SOUTH FLORIDA WATER MANAGEMENT DISTRICT

101279 – G370 and G372 CONCRETE REFURBISHMENT AND COATING

Corrected Final Design (RTA) Technical Specifications

Prepared by:
South Florida Water Management District
Operations Engineering & Construction Division
Engineering and Construction Bureau

South Florida Water Management District
3301 Gun Club Road West Palm Beach, Florida 33406
561-686-8800 • FL WATS 1-800-432-2045 • www.sfwmd.gov
MAILING ADDRESS: P.O. Box 24680 • West Palm Beach, FL 33416-4680

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ENGINEERING DESIGN STANDARDS FOR WATER RESOURCE FACILITIES

RFB 6000000XXX

G370 AND G372 CONCRETE REFURBISHMENT AND COATING

PALM BEACH COUNTY, FLORIDA

PROJECT ID#: 101279

CORRECTED FINAL DESIGN (CHECK-SET) TECHNICAL SPECIFICATIONS

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Donald J. Nuelle, P.E.
Florida P.E. License No.: 52046
(Civil / Structural)

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SECTION 01010 SUMMARY OF WORK

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: This SECTION summarizes the Work of the Project as covered in detail in the complete Contract Documents. This is a general summary and is not intended to be complete and all-inclusive of the required Work items.

1.02 SUBMITTALS: Submittals shall be in accordance with SECTION 01300.

1.03 PROJECT DESCRIPTION:

A. Description of Project: Pump Station G-370 is located off US Highway 27 in Western Palm Beach County. G-370 is located approximately 20 miles South of the intersection of SR 80 and US Highway 27 on the West side of the road. Pump Station G-372 is located off the Miami Canal Levee in Western Palm Beach County. G-372 is located approximately 7.5 miles North of Pump Station S-8 on the East side of the Miami Canal. If travelling from the South, S-8 is accessed by taking US Highway 27 North to the Palm Beach / Broward line, turn left after passing the S-7 Pump Station and crossing over the L-5 Canal, and head West on the L-5 levee approximately 14.5 miles to S-8. Follow the East Miami Canal Levee 7.5 miles North to Pump Station G-372. If travelling from the North, travel to G-370, cross over the G-370 service bridge and use the South Access Levee to travel approximately 16.5 miles to the South fence entrance to G-372. All access gates shall be locked at the end of each day.

The latitude and longitude for the two pump stations are as follows:

G-370 +26.396179, -80.590236

G-372 +26.435486, -80.806679

B. G-370 - The project consists of: Miscellaneous concrete repairs to delaminated sections of concrete, removal and replacement of exterior vertical and horizontal expansion joints, adding two concrete steps, removing and re-installing / re-aligning a steel strut in front of the access stairs to the trash rake garage, removal and replacement of a section of pile cap and application of a protective concrete covering to specified flat work areas. Installation of railing on the partial parapet to raise the parapet height to 42”, approximately 250 linear feet. The entire exterior of the Pump Station shall be prepped and re-painted in the District selected colors per drawing S001 including the exterior of all swing doors, roll-up doors and window frames. All existing caulking to be removed and replaced prior to painting.

C. G-372 - The project consists of: Miscellaneous concrete repairs to delaminated sections of concrete, removal and replacement of exterior vertical and horizontal expansion joints, adding one concrete step, removing and re-installing / re-aligning a steel strut in front of the access stairs to the trash rake garage, removal and replacement of a section of pile cap and application of a protective concrete covering to specified flat work areas. Installation of railing on the partial parapet to raise the parapet height to 42”, approximately 250 linear feet. The entire exterior of the Pump Station shall be prepped and re-painted in the District selected colors per drawing S001 including the exterior of all swing doors, roll-up doors and window frames. All existing caulking to removed and replaced prior to painting.

1.04 RELATED CONTRACT ACTIVITIES:

A. The contractor shall use caution to avoid disturbing the Red Shoulder Hawks nest on the G370 tower during nesting season, January – May.

B. There are several on-going construction contracts within the existing project area. CONTRACTOR shall be responsible for all required coordination and cooperation with the existing construction projects in the area.

1.05 WORK PERFORMED BY OTHERS:

A. N/A

1.06 CONTRACTOR'S USE OF PREMISES AND EQUIPMENT:

A. See General Terms & Conditions Article 6.11.

B. During construction activities, the CONTRACTOR shall be responsible for maintaining all access roads in good condition, including grading and drainage. See Section 00700 - General Terms & Conditions.

1. The CONTRACTOR shall ensure that all vehicles and equipment crossing the DISTRICT structures within the Limits of Construction, including but not limited to trash rake bridges and/or structures shall not exceed the maximum rating shown in the tabulation or by calculations by CONTRACTOR's Professional Engineer, whichever is more restrictive. While project culverts and other pipes crossing the route are not individually listed, CONTRACTOR is also advised to assess the condition of these to determine load limitations or special accommodations which may be warranted to protect these culverts from damage due to CONTRACTORs use of the route.

Structure and/or Bridge	Rating/Restriction
G-370 Service Bridge	HS-20
G-372 Service Bridge	HS-20

2. The CONTRACTOR shall provide a Submittal in accordance with SECTION 01300 specifying all vehicles and equipment crossing the DISTRICT structures within the Limits of Construction. At a minimum, submittal shall include:

a. The CONTRACTOR shall verify the actual condition of the bridge and/or structure and provide signed and sealed certifications, prepared by a Professional Engineer, licensed in the State of Florida, indicating that the vehicles and equipment crossing DISTRICT structures will not adversely impact the structural integrity of the structures. As-built Drawings of the existing DISTRICT bridges and/or structures may be available upon request.

b. A list of all vehicles and equipment that are proposed to cross DISTRICT structures within the Limits of Construction.

c. Vehicle and equipment type, overall length, length between axles, individual axle loading, gross weight (base), gross weight (maximum load), turning radii, and number of daily trips per vehicle or unit of equipment.

d. The CONTRACTOR shall follow the latest Process For Temporary Access Over District Bridges, Structures And Other Facilities.

3. It shall be the CONTRACTOR's sole responsibility to repair all damages to the bridges and/or structures which occur as a result of construction activities.

1.07 DISTRICT'S USE OF PREMISES: Partial DISTRICT Occupancy: The DISTRICT 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.

1.08 WORK SEQUENCE, COORDINATION ACTIVITIES AND SCHEDULED DATES:

A. General: The CONTRACTOR shall coordinate its Work with other adjacent contractors, landowners and DISTRICT 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. Enough Staff Parking and ability to operate the Pump Station.

2. The CONTRACTOR shall hire Advanced Roofing for any roof damage repairs on G-370 upper, lower and G-372 upper roofs. The CONTRACTOR shall hire CJ Contracting for any roof damage repairs on G-372 lower roof.

B. Suggested Construction Sequence: A suggested sequence of construction has been prepared by the Design Engineer and is presented in this section. The CONTRACTOR may suggest modifications to the sequence provided the access and operation requirements are satisfied and compliance with the overall contract period is achieved.

1. Removal and replacement of exterior expansion joint material.
2. Miscellaneous concrete repairs.
3. Pile Cap Section Replacement
4. Stair Step Addition
5. Replacement of strut in Trash Rake Garage.
6. Installing Parapet Handrail.
7. Re-painting of structure exterior.
8. Application of protective concrete coating.
9. Restore all disturbed areas.

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. Pump Station shall be operational at all times. At the time of this writing there currently two on-going construction projects adjacent to G-372.

D. CONTRACTOR shall coordinate lock out / tag out with the Pump Station Operators when work is near exhaust piping.

1.09 COPIES OF DOCUMENTS:

A. See Section 00700 - General Terms & Conditions Article 2.02.

1.10 LIST OF DRAWINGS:

A. Drawings:

1. RFB 6000001500, G-370 and G-372 Concrete Refurbishment and Coating, Sheets 1-16, inclusive

B. Reference Materials: The following reference materials are included as part of this solicitation. These materials are for reference only, are provided as-is, are not Contractual Documents, and do not replace the CONTRACTOR's due diligence in bid preparation.

1. As-built Drawings
2. Florida Fish and Wildlife Conservation Commission (FWC) hunting information for 2024

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

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SECTION 01015 DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.01 SCOPE:

A. Definitions:

1. A substantial amount of the Technical Specification (specification) language constitutes definitions for terms found in other areas of the Contract Documents including the Drawings, which must be recognized as diagrammatic in nature and not completely descriptive of all requirements necessary.

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.

3. The term “DISTRICT”, as defined in the General Terms & Conditions and used in these specifications, is further defined as the District or District’s authorized representative, which may include, but is not limited to, the Design Engineer, Project Manager or Construction Manager.

B. General Requirements: General requirements are the provisions or requirements of Division 1 SECTIONs which apply to the entire WORK of the Contract.

1.02 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, the basic unit of the 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, nor to be fully descriptive of requirements specified therein, nor to be an integral part of the text.

2. SECTION Numbering: Used for identification and to facilitate cross-references in the Contract Documents. SECTIONs are placed in numeric sequence; however, the numbering is not sequential, and listing of SECTIONs in Table of Contents at the beginning of the Technical Specifications must be consulted to determine numbers and names of specification SECTIONs in these Contract Documents.

3. Page Numbering: Numbered independently for each SECTION. The SECTION number is shown with the page number at bottom of each page to facilitate location of the 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 the 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 the 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 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 the 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 the 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 DISTRICT 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 the 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.

1.03 DRAWING SYMBOLS: Except as otherwise indicated, graphic symbols used on the Drawings are those symbols generally recognized in the construction industry for the purposes indicated. Refer instances of uncertainty to the DISTRICT for clarification.

1.04 INDUSTRY STANDARDS - APPLICABILITY: Applicable standards of the construction industry have the same force and effect and are made a part of the 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.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01020 MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SCOPE:

A. LUMP SUM CONTRACT: Unless indicated on the Contract Documents, all work indicated on the Contract Drawings and specified in the Bid Documents and Contract shall be included in the Contract Sum indicated on the Bid Form. The following is a description of the WORK listed in the Bid Form and is not intended to be complete and all-inclusive of the required work items. The WORK shall include all miscellaneous and ancillary items necessary to construct a complete and functional Project.

1. Bid Item A. Pump Station G-370 and G-372 Concrete Refurbishment and Coating Project, Lump Sum.

1.02 BASIS FOR PAYMENTS:

A. The above descriptions generally outline the scope of work required for those elements of the WORK to be paid for under each lump sum item listed in the Bid Form. Those lump sum amounts shall be further distributed in accordance with subvalues identified in the approved Cost Loaded Schedule specified in SECTION 01310 and the GENERAL TERMS & CONDITIONS.

1.03 PAYMENTS:

A. Payments shall be in accordance with the provisions of the GENERAL TERMS & CONDITIONS, Article 14.

END OF SECTION

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SECTION 01065 PERMITS AND FEES

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work:

1. Unless otherwise specified, the CONTRACTOR shall obtain and pay for all permits and licenses related to the WORK as provided for in the General Terms & Conditions.

2. The CONTRACTOR will be issued copies of all permits obtained by the DISTRICT 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. Refer to Article 6.08 of the Supplemental Conditions for the list of permits that DISTRICT has obtained or is in the process of obtaining.

3. The WORK shall be conducted, and shall result in construction of the improvements of the Project, in full accordance with the conditions of the permits granted for the Project.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

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SECTION 01071 STANDARD REFERENCES

Wherever used in the project manual, the following abbreviations will have the meanings listed:

AA	The Aluminum Association Incorporated 1400 Crystal Drive, Suite 430 Arlington, VA 22202
AABC	Associated Air Balance Council 2401 Pennsylvania Avenue NW, Suite 330 Washington, DC 20005
AAMA	American Architectural Manufacturers Association 1900 E Golf Road, Suite 1250 Schaumburg, IL 60173
AASHTO	American Association of State Highway and Transportation Officials 555 12th Street NW, Suite 1000 Washington, DC 20004
ABMA	American Bearing Manufacturers Association 2025 M Street, NW Suite 800 Washington, DC 20036
ACI	American Concrete Institute 38800 Country Club Drive Farmington Hills, MI, 48331
AEIC	Association of Edison Illuminating Companies 600 N 18th Street, 4N-0992 Birmingham, Al 35203
AGA	American Gas Association 400 N. Capitol Street, NW Suite 450 Washington, DC 20001
AGMA	American Gear Manufacturers Association 1001 N. Fairfax Street, Suite 500 Alexandria, VA 22314
AHA	American Hardboard Association 1210 West Northwest Hwy Palatine, IL 60067
AHRI	Air-Conditioning Heating and Refrigeration Institute 2311 Wilson Blvd., Suite 400 Arlington, VA 22201
AISC	American Institute of Steel Construction 130 E. Randolph St., Suite 2000 Chicago, IL 60601
AISI	American Iron and Steel Institute 25 Massachusetts Ave. NW Washington, DC 20001

AITC	American Institute of Timber Construction 6980 SW Varns Street Tigard, OR 97223
ALSC	American Lumber Standards Committee 7470 New Technology Way, Suite F Frederick, MD 21703
AMCA	Air Movement and Control Association, Inc. 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute, Inc. 1899 L Street NW, 11th Floor Washington, DC 20036
APA	American Plywood Association 7011 S. 19th Street Tacoma, WA 98466
API	American Petroleum Institute 200 Massachusetts Ave. NW, Suite 1100 Washington, DC 20001
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191
ASCII	American Standard Code for Information Interchange United States of America Standards Institute 10 East 40th Street New York, NY 10016
ASE	American Standard Safety Code for Elevators, Dumbwaiter and Escalators American National Standards Institute/ASME A17.1/CSA B44 1430 Broadway New York, NY 10018
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers United Engineering Center 1791 Tullie Circle, N.E. Atlanta, GA 30329
ASME	American Society of Mechanical Engineers Two Park Avenue New York, NY 10016
ASTM	ASTM International (American Society for Testing and Materials) 100 Barr Harbor Drive West Conshohocken, PA 19428
AWPA	American Wood Preservers Association 100 Chase Park S, Suite 116 Birmingham, AL 35244

AWPB	American Wood Preservers Bureau 7962 Conell Court P. O. Box 5283 Lorton, VA 22079
AWPI	American Wood Preservers Institute 2750 Prosperity Avenue, Suite 550 Fairfax,VA 22031
AWI	Architectural Woodwork Institute 46179 Westlake Drive, Suite 120 Potomac Falls, VA 20165
AWS	American Welding Society 8669 NW 36th Street Doral,FL 33166
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
BHMA	Builders Hardware Manufacturers Association 355 Lexington Avenue, 15th Floor New York, NY 10017
BOCA	Building Officials and Code Administrators 4051 West Flossmoor Road Country Club Hills, IL 60478
CAL/OSHA	California Department of Industrial Relations 1515 Clay Street, Suite 1901 Oakland, CA 94612 OaklandConsultation@dir.ca.gov
CBMA	Certified Ballast Manufacturers Association 355 Lexington Avenue, 17th Floor New York, NY 10017
CMAA	Crane Manufacturers Association of America (Formerly called: Overhead Electrical Crane Institute) (OECI) 8720 Reds Oak Boulevard, Suite 201 Charlotte, NC 28217
CRSI	Concrete Reinforcing Steel Institute 933 North Plum Grove Road Schaumburg, IL 60173
CSA	Canadian Standards Association 178 Rexdale Blvd. Toronto, ON M9W 1R3
DEMA	Diesel Engine Manufacturers Association 30200 Detroit Road Westlake, OH 44145
DHI	Door Hardware Institute

	14150 Newbrook Drive, Suite 200 Chantilly, VA 20151
EEI	Edison Electric Institute 701 Pennsylvania Avenue, NW Washington, DC 20004
EIA	Electronic Industries Alliance 2500 Wilson Blvd. Arlington, VA 22201
EJMA	Expansion Joint Manufacturers Association 25 North Broadway Tarrytown, NY 10591
EPA	Environmental Protection Agency Region 4 Sam Nunn Atlanta Federal Center 61 Forsyth Street, SW Atlanta, GA 30303-3104
ESO	Electrical Safety Order, California Administrative Code, Title 8, Chap. 4, Sub-article 5 Office of Procurement, Publications Section P. O. Box 20191 8141 Elder Creek Road Sacramento, CA 95820 Sacon@dir.ca.gov
FAC	Florida Administrative Code Florida Administrative Code and Florida Administrative Register 500 South Bronough Street Tallahassee, FL 32399 AdministrativeCode@dos.myflorida.com
FBC	Florida Building Code Florida Department of Business and Professional Regulation 2601 Blair Stone Road Tallahassee, FL 32399 www.floridabuilding.org
FEDSPEC	Federal Specifications General Services Administration Specification and Standards, Office of General Supplies and Services Engineering and Catalog Division (QSDEC) Arlington, VA 22202
FEDSTDS	Federal Standards (see FEDSPECS)
FM	Factory Mutual Research Corporation 1151 Boston-Providence Turnpike Norwood, MA 02062
GANA	Glass Association of North America 2945 SW Wanamaker Drive, Suite A Topeka, Kansas 66614

HEI	Heat Exchange Institute 1300 Summer Avenue Cleveland, OH 44115
HI	Hydraulic Institute Morris Corporate Center 300 Interpace Parkway, Suite A280 Parsippany, NJ 07054
HPVA	Hardwood Plywood and Veneer Association 1825 Michael Faraday Drive Reston, VA 20190
IAPMO	International Association of Plumbing and Mechanical Officials 4755 E. Philadelphia Street Ontario, CA 91761
ICBO	International Conference of Building Officials 5360 South Workman Mill Road Whittier, CA 90601
ICEA	Insulated Cable Engineers Association P. O. Box 493 Miamitown, OH 45041
ICRI	International Concrete Repair Institute 1000 Westgate Drive, Suite 252 St Paul, MN 55114
IEEE	Institute of Electrical and Electronics Engineers, Inc. 445 Hoes Ln Piscataway, NJ 08854
IES	Illuminating Engineering Society c/o United Engineering Center 120 Wall Street Floor 17 New York, NY 10005
ISA	Instrument Society of America 67 T.W. Alexander Drive Research Triangle Park, NC 27709
ISO	International Organization for Standardization Chemin de Blandonnet 8 CP 401 – 1214 Vernier, Geneva Switzerland
JIC	Joint Industrial Council 7901 Westpark Drive McLean, VA 22101
MFMA	Metal Framing Manufacturers Association 330 N. Wabash Avenue Chicago, IL 60611
MILSPEC	Military Specifications

