for the removal of all surface and subsurface waters from excavation areas. This section includes the construction of a well-point system used in conjunction with an open excavation or diversion, or other systems as proposed by the CONTRACTOR. The work includes the removal of temporary features at the completion of the work

#### 1.2 APPLICABLE PUBLICATIONS: (Not Used)

#### 1.3 DEFINITIONS: (Not Used)

#### 1.4 SUBMITTALS: The CONTRACTOR shall make submittals in accordance with SECTION 01300 and the following:

- A. The CONTRACTOR shall submit to the Water Management District a site-specific dewatering plan for regulatory approval, which includes the dewatering and diversion system, dewatering equipment, safety procedures, sequence of construction, and re-watering procedures, prior to the start of any such operations. The dewatering plans shall also include the items specified in Article 1.05 of this Section.
- B. Acquire all permits required to discharge water and protect waterways from turbidity during the dewatering operation.

#### 1.5 RESPONSIBILITIES:

- A. This is a performance specification. Except as otherwise specified or indicated, selection of equipment, materials, and methods shall be CONTRACTOR'S responsibility. The dewatering of any excavation areas and disposal of all water handled shall be in strict accordance with all local and state government rules and regulations.
- B. The CONTRACTOR shall be responsible for the design of the dewatering system including, but not necessarily limited to, the temporary cofferdam, diversion channels or ditches, required pump equipment, temporary shoring, as well as any miscellaneous temporary structures required.
- C. The dewatering plan shall include at a minimum: a site plan of the project indicating the location of the proposed discharge point(s) with the associated water quality monitoring locations, the location and type of erosion and turbidity control devices, and the methods necessary to ensure that the state water quality standards are met.

- D. Unless otherwise specified, the dewatering plans shall lower the groundwater table to a minimum of 2 feet below the excavation.
- E. The CONTRACTOR shall provide a water quality monitoring plan. For bidding purposes, it should be assumed that daily monitoring for turbidity and chlorides will be required.

Volume of water discharged must be reported at each site. The CONTRACTOR shall submit calibration data, operating ranges of the pumping equipment, and instrumentation to be used to determine flows and daily volumes pumped

- F. If it is anticipated that offsite discharges will occur due to construction dewatering activities, the CONTRACTOR must also include documentation that the dewatering activities will meet the criteria contained in the “Basis of Review for Water Use Permit Applications within the South Florida Water Management District-April 23, 2007” with emphasis on Section 2.5.2(4).
- G. The CONTRACTOR shall comply with the following conditions of the NPDES Generic Permit for the Discharge of Produced Ground Water from any Non-Contaminated Site Activity
  1. The facility is authorized to discharge produced ground water from any non-contaminated site activity which discharges by a point source to surface waters of the State, as defined in Chapter 62-620, F.A.C., ONLY if the reported values for the parameters listed in Table 1 do not exceed any of the listed screening values. Before discharge of produced ground water can occur from such sites, analytical tests on samples of the proposed untreated discharge water shall be performed to determine if contamination exists
  2. Minimum reporting requirements for all produced ground water dischargers: The effluent shall be sampled before the commencement of discharge, again within thirty (30) days after commencement of discharge, and then once every six (6) months for the life of the project to maintain continued coverage under this generic permit. Samples taken in compliance with the provisions of this permit shall be taken prior to actual discharge or mixing with the receiving waters. The effluent shall be sampled for the parameters listed in Table 1.

Table 1

Parameter	Screening Values for Discharges into:	
	Fresh Waters	Coastal Waters
Total Organic Carbon (TOC)	10.0 mg/l	10.0 mg/l
pH, standard units	6.0-8.5	6.5-8.5
Total Recoverable Mercury	0.012 µg/l	0.025 µg/l
Total Recoverable Cadmium	9.3 µg/l	9.3 µg/l
Total Recoverable Copper	2.9 µg/l	2.9 µg/l
Total Recoverable Lead	0.03 mg/l	5.6 µg/l
Total Recoverable Zinc	86.0 µg/l	86.0 µg/l
Total Recoverable Chromium (Hex.)	11.0 µg/l	50.0 µg/l

Parameter	Screening Values for Discharges into:	
	Fresh Waters	Coastal Waters
Benzene	1.0 µg/l	1.0 µg/l
Naphthalene	100.0 µg/l	100.0 µg/l