	Naval Publications and Forms Center 3801 Tabor Avenue Philadelphia, PA 19120
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. 127 Park Avenue, N.E. Vienna, VA 22180
NAAMM	National Association of Architectural Metal Manufacturers 800 Roosevelt Road Building C, Suite 312 Glen Ellyn, IL 60137
NACE	National Association of Corrosion Engineers 15835 Park Ten Place Houston, TX 77084
NEC	National Electrical Code National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169-7471
NECA	National Electrical Contractors Association 3 Bethesda Metro Center, Suite 1100 Bethesda, MD 20814
NELMA	Northeastern Lumber Manufacturers Association, Inc. 272 Turtle Road P. O. Box 87A Cumberland Center, ME 04021
NEMA	National Electrical Manufacturers Association 1300 N. 17th Street, Suite 1752 Rosslyn, VA 22209
NESC	National Electric Safety Code American National Standards Institute 1430 Broadway New York, NY 10018
NETA	InterNational Electrical Testing Association 3050 Old Centre Avenue, Suite 102 Portage, MI 49024
NFPA	National Forest Products Association (Formerly National Lumber Manufacturers Association) 1619 Massachusetts Avenue Washington, DC 20036
NFPA	National Fire Protection Association Batterymarch Park Quincy, MA 02269
NHLA	National Hardwood Lumber Association P. O. Box 34518 Memphis, TN 38184-0518

NIST	National Institute of Standards and Technology 100 Bureau Drive, Suite 1070 Gaithersburg, MD 20899-1070
NSF	National Sanitation Foundation P.O. Box 130140 789 N. Dixoboro Road Ann Arbor, MI 48113
OSHA	Occupational Safety and Health Act U.S. Department of Labor Occupational and Health Administration National Headquarters 200 Constitution Avenue N.W. Washington, DC 20210
PCI	Prestressed Concrete Institute 200 W. Adams Street, Suite 2100 Chicago, IL 60606
PPIC	The Plumbing & Piping Industry Council, Inc. 14695 SW Millikan Way Beaverton, OR 97003
RIS	Redwood Inspection Service California Redwood Association 818 Grayson Road, Suite 201 Pleasant Hill, CA 94523
RLM	Reflector and Lamp Manufacturers Standard Institute P.O. Box 754 Meriden, CT 06450
RMA	Rubber Manufacturers Association 1400 K Street, Suite 900 Washington, DC 20005
SAE	Society of Automotive Engineers 400 Commonwealth Drive Warrendale, PA 15096
SBC	Standard Building Code Published by SBCCI
SBCCI	Southern Building Code Congress International 900 Montclair Road Birmingham, AL 35213
SCMA	Southern Cypress Manufacturers Association 400 Penn Center Blvd., Suite 530 Pittsburgh, PA 15235
SDI	Steel Door Institute 30200 Detroit road Westlake, OH 44145
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.

	4201 Lafayette Center Drive Chantilly, VA 20151
SMC	Standard Mechanical Code Published by SBCCI
SPI	Plastics Industry Association (formerly called: Society of the Plastics Industry, Inc.) 1425 K Street NW, Suite 500 Washington, DC 20005
SPIB	Southern Pine Inspection Bureau 4555 Spanish Trail Pensacola, Fl 32504
SSPC	The Society for Protective Coatings (formerly called: Steel Structures Painting Council) 800 Trumbull Drive, Pittsburgh, PA 15205
SSPWC	Standard Specifications for Public Works Construction Building News, Inc. 3055 Overland Avenue Los Angeles, CA 90034
TEMA	Tubular Exchanger Manufacturers Association 25 North Broadway Tarrytown, NY 10591
UL	Underwriters Laboratories Inc. 2600 NW Lake Road Camas, WA 98607
USBR	Bureau of Reclamation U.S. Department of Interior Engineering and Research Center Denver Federal Center, Building 67 Denver, CO 80225
USACE	United States Army Corps of Engineers Jacksonville District P. O. Box 4970 Jacksonville, FL 32232-0019
WCLIB	West Coast Lumber Inspection Bureau 6980 SW Varns Street P. O. Box 23145 Tigard, OR 97223
WWPA	Western Wood Products Association (Formerly called: West Coast Lumbermen's Association (WCLA)) 1500 SW 1st Avenue, Suite 870 Portland, OR 97201

END OF SECTION

SECTION 01200 PROJECT MEETINGS AND REPORTS

PART 1 - GENERAL

1.01 SCOPE

A. Summary of Work: This SECTION includes the following administrative and procedural requirements:

1. Project Meetings:
    a. Preconstruction conference
    b. Progress meetings
2. Schedules and Reports:
    a. Initial coordination submittals
    b. Construction Schedules (See SECTION 01310)
    c. Special reports

B. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals
2. SECTION 01310 Cost Loaded Construction Schedule

1.02 SUBMITTALS:

A. All submittals shall be made in accordance with SECTION 01300.

1.03 PROJECT MEETINGS:

A. Pre-Construction Conference

1. The DISTRICT will administer a pre-construction conference within ten (10) days after the Effective Date of the Agreement, to review items stated in the following agenda and to establish a working understanding between the parties as to their relationships during conduct of the WORK.
2. The Preconstruction conference shall be attended by:
    a. The CONTRACTOR and his Project Superintendent
    b. Representatives of principal Subcontractors and Suppliers
    c. Engineer and his Resident Project Representative if any
    d. The DISTRICT or its representative
    e. Other affected parties determined by the DISTRICT
3. Agenda:
    a. Projected Construction Schedules
    b. Critical Work sequencing
    c. Designation of responsible personnel
    d. Project coordination
    e. Procedures and Processing of:
        i. Field decisions
        ii. Substitutions

iii. Submittals

iv. Change Orders

v. Applications for payment

f. Procedures for testing

g. Procedures for maintaining record documents

h. Use of Premises:

i. Office, work and storage areas

ii. The DISTRICT's requirements

i. Construction facilities, controls, and construction aids

j. Temporary utilities

k. Safety and first aid

l. Security

m. Requirements of any permits obtained by the DISTRICT and/or the CONTRACTOR

4. Location of Meeting: Clewiston Field Station 2425 Hookers Point Road (SR 832) Clewiston, FL 33440 Phone 863-983-1431.

B. Progress Meetings:

1. The DISTRICT will administer a progress meeting a minimum of twice each month (every two (2) weeks) and at other times requested by the DISTRICT. The CONTRACTOR, Engineer and all Subcontractors active on the Site shall be represented at each meeting. The CONTRACTOR may request attendance by representatives of his Suppliers and other Subcontractors, or other entities concerned with the Project or involved with the planning, coordination or performance of future Project activities. All participants in the meeting shall be familiar with the Project and authorized to conclude matters relating to the WORK.

2. The CONTRACTOR and each Subcontractor shall be prepared to report on and discuss the current construction progress, any anticipated future changes to the Construction Schedule, and advise if their current progress, and anticipated future schedules are compatible with the WORK.

3. If one Subcontractor is delaying another, the CONTRACTOR shall direct such changes as are necessary for those involved to mutually agree on the Construction Schedule changes in the best interest of construction progress.

4. Agenda:

a. Review of construction progress since previous meeting

b. Field observations, interface requirements, conflicts

c. Issues which may impede the Construction Schedule

d. Off-site fabrication

e. Delivery schedules

f. Submittal schedules and status

g. Site utilization

h. Temporary facilities and services

i. Hours of Work

j. Hazards and risks

k. Housekeeping

l. Quality and Work standards

m. Change orders

n. Documentation of information for payment request

o. Corrective measures and procedures to regain projected schedule, if necessary

p. Revisions to the Construction Schedule

q. Progress and schedule during the succeeding WORK period

r. Review proposed changes for:

i. Effect on the Construction Schedule and on the Completion Date

ii. Effect on the other contracts of the Project

s. Other business

5. Location of Meetings: Clewiston Field Station 2425 Hookers Point Road (SR 832) Clewiston, FL 33440 Phone 863-983-1431.

6. Reporting: After each meeting, minutes of the meeting will be distributed by the DISTRICT to each party present and to parties who should have been present.

C. Special Reports:

1. When an event of an unusual and/or significant nature occurs at the Site, a special report shall be prepared and submitted by the CONTRACTOR to the DISTRICT. List the chain of events, persons participating, the response by CONTRACTOR's personnel, an evaluation of the results or effects, and similar pertinent information.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

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SECTION 01300 SUBMITTALS

PART 1 - **GENERAL**

1.01 SCOPE:

A. Summary of Work: This SECTION includes definitions, descriptions, transmittal, and review of "Compliance" and "Miscellaneous" Submittals.

B. Related Work Specified Elsewhere:

1. SECTION 01310 Cost Loaded Construction Schedule

2. SECTION 01700 Contract Closeout

1.02 GENERAL INFORMATION:

A. Definitions:

1. Compliance Submittals include Shop Drawings, product data, and samples which are prepared by the CONTRACTOR, Subcontractor, MANUFACTURER, or Supplier and submitted by the CONTRACTOR to the DISTRICT as a basis for approval of the use of Equipment and Materials proposed for incorporation in the Work or needed to describe installation, operation, maintenance, or technical properties.

a. Shop Drawings include custom-prepared data of all types including drawings, diagrams, performance curves, material schedules, templates, instructions, and similar information not in standard printed form applicable to other projects.

b. Product data includes standard printed information on materials, products and systems not custom-prepared for this Project, other than the designation of selections from available choices.

c. Samples include both fabricated and unfabricated physical examples of materials, products, and Work; both as complete units and as smaller portions of units of Work; either for limited visual inspection or (where indicated) for more detailed testing and analysis. Mock-ups are a special form of samples which are too large to be handled in the specified manner for transmittal of sample Submittals.

2. Miscellaneous Submittals include, but are not limited to, Requests for Information, Change Orders, Work Change Directives, Field Orders, Daily Reports, Applications for Payment and other schedule related submittals, Technical Reports, Administrative Submittals, Certificates, and Warranties not defined as Shop Drawings, Product Data, or samples.

a. Request for Information, Change Orders, Work Change Directives, Field Orders, as defined in the Section 00700 – General Terms and Conditions.

b. Application for Payment as per SECTION 01310.

c. Technical Reports include laboratory reports, tests, technical procedures, technical records, CONTRACTOR's design analysis and CONTRACTOR's survey field notes for construction staking, before cross-sections and after cross-sections, and similar type submittals.

d. Administrative Submittals are those submittals required by the Contract Documents or deemed necessary for administrative records. These submittals include, but are not limited to, maintenance agreements, workmanship bonds, Project photographs, physical work records, statements of applicability, copies of industry standards, as-constructed data, security/protection/safety data, and similar type submittals also listed in SECTION 01700 and elsewhere in the Contract Documents.

e. Certificates and warranties are those Submittals on Equipment and Materials where a written certificate or guarantee from the MANUFACTURER or Supplier is called for in the Specifications.

f. Reports as required by Contract describing CONTRACTOR's means and methods for items such as dewatering, earth and water retaining, erosion/turbidity control, safety plans, and similar type Submittals.

3. Refer to ARTICLE 1.03 and 1.04 of this Part for detailed lists of documents and specific requirements.

B. Quality Requirements: Submittals such as Shop Drawings and product data shall be of high enough digital quality so that they are legible and reproducible. Every line, character, and letter shall be clearly legible. Documents submitted to the DISTRICT that do not conform to these requirements shall be subject to rejection by the DISTRICT, and upon request by the DISTRICT, the CONTRACTOR shall resubmit conforming documents. If conforming submittals cannot be obtained, such documents shall be retraced, redrawn, or photographically restored as necessary to meet such requirements. The CONTRACTOR's (or its Subcontractor's) failure to initially satisfy the legibility quality requirements will not relieve the CONTRACTOR (or its Subcontractors) from meeting the required schedule for submittal of Shop Drawings and product data.

C. Language and Dimensions:

1. All words and dimensional units shall be written in the English language.

2. International System of Units dimensional unit equivalents may be stated in addition to the United States customary units.

D. Submittal Completeness:

1. Submittals shall be complete with respect to dimensions, design criteria, materials of construction, and other information specified to enable the DISTRICT to review the information effectively.

2. Where standard drawings are furnished which cover variations of the general class of equipment, each such drawing shall be individually annotated to describe exactly which parts of the drawing apply to the equipment being furnished. Use hatch marks to indicate variations that do not apply to the Submittal. The use of "highlighting" is not an acceptable means of annotating Submittals. Such annotation shall also include proper identification of the Submittal permanently attached to the drawing.

3. Reproduction or copies of Drawings or portions thereof will not be accepted as complete fabrication or erection drawings. The CONTRACTOR may use a reproduction of the DISTRICT-prepared Drawings for erection drawings such as to indicate information on erection or to identify detail drawing references. Where the Drawings are revised to show this additional CONTRACTOR information, the DISTRICT's title block shall be replaced with a CONTRACTOR's title block and the DISTRICT's professional seal (e.g.: Professional Engineer, Registered Architect, Licensed Surveyor, or other design professional seals) shall be removed from the Drawing. The CONTRACTOR shall revise these erection drawings for subsequent DISTRICT revisions to the Drawings.

1.03 COMPLIANCE SUBMITTALS:

A. Items shall include, but not be limited to, the following:

1. MANUFACTURER's specifications

2. Catalogs, or parts thereof, of manufactured equipment

3. Shop fabrication and erection drawings

4. General outline drawings of equipment showing overall dimensions, location of major components, weights, and location of required building openings and floor plates

5. Detailed equipment installation drawings, showing foundation details, anchor bolt sizes and locations, baseplate sizes, location of DISTRICT's connections, and all clearances required for erection, operation, and disassembly for maintenance

6. Schematic diagrams for electrical items, showing external connections, terminal block numbers, internal wiring diagrams, and one-line diagrams

7. Bills of material and spare parts list

8. Instruction books and operating manuals

9. Material lists or schedules

10. Performance tests on equipment by MANUFACTURERs

11. Concrete mix design information

12. Samples and color charts

13. All drawings, calculations, catalogs or parts thereof, MANUFACTURER’s specifications and data, samples, instructions, and other information specified or necessary:

    a. For the DISTRICT to determine that the Equipment and Materials conform with the design concept and comply with the intent of the Contract Documents.

    b. For the proper erection, installation, operation and maintenance of the Equipment and Materials which the DISTRICT will review for general content but not for substance.

    c. For the DISTRICT to determine what supports, anchorages, structural details, connections, and services are required for the Equipment and Materials, and the effects on contiguous or related structures and Equipment and Materials.

B. Compliance Submittal Action Stamps or Designation: The DISTRICT's review action stamp or designation, appropriately completed, will appear on all Compliance Submittals of the CONTRACTOR when returned by the DISTRICT. Review status designations listed on the DISTRICT's action designation are defined as follows:

1. "ACCEPTED AS SUBMITTED": Signifies Equipment or Material represented by the Submittal conforms with the design concept and complies with the intent of the Contract Documents and is acceptable for incorporation in the Work. The CONTRACTOR is to proceed with fabrication or procurement of the items and with related Work.

2. "ACCEPTED AS NOTED”: Signifies Equipment and Material represented by the Submittal conforms with the design concept and complies with the intent of the Contract Documents and is acceptable for incorporation in the Work subject to the condition that as constructed it shall be in accordance with all notations and/or corrections indicated. The CONTRACTOR is to proceed with fabrication or procurement of the items and with related Work in accordance with the DISTRICT's notations.

3. "RETURNED FOR REVISION": Means that deviations from the requirements of the Contract Documents exist in the Submittal. The CONTRACTOR is to resubmit revised information responsive to the DISTRICT's annotations on the returned Submittal or written in the letter of transmittal. Fabrication or procurement of items represented by the Submittal and related Work is not to proceed until the Submittal is approved.

4. "NOT ACCEPTABLE (SUBMIT ANEW)": Signifies Equipment and Material represented by the Submittal does not conform with the design concept or comply with the intent of the Contract Documents and is disapproved for use in the Work. The CONTRACTOR is to resubmit Compliance Submittals responsive to the Contract Documents.

5. "PRELIMINARY SUBMITTAL": Signifies Submittals of such preliminary nature that a determination of conformance with the design concept or compliance with the intent of the Contract Documents must be deferred until additional information is furnished. The

CONTRACTOR is to submit such additional information to permit layout and related activities to proceed.

6. "FOR REFERENCE ONLY": Signifies Submittals which are for supplementary information only; pamphlets, general information sheets, catalog cuts, standard sheets, bulletins and similar data, all of which are useful to the DISTRICT in design, operation, or maintenance, but which by their nature do not constitute a basis for determining that items represented thereby conform with the design concept or comply with the intent of the Contract Documents. The DISTRICT reviews such Submittals for general content but not for substance.

7. Resubmit Compliance Submittals the number of times required for the DISTRICT's "ACCEPTED AS SUBMITTED," or “FOR REFERENCE ONLY”. However, any need for more resubmittals than the number set forth in the accepted schedule, or any other delay in obtaining acceptance of Submittals, will not be grounds for extension of the Contract Time, provided the DISTRICT completes its reviews within the times stated above. See 1.03 D. below for additional requirements.

C. Schedule and Log of Compliance Submittals:

1. Prepare for the DISTRICT, a schedule and log for submission of all Compliance Submittals specified or necessary for the DISTRICT's review of the use of Equipment and Materials proposed for incorporation in the Work or needed for proper installation, operation or maintenance. Submit the schedule and log with the procurement schedule and Work progress schedule. Schedule submission of all Compliance Submittals to permit review, fabrication, and delivery in time to not cause a delay in the Work of the CONTRACTOR or his Subcontractors or any other contractors as described herein.

2. In establishing schedule for Compliance Submittals, allow fifteen working days in the DISTRICT's office for reviewing original Submittals that have been deemed complete and ten (10) working days for reviewing resubmittals of previously reviewed submittals.

3. The schedule shall indicate the anticipated dates of original submission, and shall be prepared in accordance with SECTION 01310 and submitted in accordance with this SECTION.

4. Schedule as required to achieve full compliance of all Compliance Submittals required prior to fabrication or manufacture for submission within 60 days of the Notice to Proceed. Schedule Compliance Submittals pertaining to storage, installation and operation at the Site for the DISTRICT's acceptance prior to delivery of the Equipment and Materials.

D. Transmittal of Compliance Submittals:

1. All Compliance Submittals of Equipment and Materials furnished by Subcontractors, MANUFACTURERs, and Suppliers shall be submitted to the DISTRICT by the CONTRACTOR in electronic PDF format as indicated below and via the Web Based Project Construction Document Management Tool (Construction Document Management Tool). After checking and verifying all field measurements, transmit all Compliance Submittals to the DISTRICT for acceptance as follows:

a. Check and certify Compliance Submittals of Subcontractors, Suppliers, and MANUFACTURERS with CONTRACTOR's approval prior to transmitting them to the DISTRICT. The CONTRACTOR's certification of approval shall constitute a representation to the DISTRICT that the CONTRACTOR has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, or they assume full responsibility for doing so, and that they have coordinated each Compliance Submittal with the requirements of the Work and the Contract Documents.

b. At the time of each submission, call to the attention of the DISTRICT in the CONTRACTOR’s Letter of Transmittal any deviations from the requirements of the Contract Documents.

c. Provide all Submittals in electronic format, compatible with Adobe Professional, Version 8 (or higher), and submitted as a single file, using PDF bookmarks and/or chapters to identify divisions within the Submittal package ("PDF File Format"). At the DISTRICT's request, and/or with the DISTRICT's prior approval, the CONTRACTOR shall submit native format files when, in the opinion of the DISTRICT, doing so will facilitate the DISTRICT's review of the Submittal information.

d. Make all modifications noted or indicated by the DISTRICT and return revised copies, or samples until accepted. Revised Submittals must be complete and conformed, including all pages/sheets with the required revisions and any additional or replacement pages/sheets. Direct specific attention in writing, or on revised Submittals, to changes other than the modifications called for by the DISTRICT on previous Submittals. Subsequent review cycles for returned or revised Submittals shall replicate the process described in items c. above.

e. If the DISTRICT's review action is "ACCEPTED AS NOTED", the Submittal will be designated such, and electronically transmitted back to the CONTRACTOR. Upon receipt of this notification from the DISTRICT, The CONTRACTOR shall resubmit one (1) conformed electronic copy in PDF File Format to the DISTRICT for final distribution. The DISTRICT may reject, without review, conformed copy Submittals for which the CONTRACTOR does not provide a narrative including, in numbered list format, (a) the DISTRICT's comment/note, (b) the CONTRACTOR's resolution of each comment/note and the location of the resolution (i.e.: page number(s), drawing number(s)) that addresses the respective comment/note, and (c) the statement: "Other than revisions listed on herein, this conformed copy is the identical information as was provided in the DISTRICT's response dated (enter date)." In addition, if the Submittal is required to be signed and sealed by a Professional Engineer registered in the State of Florida, this version of the submittal shall be signed and sealed. Submittal will not be considered final until all copies have been received by the DISTRICT. Submittal will be designated "DISTRIBUTION COPY (PREVIOUSLY ACCEPTED)" by the DISTRICT. Accepted Submittals transmitted for final distribution will not be further reviewed and are not to be revised. If errors are discovered during manufacture or fabrication, correct the Submittal and resubmit for review.

f. Work requiring a Compliance Submittal shall not be commenced or shipped until the Submittal has been designated "ACCEPTED AS SUBMITTED," "ACCEPTED AS NOTED," or "FOR REFERENCE ONLY" by the DISTRICT.

2. Copies of the equipment CONTRACTOR's erection drawings and other Compliance Submittals required for the installation of equipment furnished by others under separate Contract for installation under this Contract will be transmitted to the CONTRACTOR by the DISTRICT in the final distribution of such Submittals.

E. The DISTRICT's Review:

1. The DISTRICT will review and return Compliance Submittals to the CONTRACTOR with appropriate notations. Instruction books and similar Submittals will be reviewed by the DISTRICT for general content but not for substance.

2. The DISTRICT's acceptance of Compliance Submittals will not relieve the CONTRACTOR from his responsibility as stated in the Section 00700 – General Terms and Conditions.

F. Instruction Books / Operation & Maintenance Manuals:

1. Equipment instruction books and manuals shall be prepared by the MANUFACTURER and shall include the following:

a. Index and tabs

b. Instructions for installation, start-up, operation, inspection, maintenance, parts lists and recommended spare parts, and data sheets showing model numbers

c. Applicable drawings

d. Name of contact person, phone number, and address of the nearest authorized service facility

e. Attached to the above shall be a notice of the exact warranty effective dates, beginning and ending

f. All additional data specified

2. Information listed above shall be submitted electronically in a PDF File Format.

a. Instruction Books/Operation & Maintenance Manuals shall contain the following:

i. Equipment name

ii. MANUFACTURER's name

iii. Project name

iv. Contract number

v. Reference to applicable Drawing No. & Technical Specifications Section

b. Format: The overall manual should be constructed around certain types of structures or equipment in the Project, and not merely assembled by technical specification section, so that all pertinent data needed by personnel to operate or maintain the equipment or structure is in one (1) manual (as far as is practical). The CONTRACTOR shall coordinate with the DISTRICT as to how the manuals are to be assembled (Bookmarked).

3. For every piece of installed equipment (electrical and mechanical) provide a written Lockout/Tagout (LOTO) procedure and checklist to follow to place the equipment in a zero energy state per 29CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout). Electrical equipment that is either cord and plug connected or hard wired with a single energy isolating device installed for which the exposure to hazardous energy is controlled by the unplugging of the equipment from a single energy source or the opening of the energy isolating device need not be included. The written Lockout/Tagout (LOTO) procedure and checklist shall be included in the Instruction Books/Operation & Maintenance Manuals.

G. Samples: Office samples shall be of sufficient size and quantity to clearly illustrate the following:

1. Functional characteristics of the product, with integrally related parts and attachment devices

2. Full range of color, texture, and pattern

1.04 MISCELLANEOUS SUBMITTALS:

A. Miscellaneous Submittals are comprised of Daily Reports, technical reports, administrative Submittals, and warranties which relate to the Work, but do not require the DISTRICT's approval prior to proceeding with the Work. Miscellaneous Submittals may include but are not limited to (at the DISTRICT's discretion):

1. Daily Reports: The CONTRACTOR shall be responsible for entering Daily Reports in the Construction Document Management Tool for review and acceptance by the DISTRICT. Daily Reports shall be entered within twenty-four hours of the date of the Daily Report. The Daily Reports shall include, but need not be limited to (a) Date, (b) Weather conditions and any impact weather conditions caused to the CONTRACTOR's ability to work, (c) Jobsite physical conditions, (d) Available or not-available resources, (e) Work performed and status, (f) Disruptions and delays, (g) Inventory changes including major material delivered or delayed (h) Potential risks and concerns of future delays, (i) Incidents that occurred, (j) Notes or comments of other relevant information related to the Project.

2. Welder qualification tests

3. Welding procedure qualification tests
4. X-ray and radiographic reports
5. Field test reports
6. Concrete cylinder test reports
7. Certification on Materials:
    a. Steel mill tests
    b. Paint lab tests
    c. Cement tests
8. Soil test reports
9. Temperature records
10. Shipping or packing lists
11. Job progress schedules
12. Equipment and Material delivery schedules
13. Progress photographs
14. Warranties
15. Fire protection and hydraulic calculations
16. Surveying field notes, preliminary and final Surveyor’s Reports
17. Pump tests
18. Traffic control plan
19. Technical Reports
20. Written Certificates and Warranties

B. Transmittal of Miscellaneous Submittals:

1. All Miscellaneous Submittals furnished by Subcontractors, MANUFACTURERS, and Suppliers shall be submitted to the DISTRICT by the CONTRACTOR in an electronic PDF File Format, unless otherwise specified.
    a. The CONTRACTOR shall complete all information fields of the Construction Document Management Tool and otherwise clearly and correctly identify each miscellaneous Submittal. The specification section and article number must be correctly listed. Unidentifiable, incomplete, and/or incorrect Submittals may be returned for correction without review.
    b. Check and certify Miscellaneous Submittals of Subcontractors, Suppliers, and MANUFACTURERS with the CONTRACTOR's approval prior to transmitting them to the DISTRICT. The CONTRACTOR's certification of approval shall constitute a representation to the DISTRICT that the CONTRACTOR has either determined and verified all information, or they assume full responsibility for doing so, and that they haves coordinated Miscellaneous Submittals with the requirements of the Work and the Contract Documents.
    c. At the time of each submission, call to the attention of the DISTRICT in the CONTRACTOR’s Letter of Transmittal any deviations from the requirements of the Contract Documents.

d. Make all modifications noted or indicated by the DISTRICT and return revised copies until accepted. Direct specific attention in writing, or on revised Submittals, to changes other than the modifications called for by the DISTRICT on previous Submittals.

2. Test Reports: Responsibilities of the CONTRACTOR and the DISTRICT regarding tests and inspections of Equipment and Materials and completed Work are set forth elsewhere in these Contract Documents.

C. The DISTRICT's Review:

1. The DISTRICT will review Miscellaneous Submittals for indications of Work or material deficiencies within fifteen working days in the DISTRICT's office for original Submittals and ten (10) working days for reviewing resubmittals.

2. The DISTRICT will respond to the CONTRACTOR on those Miscellaneous Submittals which indicate Work or material deficiency.

1.05 WEB BASED CONSTRUCTION DOCUMENT MANAGEMENT:

A. The DISTRICT, Construction Management Firms, and the CONTRACTOR shall use the internet Web Based Project Construction Document Management Tool (the Construction Document Management Tool), e-Builder® ASP software, and protocols included in that software during this Project for submission of all documents specified in this SECTION and elsewhere in the Contract Documents. The use of Construction Document Management as herein described does not replace or change any contractual responsibilities of the CONTRACTOR.

B. An intent of using the Construction Document Management Tool (i.e. e-Builder®) is to facilitate the Project work efforts by promoting timely communications and responses. This will also reduce the number of paper documents while providing improved record keeping by creation of electronic document files.

C. The Construction Document Management Tool is available through e-Builder® in the form and manner required by the DISTRICT.

D. The Construction Document Management Tool is available on-line and fully functional. User registration, electronic and computer equipment, and Internet connections are the responsibility of the DISTRICT, and the CONTRACTOR.

E. The CONTRACTOR’s Responsibility:

1. The CONTRACTOR shall be responsible for the validity of information it places in Construction Document Management Tool and for the abilities of its personnel.

2. Entry of information exchanged and transferred between the CONTRACTOR and its Subcontractors and suppliers on Construction Document Management Tool shall be the responsibility of the CONTRACTOR.

3. Users shall be knowledgeable in the use of computers, including Internet Browsers, email programs, and Portable Document Format (PDF) software.

4. The CONTRACTOR shall utilize the existing forms in Construction Document Management Tool (i.e. e-Builder®) to the maximum extent possible. If a form does not exist in Construction Document Management Tool, the CONTRACTOR must include a form of its own (subject to review and acceptance by the DISTRICT) or provided by the DISTRICT as an attachment to a submittal.

5. PDF documents shall be created through electronic conversion to be searchable, rather than optically scanned, whenever possible. Optically scanned documents shall be converted to searchable documents using Optical Character Recognition. The CONTRACTOR is responsible for the training of its personnel in the use of the Construction Document Management Tool

(outside training that is provided by the DISTRICT) and the other programs indicated above as needed.

6. User Access Limitations:

   a. Provide a list of CONTRACTOR's key Construction Document Management Tool personnel for the DISTRICT's acceptance. The DISTRICT reserves the right to perform a security check on all potential users, and to rescind user authorization at any time. The CONTRACTOR may request to add additional CONTRACTOR's key Construction Document Management Tool personnel, subject to the DISTRICT's acceptance, as the Project progresses.

   b. The DISTRICT will grant initial access to the Construction Document Management Tool by creating user profiles to accepted CONTRACTOR personnel.

F. Authorized Users: The CONTRACTOR shall:

1. Request the User Application form from the DISTRICT Project Manager.

2. Submit completed User Application Form to the DISTRICT's Construction Document Management Tool (i.e. e-Builder®) Administrator.

3. Requested users that are authorized by the DISTRICT's Administrator will be notified and provided a username and password. The CONTRACTOR may request to add additional CONTRACTOR's key Construction Document Management Tool personnel, subject to the DISTRICT's acceptance, as the Project progresses.

4. Authorized users shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.

5. Sharing usernames and passwords are strictly prohibited.

G. Training: Group training sessions will be scheduled by the DISTRICT on an as-needed basis as determined by the DISTRICT. Users are required to attend the scheduled training sessions they are assigned to.

H. Support: e-Builder® will provide on-going support through online help files. The second level of help will be to contact the DISTRICT Construction Document Management Tool Administrator with the help of the DISTRICT Project Manager.

I. Copyrights and Ownership: Nothing in this Specification or the subsequent communications supersedes the CONTRACTOR's obligations and rights for copyright or document ownership as established by the Contract Documents. The use of CAD files, processes or design information distributed in this system is intended only for the Project specified herein.

J. Communications functions are as follows:

1. Document Integrity and Revisions:

   a. Documents, comments, drawings and other records posted on the Construction Document Management Tool will remain for the Project record. The authorship time and date will be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp will be the method used to make modifications or corrections.

   b. The Construction Document Management Tool is intended to facilitate identification of documents versions, revised or superseded documents as well as their predecessors.

2. Document Security: The Construction Document Management Tool will provide a method for communication of documents. Users shall not post private and/or company confidential items in the database. All information on the Construction Document Management Tool is considered a public record and subject to public disclosure, absent an applicable statutory exemption.

3. Notifications and Distribution:

   a. Document distribution to Project members shall be accomplished both within the Construction Document Management Tool and via email as appropriate. Project document distribution to parties outside of the Construction Document Management Tool shall be accomplished by secure email of outgoing documents and attachments, readable by a standard email client.

   b. Minimum Computing Requirements

      i. Internet Connection: DSL, local cable company's Internet connection, or T1 connection is required.

      ii. Operating Systems: Windows 7 or later & OS X v10.8 or later

      iii. Supported Internet Browsers: Internet Explorer™ 11.0 or later, Google Chrome™ v 29.0.1 or later; Mozilla Firefox™ 35.0.1 or later, Safari™ 6.0.4 or later, Safari for iOS™ mobile v6.1 or later.

      iv. Screen Resolution: The recommended screen resolution is 1280 x 1024 or higher. The minimum screen resolution required to support all e-Builder® features is 1024 x 768.

      v. Verify the following internet browser settings: (1) Administrator Status; (2) Add e-Builder's websites as trusted sites; (3) Disable Pop-up Blocker(s); (4) ActiveX plugins must be installed (on the downloads page) to achieve full functionality in e-Builder and all ActiveX controls set to Enable or Prompt; (5) Download Plugins.

      vi. See www.e-builder.net/support/optimization for additional information.

4. Automated System Notification and Audit Log Tracking:

   a. Review comments made (or lack thereof) by the DISTRICT on the CONTRACTOR submitted documentation shall not relieve the CONTRACTOR from compliance with requirements of the Contract Documents.

   b. The CONTRACTOR is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. The DISTRICT's acceptance via the Construction Document Management Tool notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the CONTRACTOR's submitted information.

PART 2 - **PRODUCTS (Not Applicable)**

PART 3 - **EXECUTION**

3.01 SUBMITTAL LOG: The CONTRACTOR shall maintain an accurate Submittal Log and a Distribution List for the duration of the Work, showing current status of all Submittals required for the complete Project and Distributees at all times in a form acceptable to the DISTRICT. The CONTRACTOR shall make the Submittal Log available to the DISTRICT for its review on request and shall bring a copy of the Submittal Log to all Progress Meetings.

END OF SECTION

SECTION 01310 COST LOADED CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.01 SCOPE:

A. COST LOADED CONSTRUCTION SCHEDULE (Construction Schedule): The Work under this Contract shall be planned, scheduled, executed, and reported by the CONTRACTOR. The CONTRACTOR shall adhere to established technical standards for CPM (Critical Path Method) scheduling unless otherwise directed by the DISTRICT. The CONTRACTOR is required to provide all Construction Schedules in electronic format.

B. The CONTRACTOR shall submit a detailed Cost Loaded Schedule showing all Work required under the Contract and scheduled within the time constraints set forth under the Contract. The DISTRICT will review and comment on the Schedule submittal as per 2.03. Upon acceptance, the submitted detailed Cost Loaded Schedule becomes the Baseline Schedule. The CONTRACTOR shall not change the accepted Baseline Schedule, without prior concurrence of the DISTRICT. The Baseline Schedule shall be updated to show actual progress.

C. The CONTRACTOR shall be responsible for coordinating its own schedules (including subcontractors) as well as the construction activities of others as required to fully execute the Work.

D. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals

1.02 SOFTWARE/INTERFACE REQUIREMENTS:

A. The CONTRACTOR shall use the latest version of Oracle/Primavera P6 Professional Project Management (P6) for creating and updating all Construction Schedules and reports. No other scheduling software programs will be accepted.