- 1.6 CERTIFICATIONS AND TESTING: A Professional Engineer in the State of Florida hired by the CONTRACTOR shall inspect, accept, and certify the used sheet piling for dewatering purposes.
- 1.7 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the DISTRICT as requested for inspection. The CONTRACTOR shall provide 48 hours notice of its intention to begin new WORK activities.
- 1.8 WARRANTY: (Not Used)

## **PART 2 - PRODUCTS**

- 2.01 PRODUCT REQUIREMENTS: All materials used in the construction of the dewatering facilities shall be selected, furnished and installed by the CONTRACTOR in accordance with the design as submitted to the DISTRICT.

## **PART 3 - EXECUTION**

### 3.1 INSTALLATION:

- A. Execution of earth excavation, installing earth retention systems, and dewatering shall not commence until the related submittals have been reviewed by the CM with all CM's comments satisfactorily addressed and the geotechnical instrumentation has been installed.
- B. Provide and maintain dewatering system in accordance with the dewatering plan.
- C. Carry out dewatering program in such a manner as to prevent undermining or disturbing foundations of existing structures or of work ongoing or previously completed.
- D. Do not excavate until the dewatering system is operational.
- E. Unless otherwise specified, continue dewatering uninterrupted until all structures, pipes, and appurtenances below groundwater level have been completed such that they will not be floated or otherwise damaged by an increase in groundwater elevation.
- F. Discontinue open pumping from sumps and ditches when such pumping results in boils, loss of fines, softening of the ground, or instability of the slopes. Modify dewatering plan and submit revised plan to the CM for acceptance.

- G. Where subgrade materials are disturbed or become unstable due to dewatering operations, remove and replace the materials in accordance with Section 02240.
- H. Dewatering Discharge:
1. Install and monitor recharge systems in accordance with the submitted dewatering plan.
  2. Install sand and gravel filters in conjunction with well points and deep wells to prevent the migration of fines from the existing soil during the dewatering operation.
  3. Transport pumped or drained water to discharge location without interference to other work, damage to pavement, other surfaces, or property.
  4. Provide separately controllable pumping lines.
  5. The CM reserves the right to sample discharge water at any time.
  6. Immediately notify the CM if suspected contaminated groundwater is encountered. Do not pump water found to be contaminated with oil or other hazardous material to the discharge locations.
- I. Monitoring Devices and Records:
1. Install, maintain, monitor and take readings from the observation wells and geotechnical instruments in accordance with the dewatering plan.
  2. Install settlement markers on structures within the zone of influence for dewatering a distance equal to twice the depth of the excavation, from the closest edge of the excavation. Conduct and report settlement surveys to 1/8-inch.
- J. Install and maintain erosion/sedimentation control devices at the point of discharge as indicated or specified and in accordance with the dewatering plan.
- K. Removal:
1. Do not remove dewatering system without written acceptance from the CM.
  2. Backfill and compact sumps or ditches with screened gravel or crushed stone wrapped with geotextile fabric.
  3. All dewatering wells shall be abandoned upon completion of the work, and completely backfilled with cement grout.

END OF SECTION

## SECTION 02436 ENVIRONMENTAL PROTECTION

### **PART 1 - GENERAL**

#### 1.1 SCOPE:

A. Summary of Work: The CONTRACTOR shall provide labor, equipment and materials for the prevention of environmental damage as the result of construction operations under this contract and for those measures set forth in other technical requirements of these specifications.

1.2 APPLICABLE PUBLICATIONS: Numerous environmental laws and regulations may apply. At the federal level, the CONTRACTOR shall comply with the Clean Water Act (CWA); Clean Air Act (CAA), Coastal Zone Management Act (CZMA); Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); Endangered Species Act (ESA); Fish and Wildlife Coordination Act (FWCA); National Environmental Policy Act (NEPA); National Pollution Discharge Elimination System (NPDES); National Historic Preservation Act (NHPA); Native American Graves Protection and Repatriation Act (NAGPRA); Resource Conservation and Recovery Act (RCRA); Toxic Substance Control Act (TSCA); Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Code of Federal Regulations (CFR); Executive Orders and Environmental Protection Agency (EPA) requirements, as appropriate; and all general and specific Nationwide Permit Conditions as applicable. Additionally, the CONTRACTOR shall comply with state and local regulations and ordinances as applicable.