B. To ensure compatibility for DISTRICT asset accounting, the DISTRICT will provide Activity Codes for all Asset and Non-asset Activities and assist the CONTRACTOR in developing a Work Breakdown Structure (WBS) to be entered into the scheduling software as referenced in Section 2.02. The Construction Schedule (i.e. all Schedule Updates shall be used as the basis for payment.

1.03 SUBMITTALS: Submittals shall be in accordance with SECTION 01300.

1.04 QUALITY ASSURANCE:

A. The CONTRACTOR shall perform the Work covered by this SECTION with personnel having substantial experience in the use of the latest version of P6 scheduling software on construction projects which required the development and maintenance of the schedule throughout the Project duration.

B. It is the responsibility of the CONTRACTOR to work with each subcontractor and supplier to obtain information pertinent to the planning and updating of their respective activities in the overall Project Construction schedule.

C. It is the responsibility of the CONTRACTOR to work with the DISTRICT's scheduler to resolve any related scheduling issues such as storing period performance, making sure the Primavera file (.xer) gets imported correctly, etc.

1.05 DEALING WITH SUBSTITUTES:

A. All versions of the CONTRACTOR's Construction Schedule shall be based solely on the Work as awarded, and shall exclude any substitute proposals, even if the CONTRACTOR pursues a substitution in accordance with the provisions of the Contract.

B. The DISTRICT's final determination on any proposed substitutions may not be made until after the CONTRACTOR's Construction Schedule is prepared and accepted. Accepted proposed substitutions shall be identified in the schedule as Change Orders.

1.06 USE OF FLOAT:

A. Total Float is the amount of time a scheduled activity can be delayed without delaying the completion of the Work beyond the contractually required end date. Contract Float is the number of days between the CONTRACTOR's anticipated date for early completion of the Work, or specified part, and the corresponding Contract Time. Total Float and Contract Float belong to the Project and are not for the exclusive benefit of any party. Contract Float and Total Float shall be available to the DISTRICT, consultants, or the CONTRACTOR to accommodate changes in the Work or to mitigate the effect of events which may delay performance or completion. The DISTRICT will monitor and optimize the use of float for the benefit of the Project.

B. The CONTRACTOR shall adjust or remove any float suppression techniques (e.g., preferential sequencing, out-of-sequence activity relationships, crew movements, equipment use, form reuse, extended durations, imposed dates, lags, etc.) as a prerequisite to a request for an increase in Contract Price and/or Contract Time. Use of constraints or lags should be minimized and require approval by the DISTRICT. The accepted Baseline Schedule must have a single longest path with zero Total Float. Multiple longest paths are not acceptable.

1.07 EARLY COMPLETION: An early completion schedule is one which anticipates completion of all or a specified part of the Work ahead of the corresponding Contract Time. Since Contract and Total Floats belong to the Project, the CONTRACTOR shall not be entitled to any extension in Contract Time or recovery for any delay incurred because of extensions in an early completion date until all Contract Float is used or consumed and performance or completion of the Work extends beyond the Contract Time.

1.08 NON-COMPLIANCE: The DISTRICT may refuse to recommend/authorize a progress payment in the event of the CONTRACTOR's failure, refusal or neglect to provide the required schedule information, since this will preclude the proper evaluation of the CONTRACTOR's progress. Remedies for the CONTRACTOR's failure, neglect or refusal to comply with the requirements of this SECTION are in addition, and not limited to, those provided under other sections of the Contract.

PART 2 - PRODUCTS

2.01 GENERAL CRITERIA:

A. All Construction Schedules shall be prepared by the CONTRACTOR and reflect the CONTRACTOR's plans, means and methods, techniques and sequences for performing of the Work.

B. The Construction Schedules shall break down the Work into distinct activities with interdependencies to the extent required to clearly depict the planned approach for completion of the Work and to effectively manage the execution of the Work.

1. The Construction Schedules shall divide the Work into manageable and logical segments and specify the progression from the Notice to Proceed (NTP) to Substantial Completion (SC) to Final Completion (FC) within Contract Time. SC and FC need to have the same total float.
2. The Construction Schedule is to include, at minimum, appropriate time allowances for submittals, procurement, coordination with others, construction, start-up/check-out (if applicable), operational and performance testing (if applicable), commissioning (if applicable), and Contract Close-Out.
3. Site-related activities shall not reflect a combination of work located in separate structures, work corresponding to different divisions of the specifications, work performed by first and second tier subcontractors or rough-in and finish work of the same trade.
4. The NTP activity shall be the first activity in the schedule and shall be a Start Milestone, with an assigned 7-day, no holiday calendar. The SC and FC activities shall be Finish Milestones, with assigned "Finish on or Before" constraints, with the Contract SC and FC dates assigned to the constraints, with a 7-day, no holiday calendar.
5. Primavera Settings:
    a. Constraints – Mandatory Starts or Finishes, Start On or Finish On and As Late as Possible constraints cannot be used in the Construction Schedules.

b. Calculation Settings – Default settings must be used, except that Critical activities must be defined as Longest Path activities.

c. Activity Types – Resource Dependent, WBS Summary & Level of Effort activity types cannot be used except as directed by the DISTRICT. Activity types will be set to Task Dependent.

d. Percent (%) Complete Type must be set to Duration.

e. Duration Type must be set to Fixed Duration & Units.

f. No Curve may be applied to an activity or its resources.

g. Late finish dates for milestones need to be the same as contractual dates. Contractual dates need to be incorporated into the corresponding activity name.

6. The CONTRACTOR's Construction Schedule shall include preparation, review and acceptance of Shop Drawings, material fabrication and material deliveries. The first submittal review and acceptance activity durations shall be fifteen (15) working days. Resubmittal review and acceptance cycles shall have activity durations of ten (10) working days. The CONTRACTOR shall include only the first submittal review and acceptance cycle for each submittal in the Construction schedule. If more than one cycle for a submittal occurs, the CONTRACTOR shall add that cycle to the schedule at the time it occurs. Additional submittal, review and acceptance cycles will require a revision to the Schedule.

C. The CONTRACTOR shall schedule any requirements (such as submittal reviews) of the DISTRICT, the DESIGN CONSULTANT and others (performing Work for the DISTRICT) indicated in or required by the Contract Documents. The Construction Schedule shall incorporate appropriate activities and Work sequences based upon the Contract Documents.

2.02 RESOURCE AND COST LOADING:

A. Each activity in the Contract Schedule shall be assigned a dollar value in accordance with the physical value of that work in relationship to the Activity Codes/WBS. The total budget value of all activities shall equal the Contract Price. The CONTRACTOR shall also indicate the planned duration for each construction activity.

B. The Major Categories for the Work being performed shall be broken down by the following activity codes.

1. General (including mobilization, demobilization, bonds, insurance, survey, As-Builts)
2. Submittals
3. Submittals Review & Acceptance
4. Fabrication & Delivery

C. The WBS for the logical construction sequencing, at a minimum shall consist of the following:

1. General (e.g., NTP, SC, FC, General Conditions, Bonds, Insurance, Punchlist)
2. Submittal Preparation
3. Submittal Review and Acceptance – If there are engineering costs associated with a submittal, those costs must be approved by the DISTRICT before they can be cost loaded in the Construction Schedule. No payment will be made for submittals until the review and acceptance process has been completed for that submittal.
4. Fabrication & Delivery - If there are costs associated with the Fabrication and Delivery, then a separate cost loaded Delivery Activity must be added with one (1) day duration and assigned to its appropriate Activity Code/WBS. The DISTRICT will only pay for materials once delivered and stored in a manner that complies with all the Contract Documents.
5. The WBS for the remaining construction related work shall be broken down in sufficient detail for conveying the sequence at which the CONTRACTOR intends to construct the Project.

D. Schedules where activities are not assigned both an Activity Code and WBS will not be accepted.

E. Cost Resource Loading:

1. A single unique resource for the cost loading of all activities shall be created in the resource dictionary.
2. The resource type for costs shall be “Nonlabor”.
3. Cost loading of activities shall be lump sum loading of the Budgeted Cost field and Budgeted Units. Budgeted Cost needs to be same as Budgeted Unit.
4. All costs must be displayed to two (2) decimal places.
5. The Costs for Mobilization and Demobilization activities must be equal.

F. Financial Periods and Stored Period Performance:
1. The Financial Periods must be set for the duration of the Project and start on the first day of the month and finish on the last day of the month.
2. “Stored Period Performance” must be used on a monthly basis in order for the “Actual This Period Nonlabor Cost” to be displayed correctly in the reports. Please refer to Appendix A for details.

G. Stored Material - For those Construction Schedule activities of Work that will use Stored Materials, the material or equipment delivery activities related to the Work will be cost loaded with enough money to cover the stored material. The cost loading of activities related to the work-in-place will be reduced by the amount of the stored material costs loaded into the delivery activities. The CONTRACTOR must provide a list of materials and/or equipment that will be paid for under Stored Materials prior to acceptance of the Baseline Schedule so that the DISTRICT can check for proper cost loading.

H. If the Work includes items covered by allowances, the CONTRACTOR shall ensure that Work is completed within the limits of the Contract Time. The Construction Schedule shall incorporate the CONTRACTOR’s best estimate of the activities and logic associated with the allowances.

I. CONTRACTOR’s P6 Settings need to be same as the DISTRICT settings. Please refer to Appendix B for details.

2.03 COST LOADED CONSTRUCTION SCHEDULE SUBMITTAL:

A. The Construction Schedule submittal, which refers to both the Baseline Schedule and all Schedule Updates, are to consist of the following items:
1. An electronic file containing PDF formats of all required reports and graphics, including a written narrative.
2. An electronic backup of the Construction Schedule in Primavera P6 XER format.
3. For Schedule Updates, a copy of the payment application is required. The Period Ending date in the DISTRICT Application for Payment must match the Data Date of the corresponding Schedule Update.

B. The Schedule Narrative Report for the Update Schedule shall consist of a written description of how the Work will be accomplished in accordance with the accepted Baseline Schedule. The Schedule Narrative accompanying each Schedule Update shall, at a minimum, compare current progress and cost performance to the last update for all milestones and activities, including longest path activities. If there are potential or actual delays, the narrative shall state the cause of the delay and impact to the Construction Schedule and define steps that have been taken or intend to be taken to mitigate delay impacts. The CONTRACTOR shall list any changes in activities ‘duration and logic. The narrative shall provide sufficient detail to allow the DISTRICT to verify the progress of the Work, compare actual versus planned activities, and identify assumptions made in scheduling work, including Change Order work. The CONTRACTOR shall direct specific attention, in writing, to adjustments or corrections made, either in response to the DISTRICT’s comments on the previous submittal or otherwise. A Schedule Narrative Report must be provided for all Baseline Schedules and Construction Schedule Updates.
1. Schedule Narrative Report (Baseline)
a. The Schedule Narrative Report shall show the following sub-headings with detailed comments:
i. Project Scope of Work

ii. Assumptions and Exceptions

iii. Proposed Work Sequence and Longest Path

iv. Milestones

b. It shall be an electronic color PDF – 8 ½" x 11" portrait format file.

2. Schedule Narrative Report (Construction Updates)

c. The Schedule Narrative Report shall show the following sub-headings with detailed comments:

i. Progress, issues, delays, and claims

ii. Delay reasons and at-fault party

iii. Proposed recovery plan for next update

iv. Schedule changes, including out-of-sequence work

v. Milestones

vi. Critical submittals and Procurement items

vii. Response to DISTRICT Review comments from previous submittal on an item-by-item basis.

d. It shall be an electronic color PDF – 8 ½ x 11 portrait format file.

C. Required Schedule Reports and Graphics - Bar Chart reports/P6 (plf) layouts will be provided by the DISTRICT and imported for use by the CONTRACTOR. All deliverables to the DISTRICT shall be an electronic, color, bookmarked PDF – 8 ½ x 11 portrait format file.

1. Schedule/Leveling Report (Schedlog)

a. The report shall indicate software settings and calculations generated by Primavera software.

b. Shall be an electronic color PDF - 8 ½ x 11 portrait format file.

2. WBS with Cash Flow Diagram (Grouped by WBS)

a. Bar Chart shall indicate all activities grouped by WBS and sorted by Early Start, Early Finish and Total Float.

b. Cash Flow Diagram shall be shown at the end of the Bar Chart, which shows budget and actual monthly bars, and cumulative curves.

c. Shall be an electronic color PDF – 8 ½ x 11 portrait format file.

3. Longest Path Bar Chart (No Grouping)

e. Bar Chart shall indicate all longest path activities without grouping and sorted by Early Start, Early Finish and Total Float.

f. Bar Chart shall be an electronic color PDF – 8 ½ x 11 portrait format file.

4. Pay App - Expanded (Grouped by Activity Codes)

a. Bar Chart shall indicate all activities grouped by Activity Codes and sorted by Activity ID.

b. Bar Chart shall be an electronic color PDF – 8 ½ x 11 portrait format file.

5. Pay App - Rollup (Grouped by Activity Codes)

a. Bar Chart shall indicate all activities grouped by Activity Codes rolled up per each Activity Code. The application for payment line items must match this layout.

b. Bar Chart shall be an electronic color PDF – 8 ½ x 11 portrait format file.

6. Earned Value Report

a. The report shall show Earned Value information comparison between the accepted Baseline and the Current Schedule Update.

b. The report shall be an electronic color PDF – 8 ½ x 11 portrait format file.

D. Draft Schedule Reports – The following reports are to be provided prior to the formal submission of the Schedule Update and application for payment for the purpose of agreeing upon the Duration % Complete and Cost % Complete of each activity.

1. WBS with Cash Flow Diagram
2. Pay App - Expanded
3. Longest Path

E. One (1) week prior to each Schedule Update submittal, the DISTRICT and the CONTRACTOR will agree upon the physical progress of the Work (Duration % Complete of each activity), and the value (Cost % Complete) of the scheduled work in place. The Duration % Complete must match the Cost % Complete, or a specific reason must be given in the Schedule Narrative Report.

F. All documents shall show the Project ID and Name. The DISTRICT's review shall not extend to the CONTRACTOR's means, methods, or techniques, the correctness of which shall remain the sole responsibility of the CONTRACTOR.

G. All schedules shall be in accordance with the Contract Time requirements of the Contract. Neither the DISTRICT's review of the Construction Schedule, nor the DISTRICT's statement of "Accepted As Submitted", will relieve the CONTRACTOR from responsibility for complying with Contract Time requirements, adhering to those sequences of work indicated in or required by the Contract Documents, or from completing any omitted Work within the Contract Time.

2.04 COST LOADED BASELINE SCHEDULE UPDATES:

A. The CONTRACTOR shall submit their Initial Cost Loaded Construction Schedule to the DISTRICT for review and acceptance not more than 30 calendar days after Contract Execution and prior to NTP. It will be reviewed for conformance to the requirements of the Contract Documents. If the schedule is not accepted and requires revisions, the CONTRACTOR will revise this Construction Schedule and resubmit it for review and acceptance within ten (10) calendar days of the rejection notice.

B. Schedule Naming Structure: Once the Construction Schedule is accepted, it becomes the CONTRACTOR's Baseline Schedule Update 0 and is the basis for monitoring the CONTRACTOR's progress against milestones, Contract Time, and the evaluation and reconciliation of extensions in Contract Time. From then on, all activities, original durations, and their relationships may not be changed, added, or deleted without the prior approval of the DISTRICT. Contract Time (including all contracted milestones) cannot be changed without a formal Change Order approved by the DISTRICT.

Project Name – R0A-U0	1st Submission of Baseline Schedule.
Project Name – R0B-U0	2nd Submission of Baseline Schedule, which is accepted and designated as the Baseline Schedule
Project Name – R0B-U1A	1st Submission of Update 1.
Project Name – R0B-U1B	2nd submission of Update 1, which is accepted.

C. Schedule updates shall accurately reflect all approved Change Orders including the exact duration and cost. They will be reviewed for conformance to the requirements of the Contract Documents as amended by Change Orders.

D. Schedule Activity ID's must not be changed or deleted.

2.05 CHANGE ORDERS

A. Upon execution of a Change Order, a new Activity Code and WBS for that Change Order must be created. All activities associated with that Change Order will be assigned to the new WBS and the new Activity Code will be assigned to those activities. Both the Application for Payment and the layout report, Pay App - Rollup, will have a line item indicating the new Change Order.

B. If a particular Scope of Work (SOW) has been deleted in a Change Order, the original activities associated with that SOW must remain. A new set of identical activities will be created under a new WBS and a new activity code (e.g. CO#1) with equivalent but negative value dollars.

C. If a new activity is added because of an executed Change Order both the Activity ID and the Activity Name must reflect the associated Change Order. (e.g. CO#01-A, Additional Silt Fence ***CO#01 Item A).

D. An executed Change Order may require multiple activities broken down in sufficient detail to convey the new SOW.

E. All activities related with change orders must have predecessors and successors and must tie back to the original scope's activity network logic.

F. Executed change orders can be reflected in the next schedule update.

PART 3 - EXECUTION

3.01 MONTHLY UPDATE CYCLE:

A. Schedule Update Submittals are due every month and are to be attached to each Application for Payment. The Schedule Update Total Actual Cost to Date must match the Application for Payment Work Completed and Stored to Date amount. The DISTRICT will advise the CONTRACTOR of any change to the due dates.

B. See Paragraph 2.03.D for the Draft Schedule Reports that are to be provided prior to the formal submission of the Schedule Update and application for payment.

C. The CONTRACTOR should include a two-week look ahead report from Primavera for each bi-weekly construction meeting. DISTRICT will provide a primavera layout for this report. The report needs to be produced from the layout.

3.02 CHANGES:

A. If the monthly update is behind schedule, the CONTRACTOR shall include details in the update narrative that identify the cause of the delay, at- fault parties and any actions required by the CONTRACTOR to recover the schedule and complete the Project within Contract Time. The CONTRACTOR shall promptly undertake appropriate action, at no additional cost to the DISTRICT, to recover the schedule whenever the current schedule shows that the CONTRACTOR did not or cannot achieve a milestone established in the Contract.

B. Appropriate recovery actions include, but are not limited to, assignment of additional labor, subcontractors, equipment, shift or overtime work, expediting of submittal or deliveries, or any combination of thereof. Overlapping of activities or sequencing changes shall be deemed appropriate only if properly substantiated in the submittal. Recovery plans that are accepted by the DISTRICT that add, delete, or change activities, activity relationships, durations or constraints and cost or resource loading must be submitted in the next schedule update.

C. If the monthly update is behind schedule by thirty (30) calendar days or more, or if at any time the number of days CONTRACTOR is behind schedule has not decreased from the prior month to show progress toward recovering the schedule, the CONTRATOR shall provide a Recovery Plan submittal, in accordance with SECTION 01300, for the DISTRICT's review and approval. Upon acceptance of the Recovery Plan, the CONTRACTOR shall immediately submit a Recovery Schedule that incorporates all the actions identified in the plan, for the DISTRICT's review and approval.

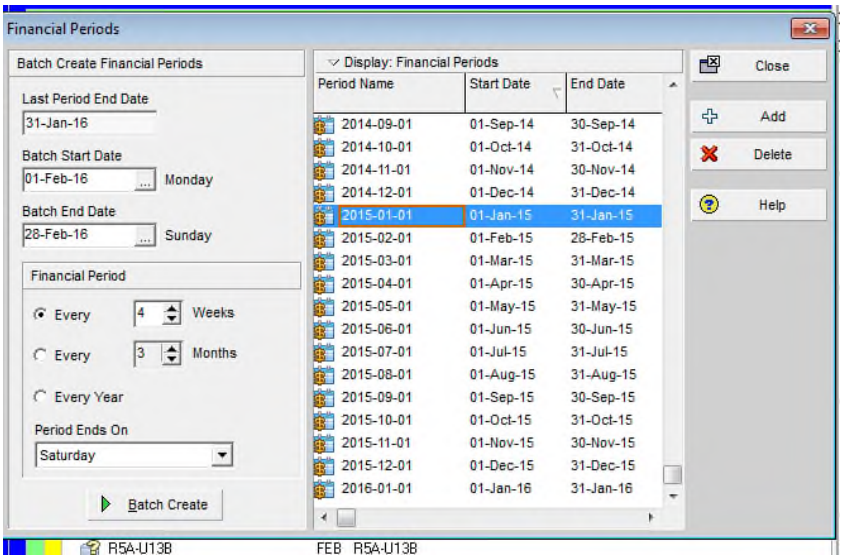
The CONTRACTOR's refusal, failure or neglect to take appropriate recovery action, or to submit a written recovery plan and/or recovery schedule shall constitute reasonable evidence that the CONTRACTOR is not prosecuting the Work, or separable part, with the diligence that will ensure its completion within the Contract Time. Such lack of action shall constitute sufficient basis for the DISTRICT to recommend the withholding of some or all of any payment due and/or shall be considered grounds for termination of the Contract by the DISTRICT in accordance with Article 15 of the General Terms & Conditions.

END OF SECTION

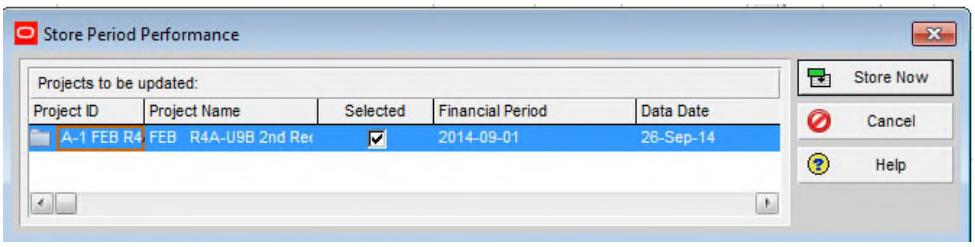
Appendix A: Monthly Updates After Pay App #1

After Pay App #1, the following steps need to be followed in order to let "This Period" show current month $ instead of up-to-date $. If these steps are not followed, "This Period" may not match your monthly invoice $ and may result the rejection of your pay app.

Step 1. Check Financial Period Settings. Go to Admin>Financial Period and make sure there are monthly periods that cover the duration of the Project. Each period should start on the 1st day of the month and end on the last day of the month.



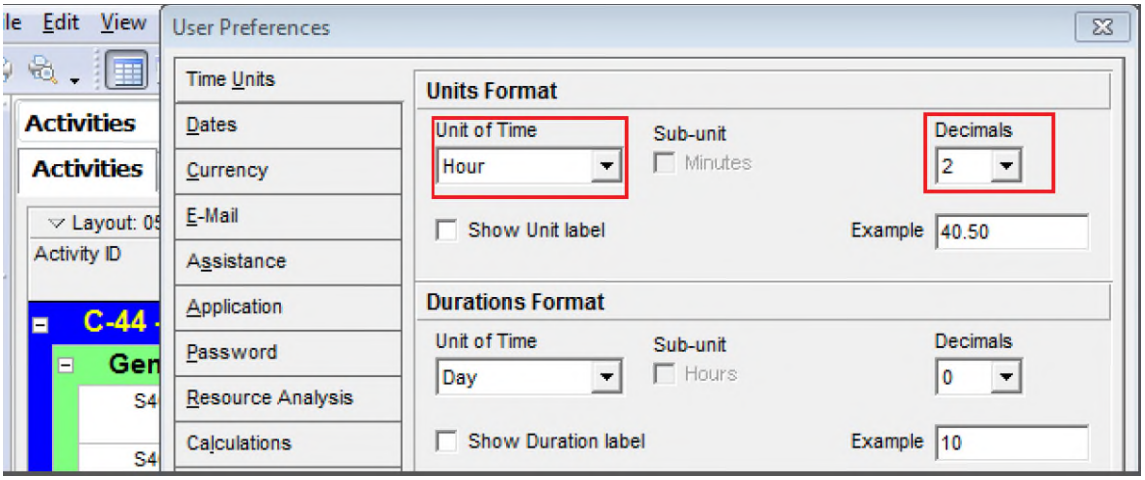
Step 2. Save Financial Period Performance. Make a copy of the P6 file of Pay App 1 and rename it "Pay App 2". Open the Pay App 2 file and before you do anything, go to Tools>Store Period Performance and choose the Financial Period that is the same month of the data date. Click "Store Now". This will clear the "This Period" column and get your file ready for updates.



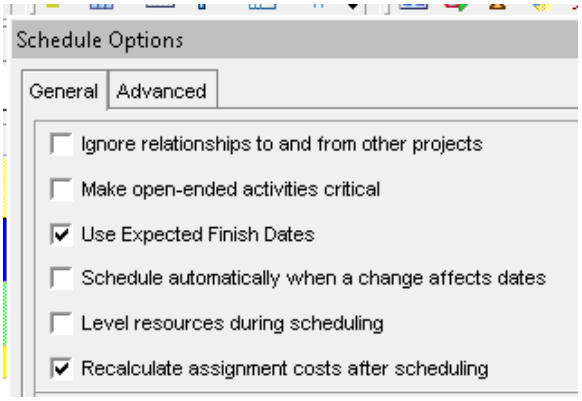
Step 3. Input updates. Type in your updates for Pay App #2, advance the data date, and generate reports. DO NOT CLICK "STORE NOW" until you are ready to make a copy of Pay App 2 to create Pay App 3. Repeat steps 2 & 3 for future updates.

Appendix B: Matching your P6 settings with SFWMD P6 settings

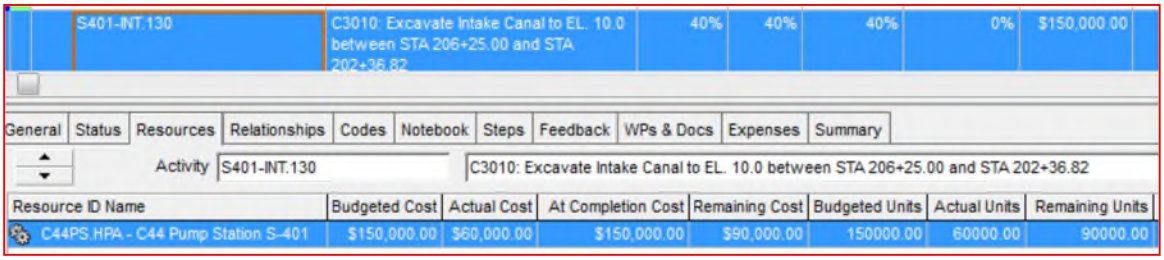
1. Go to the menu bar, click “Edit”, then “User Preferences”. In the pop-up window, choose “Unit of Time”. Make sure the unit of time is “Hour”. See the screenshot below.



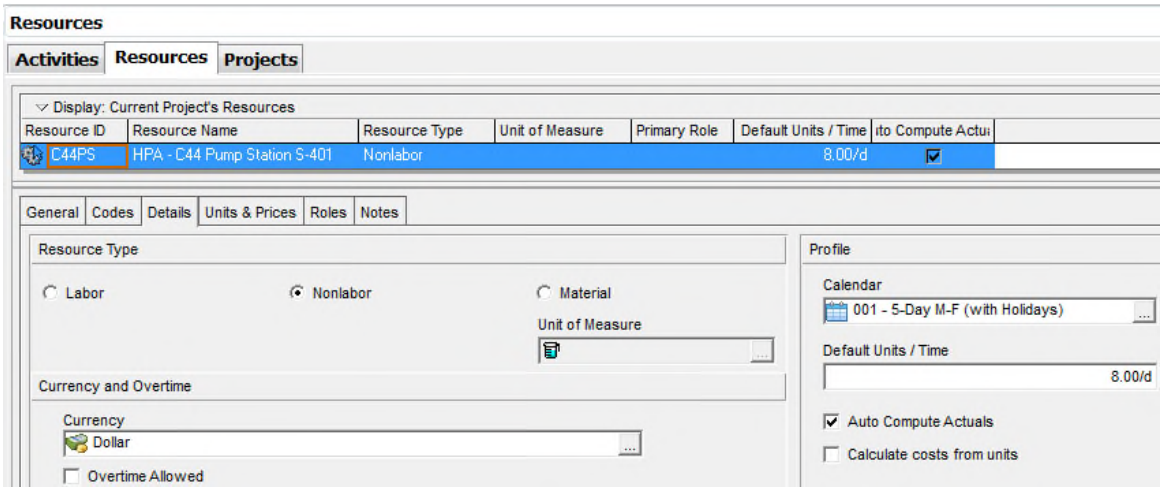
2. Click “F9”, choose “Schedule Options” and make sure your options match the selections shown below.

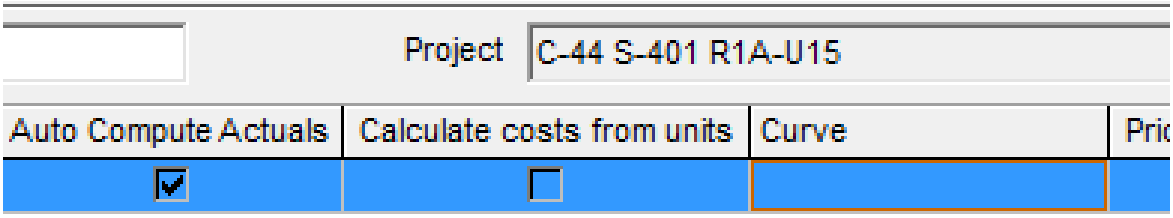


3. Go through each activity with $ (you can do this in the cash flow diagram layout) and make sure the “Budgeted Cost”, “At Completion Cost” and “Budgeted Units” have the same number. See the screenshot below. You need to click “F9” or “schedule” the Project to see if the number you entered will stay or not. If the number you entered disappears after clicking “F9”, please follow step 4.



4. Go to the “Resources” tab and uncheck “Calculate costs from units”. Make sure the “Curve” field is empty. See the screenshot below.





SECTION 01320 CONSTRUCTION VIDEO AND PHOTOGRAPHS

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: This SECTION specifies administrative and procedural requirements for construction photographs.

B. Related Work Specified Elsewhere:

1. SECTION 01300 - Submittals

1.02 SUBMITTALS: Submit photographs electronically as specified in SECTION 01300 and in PART 3, this SECTION.

1.03 QUALITY ASSURANCE: Photographs and video shall be clear and sufficient to show significant detail, not blurred, or taken in shadow, nor too distant. The DISTRICT may require that the photographs or video be retaken should the quality be insufficient. Costs for such re-takes are the CONTRACTOR's responsibility at no extra cost to the DISTRICT.

PART 2 - PRODUCTS

2.01 PHOTOGRAPHIC REQUIREMENTS: Specified in PART 3, this SECTION.

PART 3 - EXECUTION

3.01 COLOR AUDIO VIDEO TAPING OF CONSTRUCTION AREA:

A. Prior to beginning any construction, the CONTRACTOR shall prepare a color audio video recording of all the areas to be affected by construction.

B. The audio video recording shall be done within the two-week period prior to placement of materials or equipment on the construction area and furnished one week prior to the start of construction. The audio video recording shall be done with a DISTRICT Representative present.

C. To preclude the possibility of tampering or editing in any manner, all video recordings shall, by electronic means, generate and display continuously and simultaneously on the screen digital information to include the date and time of recording. The time information shall consist of hours, minutes and seconds, separated by colons (i.e., 10:35:18).

D. The audio video recording shall consist of one video and one audio track which shall be recorded simultaneously. All tracks shall consist of original live recordings and thus shall not be copies of other audio and video recordings. The audio track shall contain the narrative commentary.

E. The rate of speed in the general direction of travel of the conveyance used during recording shall be controlled to provide a usable image. Panning rates and zoom-in, zoom-out rates shall be controlled sufficiently such that playback will produce clarity of the object viewed.

F. All recording shall be done during times of good visibility. No recording shall be done during periods of visible precipitation, unless otherwise authorized by the DISTRICT.

G. The DISTRICT shall have the authority to designate what areas may be omitted or added for audio video coverage.

H. When conventional wheeled vehicles are used, the distance from the camera lens to the ground shall not be less than eight feet to insure perspective.

I. In some instances, audio video coverage will be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking or special conveyance by the DISTRICT.

J. Areas covered shall include offsite roadways that will be subjected to heavy usage such as for haul routes or delivery of heavy components or equipment.

3.02 PROGRESS SITE PHOTOGRAPHS:

A. The CONTRACTOR shall be responsible for photographs of the Site to show the existing and general progress of the WORK. The DISTRICT will advise as to which views are of interest. Photographs shall be taken of the following areas and at the following times.

1. Existing Site conditions before Site WORK is started. Number of views shall be adequate to cover the Site.

2. Progress of the WORK from beginning and throughout construction. Progress photos must be provided with each pay request. Pay requests will not be considered acceptable until photographs are provided. Number of views shall be adequate to cover the Site.

3. Finished Project after completion of WORK. Number of views shall be adequate to show the finished WORK.

4. If Project is not completed during the Contract Time, or authorized extensions, photographs shall continue to be taken at no increase in Contract Price.

B. Photographs shall be taken with three (3) megapixel minimum resolution.

C. Monthly progress photographs shall be taken from an aerial perspective on all Projects, except for indoor Projects.

D. Provide a CD containing all photographic images in JPG format. Label CD with the name and Contract number of Project, name of CONTRACTOR, description of view, and date photograph was taken.

E. Deliver CD to DISTRICT with pay applications.

3.03 ADDITIONAL PHOTOGRAPHS: From time to time the DISTRICT may issue requests for additional photographs, in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Price or an Allowance.

A. The DISTRICT will give the photographer three (3) days' advance notice, where feasible.

B. In emergency situations, the photographer shall take additional photographs within 24 hours of the DISTRICT’s request.

C. Circumstances that could require additional photographs include, but are not limited to:

1. Substantial Completion of a major phase or component of WORK.

2. DISTRICT’s request for special publicity photographs.

3. Special events planned at Project Site.

4. Immediate follow-up when on-site events result in construction damage or losses.

5. Photographs to be taken at fabrication locations away from Project Site.

6. Extra record photographs at time of final acceptance.

END OF SECTION

SECTION 01410 TESTING AND QUALITY CONTROL

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work:

1. The CONTRACTOR shall provide and maintain an effective Quality Control (QC) Program that fulfills the requirements of Article 13 *"Warranty and Guarantee, Tests and Inspections, Correction, Removal or Acceptance of Defective Work"* of the GENERAL TERMS & CONDITIONS.

2. The CONTRACTOR shall establish and implement a Quality Control Plan to perform sufficient inspection of all items of the Work, including that of Subcontractors, to insure conformance to the Technical Specifications and the Drawings with respect to the materials, workmanship, construction, equipment performance, and identification.

3. 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 defective work.

4. After the Contract is awarded and before the construction begins, the CONTRACTOR shall meet with the DISTRICT or its representative to discuss quality control requirements. The meeting shall develop mutual understanding relative to the details of the Quality Control Plan, including the appropriate forms to be used for recording the quality control operations, inspections, administration of the Quality Control Plan, and the interrelationship of the CONTRACTOR and the DISTRICT inspection.

5. The CONTRACTOR shall submit his written Quality Control Plan for review, describing the activities and listing those 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 testing and inspection activities performed by the DISTRICT, or its representatives, for on and off-site construction activities

6. All compliance inspections shall be recorded on the appropriate forms, including but not limited to the specific items required in each SECTION of the Technical Specifications. The completed forms, including record of corrective actions taken, shall be furnished to the DISTRICT. The DISTRICT's quality control representative will maintain a list of all deficiencies which are not corrected the same day as they are discovered.