1.3 DEFINITIONS: For the purpose of this specification, environmental damage is defined as the presence of hazardous, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; affect other species, biological communities, or ecosystems; or degrade the quality of the environment for aesthetic, cultural, and/or historical purposes. The control of environmental damage requires consideration of land, water, and air, and includes management of visual aesthetics, noise, solid waste, radiant energy and radioactive materials, as well as other pollutants.

1.4 SUBMITTALS: Within 20 calendar days after the Notice to Proceed, the CONTRACTOR shall submit an Environmental Protection Plan for review and acceptance by the CM. Approval of the plan shall not relieve the CONTRACTOR of his responsibility for adequate and continuing control of pollutants and appropriate environmental protection measures. Approval of the plan is conditional and predicated on satisfactory performance during construction. The CM reserves the right to require the CONTRACTOR to modify the Environmental Protection Plan if it is determined that environmental protection requirements are not being met. No physical work at the site shall begin prior to acceptance of the Environmental Protection Plan. The plan shall include, but not be limited to the following:

- A. A list of the Federal, State and Local laws, regulation and permits concerning environmental protection, pollution control and abatement that are applicable to the CONTRACTOR's proposed operations and the requirements imposed.
- B. Methods for protection of features to be preserved within the authorized work areas: The CONTRACTOR shall prepare a listing of methods to protect resources needing protection (trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil and historical, archeological and cultural resources).
- C. Procedures to be implemented are to provide the required environmental protection and to comply with applicable laws and regulations: The CONTRACTOR shall provide written assurance that immediate corrective action will be taken to correct pollution of the environment due to accident, natural causes or failure to follow the procedures set out in accordance with the Environmental Protection Plan.
- D. Environmental monitoring plans, if appropriate.
- E. Traffic control plan, if appropriate.
- F. Drawings showing locations of proposed temporary activities, such as material storage areas or stockpiles of excess spoil or materials.
- G. Erosion control methods, for protecting surface and groundwater during construction.
- H. Dust control methods for all construction activities
- I. Wildfire prevention measures
- J. Spill Prevention Methods: The CONTRACTOR shall identify any hazardous or potentially hazardous substances to be used on the job site and indicate intended actions to prevent accidental or intentional introduction of these materials into the air, ground, water, wetlands or drainage areas. The plan shall specify the actions that will be taken to meet the federal, state and local laws regarding labeling, storage, removal, transport and disposal of all hazardous or potentially hazardous substances.
- K. Spill Contingency Plan for hazardous, toxic or petroleum material.
- L. A work area plan, showing proposed activities and identifying areas of limited use or non-use, and including measures that will be taken for field identification of these areas.
- M. Identification of the person who shall be responsible for implementation of the Environmental Protection Plan. This person shall have authority to respond for the CONTRACTOR in all environmental protection matters.
- N. A recycling and waste management plan. CONTRACTOR shall include waste minimization efforts in the Plan.

1.5 QUALIFICATIONS: (Not Used)

1.6 RESPONSIBILITIES:

- A. Quality Control: The CONTRACTOR shall establish and maintain quality control for the environmental protection of all items set forth herein. The CONTRACTOR shall record on daily quality control reports or attachments thereto, any problems in complying with laws, regulations and ordinances, and corrective action taken.
- B. Permits and Authorizations: The CONTRACTOR shall obtain all needed permits or licenses unless the CM has already acquired them. The CONTRACTOR shall be responsible for implementing the terms and requirements of all permits issued for construction of the project.

1.7 CERTIFICATIONS AND TESTING: (Not Used)

1.8 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the CM as requested for inspection. The CONTRACTOR shall provide 48 hours notice of its intention to begin new WORK activities.

1.9 WARRANTY: (Not Used)

**PART 2 - ENVIRONMENTAL PROTECTION PLAN**

21 NOTIFICATION: The CM will notify the CONTRACTOR of any non-compliance with federal, state or local laws, permits or other elements of the CONTRACTOR's Environmental Protection Plan. After receipt of such notice the CONTRACTOR shall inform the CM of the proposed correction action and take such action as approved. If the CONTRACTOR fails to comply, the CM may order all work to cease until corrective action has been taken. No time extensions shall be granted or damages allowed for the suspension of work under this circumstance.