7. Should recurring deficiencies in an item or items indicate that the Quality Control Plan is not adequate, the CONTRACTOR shall take corrective actions as directed by the DISTRICT to update the Quality Control Plan, to satisfactorily address and resolve any reoccurring deficiencies.

B. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals

1.02 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 the DISTRICT. The laboratory shall be staffed with experienced technicians, and shall be properly

equipped, ACI certified, and fully qualified to perform the tests in accordance with the specified standards.

1.03 TESTING LABORATORY SERVICES FURNISHED BY CONTRACTOR:

A. The CONTRACTOR is responsible for all QC testing required in connection with the performance of the Work (which are identified as the CONTRACTOR's responsibility in the Contract Documents) which shall be performed and paid for by the CONTRACTOR, and a certified copy of the results will be furnished to the DISTRICT within five (5) days of the test.

B. The CONTRACTOR is responsible for all testing and inspection services required to achieve an effective Quality Control Program, to assure that the Work strictly complies with the Contract requirements. The CONTRACTOR shall pay all costs for such services.

C. The CONTRACTOR is responsible for the cost any tests performed by the DISTRICT which do not meet the Contract requirements.

1.04 TESTING LABORATORY SERVICES FURNISHED BY DISTRICT:

A. The DISTRICT or its representatives will provide Quality Assurance (QA) services during construction. The CONTRACTOR shall cooperate with the DISTRICT in the implementation of these services. For the purposes of the Work, QA services include visual observation of the Work and independent testing of completed Work to verify compliance with the requirements of the Plans and Specifications.

B. The QA Plan will be developed by the DISTRICT or its representatives. This plan shall include identification of the procedures and testing methods to be implemented.

C. The CONTRACTOR shall be required to implement all corrective actions identified by the results of the QA services to include removal and replacement of defective Work.

D. The DISTRICT will secure the services of a materials testing company, for field and laboratory tests designed to provide Quality Assurance (QA) and verification of the CONTRACTOR’s QC Program. The QA services, field sampling and testing will be performed in the general manner indicated in the Technical Specifications, with minimal interference to the construction operations.

E. While the CONTRACTOR may request this testing in order to proceed to a following construction stage, the DISTRICT will determine the exact time and location of the field sampling and testing, and may require additional sampling and/or testing as necessary to determine that the materials and equipment conform with the CONTRACTOR-submitted data and with the Contract Documents.

F. Arrangements for the delivery of samples and test specimens to the testing laboratory under this paragraph will be made by the DISTRICT. The testing laboratory shall perform all laboratory tests within a reasonable time consistent with the specified standards and shall furnish a written report of each test.

G. The CONTRACTOR shall furnish all sample materials and cooperate in the sampling and field testing activities, interrupting the Work when necessary.

H. When sampling or testing activities are performed in the field by testing laboratory personnel, the CONTRACTOR shall furnish personnel and facilities to assist in the activities.

I. The Testing Laboratory contracted by the DISTRICT will not be authorized to:

1. Release, revoke, alter or enlarge on requirements of the Contract Documents.

2. Approve or accept any portion of the Work.

3. Perform any duties of the CONTRACTOR.

4. The CONTRACTOR shall provide at least 48 hours advance notice of any work for which he may desire required testing for compliance by the DISTRICT.

J. The DISTRICT shall be reimbursed by the CONTRACTOR for the cost of any CONTRACTOR-requested tests or inspections, or tests on an item purported to be ready, which fail to meet the Technical Specification requirements. The DISTRICT may withhold such amounts from payments otherwise due to the CONTRACTOR.

1.05 TRANSMITTAL OF TEST REPORTS:

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

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

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SECTION 01510 TEMPORARY UTILITIES AND FACILITIES

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: This SECTION includes requirements of a temporary nature not normally incorporated into final WORK. It includes the following:

1. Utility services
2. Construction and support facilities
3. Construction aids
4. Fire protection

B. Related Work Specified Elsewhere:

1. SECTION 01300 - Submittals
2. SECTION 01530 - Temporary Barriers and Controls

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the publications of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. See the various paragraphs for the specified standard. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. American National Standards Association (ANSI):
    a. A10 Series - Safety Requirements for Construction and Demolition
    b. ANSI/ASME PTC 19.1 Test Uncertainty, Instrument and Apparatus
2. Florida Department of Transportation (FDOT)
    a. Standard Specifications for Road and Bridge Construction
3. Florida Trench Safety Act (90-96, Laws of Florida)
4. National Electrical Contractors Association (NECA):
    a. Electrical Design Library - Temporary Electrical Facilities
5. National Fire Protection Association (NFPA):
    a. NFPA 10 - Standard for Portable Fire Extinguishers
    b. NFPA 70 - National Electrical Code
    c. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations
6. National Electrical Manufacturers Association (NEMA)
7. Underwriters Laboratories (UL)

1.03 SUBMITTALS:

A. Submittals shall be in accordance with SECTION 01300.

B. Site Plan: Submit to the DISTRICT a Site Plan indicating CONTRACTOR's facilities including:

1. Trailers

2. Equipment Yard
3. Parking
4. Traffic Control

1.04 QUALITY ASSURANCE:

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:

1. Building Code requirements
2. Utility company regulations
3. Police, Fire Department, and rescue squad rules
4. Environmental protection regulations

B. Standards:

1. Comply with NFPA 10 and 241, and ANSI A10 Series standards "Temporary Electrical Facilities."
2. Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70.

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT:

A. Provide new materials and equipment. If acceptable to the DISTRICT, undamaged previously used materials and equipment in serviceable condition may be used. Provide materials and equipment suitable for the use intended, of capacity for required usage, and meeting applicable codes and standards. Comply with requirements of DIVISIONS 2 through 16.

B. Water: Provide potable water approved by local health authorities.

C. Water Hoses: Provide 3/4-inch (19 mm), heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet (30 m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

D. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120V plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

E. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

F. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.

G. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the

exposures. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.01 TEMPORARY UTILITIES:

A. General:

1. Engage the appropriate local utility company to extend temporary electric and phone service to the Project area from nearby existing utilities. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.

2. Provide adequate utility capacity at each stage of construction. Prior to availability of temporary utilities at the Site, or in remote areas without services, provide trucked-in services as required for start-up and construction operations.

3. Furnish, install and maintain temporary utilities required for adequate construction, safety and security. Modify, relocate and extend systems as WORK progresses. Repair damage caused by installation or use of temporary facilities. Grade the areas of Site affected by temporary installations to required elevations and grades, and clean the area. Remove on completion of WORK or until service or facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

4. The types of temporary construction utilities and facilities required include, but are not limited to, potable drinking water, wastewater, drainage, dewatering equipment, enclosure of WORK, ventilation, electrical power, lighting, hoisting facilities, stairs, ladders, and roads.

5. Inspect and test each service before placing temporary utilities in use. Arrange for required inspections and tests by governing authorities, and obtain required certifications and permits for use.

6. Materials used for temporary service shall not be used in the permanent system unless so specified or acceptable to the DISTRICT.

3.02 TEMPORARY ELECTRICITY AND LIGHTING:

A. New Service:

1. Arrange with utility company to extend existing electric service to temporary office trailers.

2. Connect temporary service in a manner directed by utility company officials. Provide separate meter for metering of power used by all entities authorized to be at or perform WORK at the Project Site.

3. The electric service shall be of sufficient capacity and characteristics for the various construction tools, machinery, lights, heating and air conditioning, pumps, and other tools required by CONTRACTOR and his Subcontractors. In areas of the Project where permanent or temporary power service from the local utility is not available, the CONTRACTOR shall supply and maintain engine-driven, power-generator sets.

4. Provide weatherproof, grounded, power distribution system sufficient to accommodate construction operations requiring power, use of power tools, electrical heating and lighting. Provide overload protection. Supply power for electric welding, if any, from engine-driven, power-generator sets.

5. Provide adequate artificial lighting for all areas of WORK when natural light is not adequate for WORK.

6. Sufficient light shall be provided for general construction areas, with additional sufficient lighting for specific tasks and to meet safety requirements.

B. Use of Permanent System:

1. Prior to use of permanent system to be installed by the power company for construction purposes, obtain written permission of the DISTRICT.

2. Maintain permanent system as specified for temporary facilities.

C. Costs of Installation and Operation:

1. Pay fees and charges for permits and applications.

2. Pay costs of installation, maintenance, removal of temporary services, and restoration of any permanent facilities used.

3. Pay costs of electrical power used (if applicable).

4. Pay costs of furnishing, operating, and maintaining engine-driven power-generator sets, where applicable.

3.03 TEMPORARY HEAT AND VENTILATION:

A. General:

1. Provide temporary heat, ventilation and cooling as required to maintain adequate environmental conditions in temporary office trailers and storage sheds and to facilitate progress of the WORK, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage. Protect from adverse effects of low temperatures or high humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.

2. Methods of heating and fuel shall be suitable for particular purposes. Portable heaters shall be standard approved units with controls.

B. Costs of Installation and Operation:

1. Pay fees and charges for applications, permits, and inspections.

2. Pay costs of installation, operation, maintenance, removal of equipment, and restoration of existing or permanent facilities if used.

3. Pay cost of power and fuel used.

3.04 TEMPORARY TELEPHONE SERVICE:

A. General:

1. Arrange with local telephone service company to extend existing direct line telephone service to the CONTRACTOR’s and DISTRICT's field office site for the use of the DISTRICT and construction personnel and employees.

2. Telephone Service: Local Provider.

3. CONTRACTOR shall arrange with local cellular/mobile telephone service company to provide mobile telephone service for use by CONTRACTOR and so CONTRACTOR can be reached throughout the entire Project area during normal working hours.

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

3.05 TEMPORARY SANITARY FACILITIES:

A. CONTRACTOR-Furnished Facilities:

1. Furnish, install and maintain temporary sanitary facilities for use through construction period. Remove on completion of WORK.

2. Provide for all construction workers under this Contract and representatives at the Site.

3. Toilet facilities shall be of the chemical-aerated recirculation or combustion type, properly vented and fully enclosed with a glass- fiber-reinforced polyester shell or similar nonabsorbent material.

3.06 TEMPORARY CONSTRUCTION AIDS:

A. General:

1. Provide construction aids and equipment required by personnel, available for DISTRICT observers' use, and to facilitate the execution of the WORK; scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes, and other such facilities and equipment.

2. Materials may be new or used, must be suitable for the intended purpose and meet the requirements of applicable codes, regulations and standards.

3. When platform stair framing is in place, provide temporary treads, platforms, and railings for use by construction personnel.

3.07 INSTALLATION AND REMOVAL:

A. Relocation: Relocate construction aids as required by progress of construction, by storage or WORK requirements, and to accommodate requirements of DISTRICT and other CONTRACTOR's at the Site.

B. Removal: Remove temporary materials, equipment and services when construction needs can be met and allowed by use of permanent construction, or at completion of the Project.

C. Repair: Clean and repair damage caused by installation or by use of temporary facilities.

1. Remove foundations and underground installations for construction aids.

2. Grade the areas of the Site affected by temporary installations to required elevations and clean the area.

END OF SECTION

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SECTION 01519 TEMPORARY CONSTRUCTION

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The WORK specified in this SECTION consists of maintaining traffic within the limits of the Project for the duration of the construction period. It shall include the construction and maintenance of the detour road as shown on the Drawings, furnishing, installing, and maintaining of traffic control and safety devices during construction, the control of dust, and any other special requirements for safe and expeditious movement of traffic as may be called for on the Drawings or as directed by the DISTRICT.

B. Related Work Specified Elsewhere:

1. SECTION 01300 - Submittals

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the publications of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. See the various paragraphs for the specified standard. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

B. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition, (FDOT)

1. Specification Section 102 – Maintenance of Traffic

2. Manual of Traffic Control and Safe Practices for Street and Highway Construction

PART 2 - PRODUCTS

N/A

PART 3 - EXECUTION

3.01 MAINTENANCE OF TRAFFIC:

A. All lanes that are being used for the maintenance of traffic shall be adequately maintained in accordance with FDOT Standard Specification Section 102.

3.02 TRAFFIC CONTROL:

A. The CONTRACTOR shall provide, install, and maintain adequate traffic control devices, warning devices, and barriers in accordance with FDOT Standard Specification Section 102-5, Traffic Control, and applicable sections of the Manual of Traffic Control and Safe Practices for Street and Highway Construction.

END OF SECTION

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SECTION 01530 TEMPORARY BARRIERS AND CONTROLS

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: This SECTION includes General Requirements for:

1. Protection of the WORK
2. Protection of existing property
3. Barriers
4. Security
5. Environmental controls
6. Access roads and parking areas
7. Traffic control and use of roadways

B. Related Work Specified Elsewhere:

1. SECTION 01300 – Submittals
2. SECTION 01700 - Contract Closeout

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the publications of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 SAFETY AND PROTECTION OF WORK AND PROPERTY:

A. General:

1. The CONTRACTOR shall provide for the protection of the WORK as set forth in the GENERAL TERMS & CONDITIONS. Provide protection at all times against rain, wind, storms, frost, freezing, condensation, or heat so as to maintain all WORK and Equipment and Materials free from injury or damage. At the end of each day all new WORK likely to be damaged shall be appropriately protected.
2. The CONTRACTOR shall notify the DISTRICT immediately if at any time, operations are stopped due to conditions which make it impossible to continue or to obtain proper results.
3. The CONTRACTOR shall construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations, pits, and trenches dewatered sufficiently to permit continuous construction.
4. The CONTRACTOR shall protect floors from damage by proper covering and care when handling heavy equipment, painting, or handling mortar or other such materials. Use proper cribbing and shoring to prevent overloading of floors while moving heavy equipment. Provide

metal pans under pipe-threading machines and other machines that may leak oil and clean such pans daily, keeping oil off of the floors. Restore floors to former condition where damaged or stained.

5. The CONTRACTOR shall not load concrete floors less than 28-days old without the written permission from the DISTRICT.

6. The CONTRACTOR shall restrict access to roofs except as required by the WORK. Where access is required, provide protection with plywood, boards, or other suitable materials.

B. Property Other than DISTRICT's:

1. The CONTRACTOR shall provide for the protection of property as set forth in the GENERAL TERMS & CONDITIONS. Report immediately to the owners thereof and promptly repair damage to existing facilities resulting from construction operations.

2. Names and telephone numbers of representatives of the power company having jurisdiction over power lines in the WORK area can be obtained from the DISTRICT. The CONTRACTOR shall contact the power company a minimum of seven (7) calendar days prior to performing WORK within 500' of power transmission line property, right-of-way or easement lines.

3. The applicable requirements specified for protection of the WORK shall also apply to the protection of existing property of others.

4. The CONTRACTOR shall restore all property affected by the CONTRACTOR's operations to the original or better condition, to the satisfaction of the DISTRICT.

3.02 BARRIERS:

A. General:

1. The CONTRACTOR shall furnish, install, and maintain suitable barriers as required to prevent public entry, protect the public, and to protect the WORK, existing facilities, trees, and plants from construction operations. Remove the barriers when no longer needed or at completion of the WORK.

2. The CONTRACTOR may use new or used materials, suitable for the intended purpose, but must not violate requirements of applicable codes and standards or of regulatory agencies.

3. Barriers shall be of a neat and reasonably uniform appearance, structurally adequate for the required purposes.

4. The CONTRACTOR shall maintain barriers in good repair and a clean condition for adequate visibility.

5. The CONTRACTOR shall relocate barriers as required by progress of the WORK.

6. The CONTRACTOR shall repair damage caused by the installation of barriers and restore damaged areas to original or better condition, to the satisfaction of the DISTRICT.

3.03 ENVIRONMENTAL CONTROLS:

A. Dust Control:

1. If appropriate and at the discretion of the DISTRICT, the CONTRACTOR shall provide and apply methods of positive dust control to minimize raising dust from construction operations.

2. The CONTRACTOR shall clean interior spaces and surfaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.

3. The CONTRACTOR shall schedule operations so that dust and other contaminants will not fall on wet or newly-coated surfaces.

4. The CONTRACTOR shall cover materials transported to and from Site as necessary to prevent depositing material on offsite roadways or creating dust.

B. Water and Erosion Control:

1. The CONTRACTOR shall provide methods necessary to control surface water to prevent damage to the WORK, the Site, or adjoining properties as specified in SECTION 02435.

2. The CONTRACTOR shall control fill, grading, and ditching to direct surface water away from excavations and other construction areas, and to direct surface water to proper storage and/or conveyance facilities.

3. The CONTRACTOR shall control surface water and ground water as necessary to prevent flooding, erosion, or other damage to any portion of the Site and/or to adjoining areas.

C. Debris Control and Clean-Up:

1. The CONTRACTOR shall keep the premises free at all times from accumulations of debris, waste materials, and rubbish. The CONTRACTOR's responsibilities shall include, but not be limited to the following:

a. Adequate trash receptacles at the Site, emptied promptly when filled.

b. Periodic cleanup to avoid hazards or interference with operations at the Site and to maintain the Site in a reasonably neat condition.

c. The keeping of construction materials such as forms and scaffolding neatly stacked.

d. Immediate cleanup to protect the WORK by removing splattered concrete, oil, paint, corrosive liquids, and cleaning solutions from walls, floors, and other surfaces before the surfaces are marred.

2. The CONTRACTOR shall prohibit overloading of trucks to prevent spillages on access and haul routes. Provide periodic inspection of traffic areas to enforce requirements.

3. Final cleanup is specified in SECTION 01700.

D. Pollution Control:

1. The CONTRACTOR shall provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by the discharge of hazardous or toxic substances from construction operations.

2. The CONTRACTOR shall provide equipment and personnel and perform emergency measures required to contain any spillages, and to remove contaminated soils or liquids. Excavate and dispose of any contaminated earth off-site in approved locations, and replace with suitable compacted fill and topsoil.

3. The CONTRACTOR shall take special measures to prevent harmful substances from entering public waters, sanitary sewers, or storm sewers.