22 SUMMARY: The CONTRACTOR shall submit a written report within 30 days of completion of the project. This report shall delineate the absence, or occurrence, of environmental incidents during the course of the project.

23 TRAINING: The CONTRACTOR shall train its personnel in relevant phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, and careful installation and monitoring of the project to ensure continuous environmental pollution control.

**PART 3 - PROTECTION OF ENVIRONMENTAL RESOURCES**

3.1 GENERAL: During the entire period of the Contract, the CONTRACTOR shall protect environmental resources within the project boundaries and those affected outside the limits of permanent. The CONTRACTOR shall confine its activities to the areas defined by the drawings and specifications. Any deviations from the plans (borrow areas, disposal areas, staging areas, and alternate access routes) will require additional review by the CM to ensure compliance with environmental rules and regulations.

- 32 PROTECTION OF LAND RESOURCES: Prior to the beginning of any construction the CONTRACTOR shall identify all land resources that are to be preserved or avoided within the work area. The CONTRACTOR shall not remove, cut, deface, injure, or destroy any land resources (trees, shrubs, vines, grasses, topsoil, or land forms) unless indicated in the plans or specifically authorized by the CM. All damaged areas shall be restored to original or better condition.
- 33 DISTURBED AREAS: The CONTRACTOR shall effectively prevent erosion and control sedimentation through approved methods as identified in the Environmental Protection Plan.
- 34 PROTECTION OF WATER RESOURCES: The CONTRACTOR shall conduct his activities in a manner to avoid pollution of surface and ground water and wetlands. The CONTRACTOR's construction methods shall protect wetland and surface water areas from damage due to mechanical grading, erosion, sedimentation and turbid discharges. No storage or stockpiling of equipment shall be allowed within any wetland area unless specifically authorized under permit.

Water directly derived from construction activities shall not be allowed to directly discharge to water areas, but shall be collected in retention areas to allow settling of suspended materials. All monitoring of any water areas that are affected by construction activities shall be the responsibility of the CONTRACTOR.

- 35 OIL, FUEL AND HAZARDOUS SUBSTANCE SPILL PREVENTION: The CONTRACTOR shall prepare a spill contingency plan in accordance with 40CFR, Part 109. The CONTRACTOR shall prevent oil, fuel or other hazardous substances from entering the air, ground, drainage, and local bodies of water or wetlands. In the event that a spill occurs, despite design and procedural controls, the CONTRACTOR shall take immediate action to contain and cleanup the spill and report the spill immediately to the CM. A written report providing certification of commitment of manpower, equipment and materials necessary to prevent the spread and affect expeditious cleanup and disposal shall be submitted.
- 36 FISH AND WILDLIFE RESOURCE PROTECTION: The CONTRACTOR shall control and minimize interference with, disturbance to, and damage of fish and wildlife resources. If appropriate, threatened and endangered species that require specific protection measures shall be listed in the Environmental Protection Plan. The person designated as responsible for the Environmental Protection Plan shall be able to identify the threatened and endangered species listed in the Environmental Protection Plan. Any activity observed by the CONTRACTOR that may result in adverse impact to threatened or endangered species shall be reported immediately to the CM, who shall have sole authority for any work stoppages, creation of a buffer area, or restart of construction activities.

In the event that the CM determines that an adverse impact to threatened or endangered species may occur as a result of the construction activities, the CM shall notify the Corps of Engineers and the Fish and Wildlife Service. Adverse impact is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such



conduct. The order of contact for the Corps of Engineers and Fish and Wildlife Service shall be as follows:

TITLE	TELEPHONE NUMBER
XXX	

37. PROTECTION OF AIR RESOURCES: The CONTRACTOR shall minimize pollution of air resources. All activities, equipment, processes and work operated or performed in accomplishing the specified construction shall be in strict accordance with the applicable air pollution standards of the State of Florida (F.S. Chapter 403 and F.A.C. Section 200) and all Federal emission and performance laws and standards as appropriate. This includes control of particulates, burning and odors. For the purpose of dust suppression, the CONTRACTOR shall maintain water spraying equipment available at the site at all time. Water shall be applied regularly and as frequently as necessary to maintain the level of dust created by vehicle movements and construction activities at the site in compliance with the applicable air pollution standards.
38. PRESERVATION AND RECOVERY OF HISTORIC, ARCHEOLOGICAL, AND CULTURAL RESOURCES: If applicable, known historic, archeological and cultural resources within the CONTRACTOR's work area(s) will be designated as a "sensitive environmental area" on the contract drawings or other documents. If so designated, the CONTRACTOR shall install protection for these resources and shall be responsible for their preservation during the contract's duration. The CONTRACTOR shall not distribute maps or other information on these resource locations except for distribution among the CONTRACTOR's staff with a "need to know" technical responsibility for protecting the resources.
- A. Inadvertent Discoveries: If, during or other construction activities, the CONTRACTOR observes items that may have historic or archeological value, such observations shall be reported immediately to the CM so that the appropriate staff may be notified and a determination for what, if any, additional action is needed. Examples of historic, archeological and cultural resources are bones, remains, artifacts, shell, midden, charcoal or other deposits, rocks or coral, evidences of agricultural or other human activity, alignments, and constructed features. The

CONTRACTOR shall cease all activities that may result in the destruction of these resources and shall prevent his employees from further removing, or otherwise damaging, such resources.

- B. Claims for Downtime due to Inadvertent Discoveries: Upon discovery and subsequent reporting of a possible inadvertent discovery of cultural resources, the CONTRACTOR shall seek to continue work well away from, or otherwise protectively avoiding, the area of interest, or in some other manner that strives to continue productive activities in keeping with the contract. Should an inadvertent discovery be of the nature that substantial impact(s) to the work schedule are evident, such delays shall be coordinated with the CM.

END OF SECTION

## SECTION 02735 GRAVEL ROADWAY

### **PART 1 - GENERAL**

#### 1.1 DESCRIPTION:

- A. Provide gravel roadway as indicated and in compliance with Contract Documents.

#### 1.2 REFERENCES:

- A. American Association of State Highway and Transportation Officials (AASHTO):
  - 1. M43: Standard Specification for Sizes of Aggregate for Road and Bridge Construction.
  - 2. M145: Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.
  - 3. M147: Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses.
  - 4. M288: Standard Specification for Geotextile Specification for Highway Applications.
  - 5. T2: Standard Method of Test for Sampling of Aggregates.
  - 6. T27: Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates.
  - 7. T87: Standard Method of Test for Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test.
  - 8. T89: Standard Method of Test for Determining the Liquid Limit of Soils.
  - 9. T90: Standard Method of Test for Determining the Plastic Limit and Plasticity Index of Soils.
  - 10. T99: Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop.
  - 11. T180: Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. American Society for Testing and Materials (ASTM):
  - 1. D75/D75M: Standard Practice for Sampling Aggregates.

2. D448: Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
3. D698: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
4. D1556: Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
5. D1557: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>(2,700 kN-m/m<sup>3</sup>)).
6. D2167: Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
7. D3744: Standard Test Method for Aggregate Durability Index.
8. D6938: Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

C. Florida Department of Transportation (FDOT):

1. Standard Specifications for Road and Bridge Construction (latest edition).
2. Design Standards (latest edition).

D. U.S. Department of Transportation, Federal Highway Administration (FHWA):

1. Gravel Roads Maintenance and Design Manual, South Dakota Local Transportation Assistance Program (LTAP).

1.3 SUBMITTALS:

A. Submit the following in accordance with Section 01300.

1. Materials Reports:
  - a. Name and location of materials source.
  - b. Date of sample.
  - c. Grain-size analysis.
  - d. Laboratory compaction test results.
2. Field Evaluation Reports:
  - a. Field density testing reports: Provide results from field density testing of prepared subgrade and compacted fill.

- b. Grain-size analysis.
  - c. Laboratory compaction characteristics of soils.
  - d. Water content.
3. Geotextile:
- a. At least two weeks prior to shipment, submit manufacturer's certificate of compliance and physical property data sheet indicating that requirements for materials and manufacture are in conformance as specified.
  - b. For informational purposes only, submit manufacturer's printed installation instructions.

1.4 QUALITY ASSURANCE:

- A. Comply with the requirements specified in Section 01410.
- B. Quality assurance testing, to confirm Contactor's independent quality control (QC) testing, will be performed by the Owner. CONTRACTOR shall be responsible for the cost of his QC tests and inspection, and any retesting resulting from non-conforming work.
- C. Follow construction methods and recommendations contained in the FHWA Gravel Roads Maintenance and Design Manual.

1.5 DELIVERY STORAGE AND HANDLING:

- A. Comply with the requirements specified in Section 6 of the latest edition of the FDOT Standard Specifications for Road and Bridge Construction.

**PART 2 - PRODUCTS**

2.1 BASE AGGREGATE COURSE:

- A. Gradation: ASTM D448, No. 57.

2.2 GEOTEXTILES:

- A. Physical Properties: AASHTO M288, Class 2.
- B. Separation Fabric: AASHTO M288, Separation Requirements, Table 3.
- C. Drainage Fabric: AASHTO M288, Subsurface Drainage, Table 2 with 15 to 50 percent of in situ soil passing the No. 200 sieve.

## **PART 3 - EXECUTION**

### **3.1 SUBGRADE PREPARATION:**

- A. Excavate and shape subgrade to line, grade, and cross section shown in the drawings. The subgrade shall be considered to extend over the full width of the gravel course.
- B. Scarify and cultivate the top 6 inches of subgrade when the subgrade consists of dry soils which are impervious to the penetration of water, soils which contain excessive amounts of moisture which may result in unstable foundations, soils which are nonuniform in character which may result in nonuniform relative compactions and subsequent differential settlements of finished surfaces, or when gravel is to be placed directly on the roadbed material.
- C. After rough grading has been completed, when scarifying and cultivating are required, loosen the roadbed to a depth of at least 6 inches. Work the loosened material to a finely divided condition and remove rocks larger than 3 inches in diameter. Bring the moisture content to optimum by the addition of water, by the addition and blending of dry material, or by the drying of existing material. Compact the material to the specified relative compaction.
- D. Uniform pervious soils that allow the immediate penetration of water or uniform impervious soils which will allow the penetration of water to a depth of at least 6 inches after the addition of a suitable wetting agent will not require scarifying and cultivating. When scarifying and cultivating are not required, bring the moisture content of the top 6 inches of the subgrade material to optimum by the addition of water at the surface, and compact the material to the specified relative compaction.
- E. Remove soft material disclosed by the subgrade preparation, replace with structure backfill material as specified in Section 02200 and compact.
- F. Compact the top 6 inches of subgrade to 95 percent of maximum dry density per AASHTO T180.

### **3.2 GEOTEXTILE INSTALLATION:**

- A. Install in accordance with AASHTO M288, Appendices A1 and A3, except as modified below.
- B. Areas on which geotextile is to be placed shall have a uniform slope and be reasonably smooth, free from mounds and windrows, and free of any debris or projections which could damage the fabric to be placed on it. Loosely lay the material (do not stretch it). Overlap adjacent strips per AASHTO M288, Table A1. Support the fabric at all times to maintain its intended position.
- C. If there is any fabric damage or displacement before fabric placement or during fabric placement, replace or repair it.

- D. During periods of shipment and storage, protect the fabric from direct sunlight, ultraviolet rays, temperature greater than 140 degrees F (60 degrees C), mud dirt, dust, and debris. To the extent possible, keep the fabric wrapped in a heavy-duty protective covering.
- E. Schedule the work so that the fabric is covered or otherwise protected within 30 days after it is placed. Failure to comply with this requirement shall require replacement of the fabric

### 3.3 INSTALLATION:

#### A. Spreading Aggregate:

1. Transport aggregate base or rock materials mixed at locations off the roadbed to the roadbed and deposit them by means of spreading equipment. Place the layers so that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Make such adjustments in placing procedures or equipment to obtain true grades, minimize segregation and degradation, reduce or increase moisture content, and assure an acceptable base.
2. Spread and compact the aggregate base or rock material to the required density in one or more layers, as specified below, and of such width and thickness that, after compacting, the finished base will conform to the required grade and cross section. Spread the aggregate or gravel base material for each separate course for the full width of the roadbed before placing the succeeding courses. Stagger longitudinal and transverse joints a minimum of 12 inches in each succeeding course.
3. Place aggregate material in compacted thicknesses between 3 inches and 6 inches, except when shoulders are shown on a typical section to be constructed as a separate operation, then they may be constructed in one course providing they do not exceed 8 inches in thickness, and in two approximately equal courses where they exceed 8 inches. In either case, the compacted shoulders shall meet specified density requirements.
4. After testing the blended and flattened windrow of aggregate base or gravel material mixed on the roadbed, spread it uniformly as specified above over the full length and width of the section to be compacted. Do this spreading in such a manner as to prevent segregation of the mixture.