4. If hazardous materials are discharged, report to authorities as required by applicable law or regulations and notify the DISTRICT, immediately.

3.04 TRAFFIC CONTROL AND USE OF ROADWAYS:

A. Traffic Control:

1. The CONTRACTOR shall provide, operate, and maintain equipment, services, and personnel, with traffic control and protective devices, as required to expedite safe vehicular traffic flow on haul routes, at Site entrances, onsite access roads, and parking areas. This includes barricades and other devices or personnel as necessary to adequately protect the public. Prepare and submit a Traffic Control Plan to DISTRICT for review.

2. The CONTRACTOR shall remove temporary equipment and facilities when no longer required. Restore grounds to original, better, or specified conditions.

3. The CONTRACTOR shall provide and maintain suitable detours or other temporary expedients if necessary.

4. Bridge over open trenches where necessary to maintain traffic.

5. The CONTRACTOR shall consult with applicable governing authorities to establish public thoroughfares which will be used for Site access. All operations shall meet the approval of owners or agencies having jurisdiction.

B. Maintenance of Roadways:

1. The CONTRACTOR shall repair off-site roads, water control and DISTRICT structures and levees damaged by operations. Keep traffic areas as free as possible of excavated materials and maintain in a manner to eliminate dust, mud, and hazardous conditions.

2. All operations and repairs shall meet the approval of owners or agencies having jurisdiction.

3.05 SECURITY:

A. The CONTRACTOR is solely responsible for initiating and maintaining security at the construction Site. CONTRACTOR shall take all necessary precautions for the security of, and shall provide the necessary protection to:

1. Materials and equipment incorporated into the WORK, or stored on-site prior to incorporation into the WORK.

2. Plant and equipment including any equipment furnished for use by the DISTRICT.

B. The CONTRACTOR shall replace, in kind, any materials or equipment lost, damaged or destroyed at no cost to the DISTRICT.

END OF SECTION

SECTION 01600 EQUIPMENT AND MATERIALS

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: This SECTION includes general requirements for transportation, handling, delivery, storage, and protection of CONTRACTOR and DISTRICT - furnished Equipment and Materials.

B. Related Work Specified Elsewhere:

1. SECTION 01300 – Submittals

2. SECTION 01630 - Product Options and Substitutions

1.02 DEFINITIONS: Definitions used in this Paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including such terms as "systems," "structure," "finishes," "accessories," "furnishings," "special construction," and similar terms. Such terms are self-explanatory and have recognized meanings in the construction industry.

A. Products: Items purchased for incorporation in the WORK, regardless of whether they were specifically purchased for the Project or taken from the previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and other terms of similar intent.

B. Equipment: A product with operational or non-operational parts, regardless of whether motorized, manually operated, or fixed. Equipment may require service connections such as wiring or piping.

C. Materials: Products that must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form part of the WORK.

1.03 QUALITY CONTROL:

A. Equipment and Material Incorporated into the WORK: Provide products that comply with the requirements of the Contract Documents, are undamaged, and unless otherwise indicated, are unused at the time of installation. The CONTRACTOR shall provide products that are complete with all accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and for the intended use and effect.

B. Standard Products: Where they are available and comply with the Technical Specifications, provide standard products of types that have been produced and used successfully in similar situations on other projects.

C. Continued Availability: Where, because of the nature of its application, the DISTRICT is likely to need replacement parts or additional amounts of a product at a later date, either for maintenance and repair or replacement, provide standard products for which the MANUFACTURER has published assurances that the products and its parts are likely to be available to the DISTRICT at a later date.

1. Conform to applicable Technical Specifications, codes, standards, and regulatory agency requirements.

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

3. Manufactured and Fabricated Products:

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

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

c. Equipment and Materials shall be suitable for service conditions intended.

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

e. Provide labels and nameplates where required by regulatory agencies or to state identification and essential operating data.

f. Two (2) or more items of the same kind shall be identical, supplied by the same MANUFACTURER.

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

D. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.

E. Identification: Each item of equipment shall have permanently affixed to it a label or tag with its equipment number designated in this Contract. The label or tag shall be stainless steel and shall be located so as to be easily visible.

1.04 TRANSPORTATION AND SHIPMENT:

A. Shipment Preparation: The CONTRACTOR shall require MANUFACTURERs and suppliers to prepare Equipment and Materials for shipment in a manner to facilitate unloading and handling, and to protect against damage or unnecessary exposure in transit and storage, for CONTRACTOR supplied equipment. Provisions for protection shall include the following:

1. Crates or other suitable packaging materials

2. Covers and other means to prevent corrosion, moisture damage, mechanical injury, and accumulation of dirt in motors, electrical equipment, and machinery

3. Suitable rust-preventive compound on exposed machined surfaces and unpainted iron and steel

4. Grease packing or oil lubrication in all bearings and similar items

5. Precast concrete components shall be transported, lifted and stored as specified by the precast supplier. Precast supplier shall provide written instructions to the CONTRACTOR as to the above. The CONTRACTOR shall provide a copy to the DISTRICT.

B. Marking: Each item of Equipment and Material shall be tagged or marked as identified in the delivery schedule or on Submittals, submitted in accordance with SECTION 01300. Complete packing lists and bills of material shall be included with each shipment. Each piece of every item need not be marked separately, provided that all pieces of each item are packed or bundled together and the packages or bundles are properly tagged or marked.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Delivery – The CONTRACTOR shall:

1. Arrange deliveries of Equipment and Materials in accordance with cost loaded construction schedules, in ample time to facilitate inspection prior to installation, and to avoid delay of the WORK.

2. Deliver, store and handle Equipment and Materials in accordance with the MANUFACTURER's recommendations using means and methods that will prevent damage, deterioration, and loss, including theft.

3. Control delivery schedules to minimize long term storage at the Site and to prevent overcrowding of construction areas. In particular, coordinate delivery and installation to ensure minimum holding or storage times for items known or recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss.

4. Avoid conflict with Work of DISTRICT or other contractors.

5. Deliver Equipment and Materials to the Site in MANUFACTURER's sealed containers or other packaging system with identifying labels and instructions for handling, storing, unpacking, protecting, and installing.

6. Mark deliveries of component parts of equipment to identify the equipment, to permit easy accumulation of parts, and to facilitate inspection and measurement of quantity or counting of units.

7. Immediately upon delivery, inspect shipment to assure:

   a. That each product complies with requirements of Contract Documents and reviewed Submittals.

   b. Quantities are correct.

   c. Containers and packages are intact, labels are legible.

   d. Equipment and Materials are properly protected and undamaged.

B. Storage – The CONTRACTOR shall:

1. Store Equipment and Materials immediately after delivery, and protect it as necessary until completion of the WORK. Store in accordance with MANUFACTURER's instructions with seals and labels intact and legible.

2. Store Equipment and Materials in a manner that will not endanger the supporting construction and/or existing structures and facilities.

3. Store Equipment and Materials that are subject to damage by elements in weathertight enclosures.

4. Maintain temperature and humidity within ranges required by the MANUFACTURER.

5. Protect motors, electrical equipment, plumbing fixtures, and machinery of all kinds against corrosion, moisture deteriorations, mechanical injury, and accumulation of dirt or other foreign matter.

6. Protect exposed-machined surfaces and unpainted iron and steel as necessary with suitable rust-preventive compounds.

7. Protect bearings and similar items with grease packing or oil lubrication.

8. Handle and store steel plate, sheet metal, and similar items in a manner to prevent deformation.

9. Exterior Storage – The CONTRACTOR shall:

   a. Provide platforms, blocking, or skids to support fabricated products aboveground; and to prevent soiling, staining and damage. Cover products subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.

   b. Store loose granular materials on solid surface areas to prevent mixing with foreign matter.

   c. Provide surface drainage to prevent flow or ponding of rainwater.

10. Equipment and Materials shall not show any pitting, rust, decay, or other deleterious effects of storage prior to final acceptance of WORK.

11. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and are free from damage or deterioration.

C. Handling – The CONTRACTOR shall:

1. Provide equipment and personnel necessary, to properly unload and handle Equipment and Materials, by methods to prevent damage, soiling and /or staining of the Equipment and Materials, or packaging.

2. Handle by methods to prevent bending or overstressing. Where lifting points are designated, lift components only at those points.

3. Provide additional protection to surrounding surfaces as necessary to prevent damage.

D. Maintenance of Storage – The CONTRACTOR shall:

1. Inspect stored Equipment and Materials on a regularly scheduled basis.

2. Verify that storage facilities comply with the MANUFACTURER's product storage requirements, including environmental conditions continually maintained.

3. Verify that surfaces of products exposed to elements are not adversely affected; that any weathering of finishes is acceptable under requirements of Contract Documents.

4. For mechanical and electrical equipment in long-term storage, provide the MANUFACTURER's service instructions to accompany each item, with notice of enclosed instructions on the exterior of the package. Service the Equipment, as necessary on a regularly scheduled basis.

E. Protection after installation – The CONTRACTOR shall:

1. Provide substantial coverings as necessary to protect all installed Equipment and Materials from damage from subsequent construction operations. Remove the protective coverings when no longer needed or as specified.

1.06 EXISTING EQUIPMENT AND MATERIALS:

A. Equipment and Materials to be reused:

1. For Equipment and Materials specifically indicated or specified to be reused in the WORK, use special care in removal, handling, storage, and reinstallation to assure proper function in the completed WORK.

2. Arrange for transportation, storage and handling of products which require off-site storage, restoration, or renovation and pay all costs for such work.

3. The CONTRACTOR may at his option, furnish and install new items in lieu of those specified to be reused.

4. Remove, relocate and reinstall the following Equipment and Materials:

a. None

B. Equipment and Materials not to be reused:

1. The following Equipment and Materials to be removed shall remain DISTRICT's property and are not to be reused in the WORK. The CONTRACTOR shall Remove from its location, prepare for handling and storage, and deliver to DISTRICT.

a. None

C. Equipment and Materials designated to be removed but not reused or delivered to DISTRICT, shall become the property of the CONTRACTOR and shall be removed from the Site.

PART 2 - PRODUCTS

2.01 PRODUCTS AND MANUFACTURERS:

A. Specified in each applicable SECTION of the Technical Specifications and/or Drawings.

2.02 PRODUCT SELECTION AND SUBSTITUTIONS:

A. Specified in the Instructions to Bidders and General Terms & Conditions

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS:

A. Installation:

1. When Contract Documents require that installation of WORK shall comply with MANUFACTURER's printed instructions, the CONTRACTOR shall:

a. Obtain and distribute copies of such instructions if not a part of Submittals, containers, or packaging to all parties involved in the installation, including a copy to the DISTRICT.

b. Maintain one complete set of instructions at the Site during installation and until Final Acceptance.

c. Handle, install, connect, clean, condition, and adjust all products in accordance with such instructions and in conformance with the specified requirements. Should job conditions or specified requirements conflict with the MANUFACTURER's instructions, consult with the DISTRICT for further instructions.

d. Not omit any preparatory step or installation procedure unless specifically modified or exempted by the Contract Documents, or approved in writing by the MANUFACTURER and the DISTRICT.

e. Accurately locate and align with other work, and anchor all Equipment and Materials securely in place except as required for proper movement and performance.

f. Clean and protect all exposed surfaces as necessary to ensure freedom from damage and deterioration until Final Acceptance.

END OF SECTION

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SECTION 01630 PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 SCOPE:

A. This SECTION covers the DISTRICT's review procedures for CONTRACTOR's requests of acceptable substitute items of material and equipment. All requests for substitution shall be made no earlier than the Effective Date of the Contract. See Article 22 of the Instructions to the Bidders of this Contract Document. A determination of acceptability or rejection of the substitution request will be made in accordance with paragraph 6.05 of Section 00700 - General Terms and Conditions.

B. Requests received prior to the date established above will not be considered.

C. Substitutions may be approved at the DISTRICT's sole discretion where one or more of the following conditions apply:

1. The substitution must be required for compliance with final interpretation of code requirements or regulations.
2. The substitution must be due to the unavailability of the specified products, through no fault of the CONTRACTOR.
3. The substitution may be requested when subsequent information discloses the inability of the specified products to perform properly or to fit in the designated space.
4. The substitution may be requested when in the judgment of the DISTRICT a substitution would be substantially to the DISTRICT's best interests in terms of cost, time or other considerations.

D. Related Work Specified Elsewhere:

1. SECTION 01300 – Submittals

1.02 SUBSTITUTION REQUEST:

A. Submit as required in SECTION 01300:

1. Complete data substantiating compliance of the proposed substitution with the Contract Document
   a. Product identification including MANUFACTURER's name and address
   b. MANUFACTURER's literature including product description, performance and test data, and reference standards
   c. Name and address of similar projects on which product was used and dates of installation
2. Itemized comparison of proposed substitution with product or method specified
3. Data relating to changes in the construction schedule
4. Accurate cost data on proposed substitution in comparison with product or method specified

B. In submitting the request for substitution, the CONTRACTOR makes the following representations:

1. The CONTRACTOR has investigated the proposed product and has determined that it is equal or superior in all respects to that specified.
2. The CONTRACTOR will provide the same warranty or guarantee for the substitution as for the product specified.
3. The CONTRACTOR will coordinate installation of the accepted substitution into the WORK, making such changes as may be required for the WORK to be completed in all respects.
4. The CONTRACTOR waives all claims for additional costs related to substitution that subsequently becomes apparent.
5. Cost data is complete and includes all related costs under the Contract.

1.03 DISTRICT ENGINEER'S REVIEW:

A. The DISTRICT, in evaluating the request for substitution, will consider all variations of the proposed substitute from that specified to determine the acceptability of the proposal. The DISTRICT may require the CONTRACTOR to furnish additional data about the proposed substitute necessary to make such a determination. The DISTRICT will be the sole judge of acceptability, and no substitute will be ordered or installed without the DISTRICT's prior written acceptance. The DISTRICT may require the CONTRACTOR to furnish, at the CONTRACTOR's expense, a special performance guarantee or other surety with respect to any substitute. Substitutions will not be considered if:

1. Substitutions are indicated or implied on Shop Drawings or product data submittals without a request submitted in accordance with this SECTION.
2. Acceptance will require substantial revision to the Contract Documents.

END OF SECTION

SECTION 01700 CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: 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. Submittal of warranties
4. Final cleaning
5. CONTRACTOR's Certification

B. Closeout requirements for specific construction activities are included in the appropriate SECTIONs in DIVISIONS 1 through 16.

C. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals
2. SECTION 01530 Temporary Barriers and Controls

1.02 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 in accordance with SECTION 01300.
2. Obtain and submit releases enabling the DISTRICT unrestricted use of the Work and access to services and utilities. Include Certificates of Occupancy (C.O.), operating certificates, and similar releases, as required.
3. Submit Record Documents, including but not limited to, maintenance manuals, Project photographs, damage or settlement surveys, Boundary surveys, all As-Built and Topographic Surveys as per SECTION 01050 and similar record information as specified in Paragraph 1.04. All Drawings shall be scanned and submitted in accordance with SECTION 01300, and in hard copy form, 24 inch by 36 inch plan size. All other documents shall also be scanned and submitted in accordance with SECTION 01300.
4. Submit all the arc flash hazard analysis study reports - the preliminary arc flash analysis study provided within **[60]** days of notice to proceed and the final arc flash analysis study provided after third party testing just prior to Project Substantial Completion.
5. Submit the Electrical system analysis binder which shall consist of the final short circuit, protective device coordination, arc flash hazard analysis study report, the results of the third-party electrical testing, all the breaker settings documented, and complete set of spare arc flash labels in accordance with SECTION 16015.
6. Other than locks, provide all Lock Out/Tag Out (LOTO) devices (blanks, blocks, chains, appropriate valve lockout covers, circuit breaker lockout devices, etc.) of the appropriate type, size and number necessary to comply with the LOTO procedures submitted in accordance with SECTION 01300. Train and familiarize the DISTRICT maintenance personnel in the LOTO procedures submitted and the proper use and application of the LOTO devices provided.
7. See General Terms and Conditions Article 14.04 Substantial Completion.

B. Inspection Procedures: On receipt of a request for inspection, the DISTRICT will either proceed with inspection or advise the CONTRACTOR of unfulfilled requirements. The DISTRICT 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 DISTRICT will reschedule the inspection when in its opinion, the Work is substantially complete.

1.03 FINAL ACCEPTANCE:

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 a letter certifying that all items listed as part of the Certification of Substantial Completion have been completed or corrected.
2. Submit consent of surety to final payment.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit Release of Liens (from the Prime, and all Subcontractors, Vendors and Suppliers).
5. Submit Maintenance Bond (if applicable).
6. The above shall be submitted in accordance with SECTION 01300.

B. Reinspection Procedure: The DISTRICT will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed.

1. Upon completion of reinspection, the DISTRICT 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, the reinspection will be repeated.

C. Return all keys furnished by the DISTRICT. The CONTRACTOR shall forfeit his key deposit for keys that are not returned.

1.04 RECORD DOCUMENT SUBMITTALS:

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure location. Provide access to record documents for the DISTRICT's reference during normal working hours.

B. As-Built Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Drawings and Shop Drawings. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set. 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 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 DISTRICT will make electronic copies of whatever electronic versions of the Drawings exist, available to the CONTRACTOR for As-Built purposes. The CONTRACTOR must obtain concurrence from the DISTRICT as to form and content of record information provided in electronic format prior to proceeding, but in general, information similar to that noted below needs to be provided.