- #### B. Rolling and Compaction:
- Begin rolling and compaction at the outer edges of the surfacing and continue toward the center. Compact each layer until the specified density is achieved. Maintain the surface of each layer during the compaction operations so that a uniform texture is produced and the aggregates remain firmly keyed. Apply water uniformly over the base materials during compaction in the amount necessary for proper consolidation.

3.4 COMPACTION:

- A. Refer to Section 02230 for additional compaction requirements.
- B. Subgrade: Compact the top 6 inches of subgrade to 95 percent of maximum dry density per AASHTO T180.
- C. Base Aggregate: Compact two separate 6 inch lifts to 95 percent of maximum dry density per AASHTO T180.

3.5 FIELD QUALITY CONTROL:

- A. Refer to Section 02230 for compaction and testing requirements.
- B. Submit test results to Engineer for acceptance.
- C. Perform field density testing in accordance with Section 02230.
- D. Evaluate field density test results in relation to maximum dry density as determined by testing material in accordance with Section 02230.
- E. Perform classification of materials according to AASHTO M145.
- F. Perform sampling of materials according to AASHTO T2. Prepare samples according to AASHTO T87.
- G. Perform sieve analysis according to AASHTO T27.
- H. Tolerances:
  - 1. Subgrade: Plus or minus 1 inch of the indicated grade and cross-section, smooth and free of irregularities.
  - 2. Finish Grade:
    - a. Surface, width, and thickness: 1/2-inch in 10 feet, plus or minus.
    - b. Thickness: 1/4-inch of plans with not more than 1/2-inch deficient at any point.

3.6 CLOSEOUT ACTIVITIES:

- A. Provide in accordance with Section 01700.

END OF SECTION



## SECTION 02922 HYDROSEEDING

### **PART 1 - GENERAL**

#### 1.1 DESCRIPTION:

1.2 This section describes hydroseeding, hydromulching, and seed mix establishment and maintenance for erosion control and revegetation.

#### 1.3 REFERENCES:

A. Florida Department of Transportation (FDOT):

1. Standard Specifications for Road and Bridge Construction (latest edition).

B. American National Standards Institute (ANSI):

1. Z60.1-2004: American Standard for Nursery Stock.

C. American Society for Testing and Materials International (ASTM):

1. ASTM D5268, Standard Specification for Topsoil Used for Landscaping Purposes.

2. ASTM D5435, Standard Test Method for Plant Growth and Food Chain Protection.

#### 1.4 SUBMITTALS:

A. Comply with the requirements specified in Section 01300.

#### 1.5 QUALITY ASSURANCE:

A. Comply with the requirements specified in Section 01410.

### **PART 2 - PRODUCTS**

#### 2.1 TURF MATERIALS

A. According to Sections 570 and 981 of the latest edition of the FDOT Standard Specifications for Road and Bridge Construction.

2.2 FERTILIZER:

- A. According to Sections 570 and 982 of the latest edition of the FDOT Standard Specifications for Road and Bridge Construction.

2.3 WATER:

- A. According to Sections 570 and 983 of the latest edition of the FDOT Standard Specifications for Road and Bridge Construction.

**PART 3 - EXECUTION**

3.1 INSTALLATION:

- A. Hydroseed and establish a stand of grass in all disturbed earthen areas of the project site in accordance with Section 570 of the latest edition of the FDOT Standard Specifications for Road and Bridge Construction.

3.2 CLOSEOUT ACTIVITIES:

- A. Provide in accordance with Section 01700.

END OF SECTION

Attachment A Limited Geotechnical Exploration

Attachment B NRCS Soil Survey Report