1. Record information concurrently with construction progress.
2. Mark record sets with red erasable pencil. Mark each document "AS-BUILT DRAWINGS" in neat, large, printed letters.
3. Mark As-Built invert elevations for all water control structures, culverts, etc. Refer to SECTION 01050 for structures which require a permanent benchmark.
4. Mark new information that is important to the DISTRICT that is not shown on Drawings or Shop Drawings.
5. Note related Change-Order numbers where applicable.
6. 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 Drawings.

e. As-Builts shall also include a plot of the actual excavation cross-sections plotted at the same station as overlaid on top of the design cross-sections.

f. As-Builts shall include a plot of the actual levee and embankment cross-sections plotted at the same station as overlaid on top of the design cross-sections. Refer to SECTION 01050.

g. Give particular attention to concealed elements that would be difficult or expensive to locate at a later date.

h. GPS (global positioning system) coordinates of major structures using the format lat/long DD (decimal/degree) NAD83/2007 (North American Datum).

7. Record Specifications: Maintain one (1) complete copy of the Contract Documents including addenda. Include with the Contract Documents one (1) copy of other written construction documents, such as Requests for Information (RFIs), Change Orders and modifications issued in printed form during construction.

8. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.

9. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.

10. Note related As-Built information and Product Data.

11. Upon completion of the Work, submit Record Specifications to the DISTRICT for the DISTRICT's records in electronic PDF format.

12. 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

13. 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 (1) copy of each Product Data submittal. Note related Change Orders and markup of Record Documents.

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 DISTRICT's personnel at the Project Site to determine which Samples are to be transmitted to the DISTRICT for record purposes. Comply with the DISTRICT's instructions regarding packaging, identification, and delivery to the DISTRICT.

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 DISTRICT for the DISTRICT's records.

G. Warranties and Bonds: Submit original documents as specified in Section 00700 - General Terms & Conditions, Supplemental Conditions, SECTION 01300, and technical specifications.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 FINAL CLEANING:

A. General: The General Terms & Conditions require general cleaning during construction. Regular Site cleaning is included in SECTION 01530.

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 DISTRICT's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems, surface waters or wetlands. 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 DISTRICT's property. Dispose of materials of no value to the DISTRICT as directed by the DISTRICT.

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 02215 PROTECTION OF EXISTING STRUCTURES

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The CONTRACTOR shall furnish all labor, equipment, and materials for protecting existing structures during construction, and for monitoring and documenting the effectiveness of said protection.

B. Related Work Specified Elsewhere:

1. SECTION 01300 - Submittals
2. SECTION 02435 - Turbidity Control and Monitoring

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the standards of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. See the various paragraphs for the specified standard. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. All applicable local (City, County, Village, Town, Tribe, etc.) codes, regulations, ordinances, and standards
2. Florida Department of Transportation (FDOT):
    a. Standard Specifications for Road and Bridge Construction, Latest Edition.

1.03 SUBMITTALS:

A. Submittals shall be in accordance with SECTION 01300.

B. The CONTRACTOR shall provide a complete list of all applicable rules and regulations with which they must comply.

C. Pre-Construction Condition Survey

1. The CONTRACTOR shall submit a Pre-Construction Condition survey in accordance with SECTION 01300, not less than 10 days prior to commencing construction operations.
2. The CONTRACTOR shall schedule and conduct a pre-construction condition survey. The CONTRACTOR shall provide at least one (1) person from its organization to perform said condition survey @ both G-370 & G-372.
3. A survey method acceptable to the CONTRACTOR’s insurance company shall be used. Damage resulting from construction is the CONTRACTOR’s responsibility. The CONTRACTOR shall notify the DISTRICT and occupants of nearby buildings at least 24 hours before the start of construction.

D. The Pre-construction condition survey document shall include at a minimum:

a. A map of the Project Site with areas of concern highlighted.

b. Videotaped or photographically documented existing conditions, and instances of pre-existing cracks or other defects. The documentation shall clearly identify each item. Documentation shall describe the location, the direction from which the photo was taken, and dates. Documentation shall include a narrative of each issue. CONTRACTOR shall note the condition of the existing structures and shall locate and identify any areas where bulging, sloughing, cracking, or existing damage is observed.

c. Actual measured horizontal and vertical dimensions (not estimated dimensions) from the nearest operations to surveyed properties, structures, levees, utilities or facilities.

d. The CONTRACTOR shall clearly document existing conditions.

E. Damage Investigation Survey Document:

1. Within seven (7) calendar days of any WORK event causing damage to any property a survey shall be conducted. Such survey shall include as a minimum:

a. Detailed description of the damage, including videotape or photographic documentation.

b. Name, address and telephone number of the Owner of the damaged property, structures, levees, utilities or facilities. The DISTRICT will supply a master list of adjacent property owner information.

c. Evaluation of the cause of the damage and measures taken or to be taken to prevent recurrence.

2. The CONTRACTOR shall supplement this report on a bi-weekly basis (or other time period as determined by the DISTRICT) until the damage is repaired or otherwise made whole.

3. The CONTRACTOR shall submit an overview of the damage survey results including the status of any damage events, within 30 calendar days of the completion of all construction operations.

F. Damage Inspection Survey:

1. The CONTRACTOR shall perform Damage Inspection surveys to detect any effects resulting from construction operations.

2. The CONTRACTOR shall submit Damage Inspection survey, photographs, and other finalized data to the DISTRICT.

3. The DISTRICT shall inspect the properties, levees, structures, facilities and utilities after receipt of the report to verify the accuracy of the survey. Florida Department of Transportation (FDOT), Florida Power & Light (FPL) or other property or utility owners may inspect their structures, facilities, levees or utilities. Any damaged areas, which were not specifically identified in the pre-construction survey narrative and photographs, shall be deemed to have been caused by the construction operations. The CONTRACTOR shall be responsible for required repairs at no additional cost to the DISTRICT.

1.04 RESPONSIBILITIES:

A. The CONTRACTOR shall include in its bid consideration in its progress schedule for time it takes to obtain permits, permit revisions and inspections from the issuing entities.

B. The CONTRACTOR shall obtain copies of all applicable codes, regulations, laws and ordinances and keep them in its on-site Project file.

1.05 CERTIFICATIONS AND TESTING: (Not Applicable)

1.06 INSPECTION COORDINATION: (Not Applicable)

1.07 WARRANTY: (Not Applicable)

PART 2 - PRODUCTS

2.01 MATERIALS ENCOUNTERED: Materials to be encountered include geologic formations for which the CONTRACTOR has determined appropriate methods for achieving required grades, loosening material, and fragmenting according to gradation requirements. The CONTRACTOR shall ensure in its bid that it has

considered all the potential expenses related to the construction required to comply with the industry regulations and with requirements of the plans and specifications.

PART 3 - EXECUTION

3.01 GENERAL:

A. The CONTRACTOR shall be responsible for any damage to existing properties, utilities, structures, facilities, levees or access roads due to construction activities. The CONTRACTOR shall expediently repair (within 30 days or as directed by the DISTRICT) at no additional expense. Upon the circumstance of damage:

1. The CONTRACTOR shall stop construction operations.
2. The CONTRACTOR shall provide the required damage survey.
3. The CONTRACTOR shall undertake to rectify the damage.
4. The CONTRACTOR shall revise, resubmit, and obtain the DISTRICT's acceptance, and any required third-party acceptance, on the appropriate construction methods before any further WORK is undertaken.

B. The CONTRACTOR shall have the sole responsibility for the safety of all WORK activities including labor, materials handling, shipment, storage, and equipment.

C. No time extensions will be made, nor will additional compensation be made for delays or other circumstances related to unacceptable WORK.

D. The CONTRACTOR shall take precautions to preserve the materials outside the lines of excavation in an undisturbed condition.

3.02 COORDINATION WITH THIRD PARTIES WITH RESPECT TO CONSTRUCTION:

A. Critical properties, public utilities, levees, structures or facilities may lie close to construction areas associated with this Project. During Project development agreements may have been made between the DISTRICT and relevant third parties. Some of these agreements will guide, restrict and affect the CONTRACTOR's activities. The following list includes the affected parties, and conditions, restrictions, timeframes, issues and consequences that the CONTRACTOR must consider in his bid for both costs and scheduling. The CONTRACTOR shall be responsible for plan implementation and effectiveness while accommodating such agreements. There will be no extra compensation for activities the CONTRACTOR must pursue to satisfy the conditions.

3.03 TURBIDITY AND EROSION CONTROL: The CONTRACTOR shall install turbidity and erosion control devices in accordance with SECTION 02435 prior to start of construction.

END OF SECTION

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SECTION 02435 TURBIDITY CONTROL AND MONITORING

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The CONTRACTOR shall furnish all necessary equipment, labor and materials and utilize appropriate means and methods of turbidity controls necessary and sufficient to ensure that the more restrictive and protective of the following are achieved at all times: (1) all applicable State water quality standards, as prescribed in Chapter 62-302.530, Florida Administrative Code (F.A.C.), incorporated by reference, (2) all applicable environmental permit conditions, as prescribed in the permits appended to the Contract, and (3) all stormwater and erosion control shall be in accordance with the Florida Department of Environmental Protection (FDEP) Florida Stormwater Erosion and Sedimentation Control Inspector's Manual.

B. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals

2. SECTION 01530 Temporary Barriers and Controls

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the publications of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. See the various paragraphs for the specified standard. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. Florida Department of Environmental Protection (FDEP)

a. Florida Stormwater Erosion and Sedimentation Control Inspector's Manual

2. Florida Department of Transportation (FDOT)

b. Standard Specification for Road and Bridge Construction - Sections 104 - 1, 2, 3, 4, 6 and 7

3. U.S. Army Corps of Engineers (USACE)

B. The environmental protection rules and standards in the applicable sections of the Florida Administrative Code (F.A.C.) incorporated herein by reference are:

1. https://floridadep.gov/ogc/ogc/content/rules

2. Design and Performance Standards - 62-25.025 F.A.C.

3. Quality Assurance - 62-160 F.A.C.

4. Surface Waters of the State - 62-301 F.A.C.

5. Surface Water Quality Standards - 62-302 F.A.C.

6. Generic Permits - 62-621.300(2) & (4) F.A.C.

1.03 SUBMITTALS: The CONTRACTOR shall make submittals for the turbidity control and monitoring system in accordance with SECTION 01300 and the requirements herein.

A. Provide details of the turbidity controls proposed.

B. Provide proposed layout of the turbidity controls and monitoring system on the Site plan.

C. Obtain the monitoring data and prepare quarterly reports in accordance with Paragraph 3.03B.

1.04 QUALIFICATIONS: The CONTRACTOR shall have at least one (1) employee, on-site, certified by the Florida Department of Environmental Protection as a Stormwater Erosion and Sedimentation Control Inspector. The certification shall be submitted to the DISTRICT for review prior to the installation, inspection, maintenance, repair or replacement of any erosion or sedimentation control Best Management Practices, including but not limited to the turbidity controls. The turbidity monitoring shall be conducted according to the FDEP-approved procedures.

1.05 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the DISTRICT as requested for inspection. The CONTRACTOR shall provide at least 48 hours advance notice of its intention to begin new WORK activities.

PART 2 - PRODUCTS

2.01 FABRIC: The CONTRACTOR shall provide floating turbidity barriers with fabric that is flexible and of sufficiently fine mesh to prevent passage of suspended material through the fabric. The floating turbidity barriers shall extend to within a foot of the bottom of the canal except in the areas with the potential for the presence of manatees the barriers shall be two (2) feet above the bottom.

2.02 FLOATS: The CONTRACTOR shall provide floats for the turbidity barriers of sufficient buoyancy to prevent the top of the barrier from submerging under any water and wind conditions. If the top of the barrier becomes submerged for any reason, the CONTRACTOR shall suspend construction operations until the condition is corrected.

2.03 ANCHORS AND WEIGHTS: The CONTRACTOR shall provide and maintain an anchor system to secure the turbidity barrier in position. Attach weights to the barrier as necessary to keep the fabric at an angle to the vertical of thirty (30) degrees or less. Fabric material shall not be attached to the canal bottom.

2.04 REPORTS: The CONTRACTOR shall produce and maintain onsite records of Daily Turbidity Monitoring Logs.

PART 3 - EXECUTION

3.01 TURBIDITY BARRIERS:

A. The CONTRACTOR shall install and maintain the turbidity barriers as noted in the Drawings and where necessary to maintain turbidity releases at or below the permit compliance levels. Turbidity barriers shall be installed prior to any backfilling, clearing and grubbing, dredging, or excavation and maintained in place until construction is complete and turbidity from construction has dissipated. All barriers shall be adequately marked and appropriate signage erected to identify them as obstructions to navigation.

B. The turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. The barriers must not impede manatee movement.

C. The applicable U.S. Amy Corps of Engineers in-water work protection guidelines for the endangered West Indian Manatee incorporated herein by reference are: http://www.saj.usace.army.mil/Portals/44/docs/regulatory/sourcebook/endangered_species/Manatee/2011_StandardConditionsForIn-waterWork.pdf .

D. Any rips or tears that occur in the turbidity barrier material during use shall be repaired or replaced immediately by the CONTRACTOR at its expense. Rips or tears that occur in the turbidity barrier material in use that are not repaired or replaced immediately by the CONTRACTOR will result in a suspension of excavation and/or construction operations, and shall require repairs and replacements as a prerequisite to the resumption of WORK.

E. The CONTRACTOR shall keep in place and maintain all barriers until the WORK is complete (construction areas stabilized with vegetation) and turbidity levels return to the background levels based on the monitoring results. Upon completion of use, the CONTRACTOR shall remove the turbidity

barriers and associated items to an off-site location at its own expense.

F. The CONTRACTOR shall conduct its operations at all times in a manner that minimizes turbidity. The CONTRACTOR is required to conform to the State Water Quality standards as prescribed in Chapter 62-302.530, F.A.C., and to meet the special requirements of any environmental permits that have been issued.

G. The turbidity controls shall be inspected by the CONTRACTOR every work day, after every rainfall event of 0.5 inches or greater in a 24 hour period, and after every extreme weather event that could dislodge or damage the turbidity controls, to assure that the turbidity controls remain properly installed, undamaged, and fully functional at all times.

3.02 EROSION CONTROL: The CONTRACTOR shall prevent and control erosion, sedimentation and water pollution as per the Florida Department of Transportation (FDOT) Specification Sections 104-1, 2, 3, 4, 6 and 7 and FDEP regulations and permit conditions.

3.03 MONITORING:

A. The CONTRACTOR shall conduct and record the results of turbidity monitoring appropriate to the conditions and at the locations, times, and frequencies specified below. An FDEP approved Turbidity Monitoring Log is attached (Appendix A) for the CONTRACTOR's use.

1. Sampling and analyses shall be performed as required by Chapter 62-160, F.A.C., and in accordance with appropriate FDEP Standard Operating Procedures (FDEP-SOP), located at http://www.dep.state.fl.us/water/sas/sop/sops.htm. Turbidity monitoring equipment and personnel trained to use it shall be available on site at all times during construction or maintenance activities that could result in project-generated turbidity levels beyond the work area that have the potential to be discharged to a receiving water body.

2. During construction or maintenance activities, the Permittee shall monitor turbidity levels at least twice daily for the background and compliance samples, with samples taken a minimum of once every four hours, at the locations described within the project's approved Turbidity Control Plan.

   a. Approximately 100 feet upstream of the work sites and clearly outside the influence of construction activities. (This shall serve as the natural background sample against which other turbidity readings shall be compared.)

   b. Directly outside the turbidity curtains surrounding the work sites and within the densest portion of any visible turbidity plume. (This sample shall serve as the compliance sample.)

3. For monitoring purposes, work areas are defined by the turbidity curtains.

4. If there are multiple work areas where construction is creating a visible turbidity plume, each construction activity shall be monitored separately.

5. Equipment: The turbidity monitoring equipment shall meet the specifications and be calibrated, maintained, repaired, and replaced according to the methods, procedures, and frequencies set forth in Chapter 62-160, F.A.C.

6. Records Management: The individual conducting the turbidity monitoring shall transcribe the readings to the approved Daily Turbidity Monitoring Log form (Appendix A) and sign and date the form at the close of each monitoring day. The notebook containing the signed and dated daily turbidity monitoring log forms shall be accessible at the construction Site during the work day.

B. The CONTRACTOR shall submit the quarterly monitoring data (Turbidity Monitoring Log forms), to the DISTRICT. Daily monitoring logs shall also be readily available on site and clearly identify the following information:

1. Project name and current permit number.
2. Dates and times of sampling and analysis.

3. Name of individual collecting samples.
4. Unique identification of the specific instrument unit(s) used for sample collection and analysis as required by FDEP-SOP-001/01 FT 1600 Field Measurement of Turbidity.
5. Measurement value and reporting units.
6. Water depth.
7. Depth of sample.
8. Weather conditions.
9. Water level stage in the canal or water body and direction of flow.
10. Clear description of project component activities taking place at the time of sampling that may have contributed to turbidity.
11. Signature and statement of authenticity by a properly trained individual indicating that the instrument meets the outlined specifications and has been calibrated in accordance with FDEP-SOP-001/01 FT 1600 Field Measurement of Turbidity and a map indicating the sampling locations.

3.04 EXCEEDANCES OF WATER QUALITY STANDARDS:

A. Turbidity shall not exceed 29 Nephelometric Turbidity Units (NTUs) above background in Class III receiving waters, or greater than 0 NTU above background samples in receiving waters classified as OFW (Outstanding Florida Waters). If monitoring reveals project-generated turbidity exceeds the applicable Turbidity Standard the CONTRACTOR shall take the following measures:

1. Immediately cease all work contributing to the water quality exceedance(s).
2. Immediately report turbidity exceedance(s) to the DISTRICT Project Manager and DISTRICT Permit Compliance Representative;
    a. The CONTRACTOR shall submit a turbidity exceedance report to the DISTRICT within 24 hours of the exceedance(s). The report shall include a copy of the monitoring data sheets, which indicate the exceedance(s) and a description of the corrective actions taken or proposed.
    b. The DISTRICT Permit Compliance Representative is responsible to timely report the exceedance(s) to the regulatory agencies, as required by Permit(s).
3. The possible cause of the exceedance(s) shall be identified.
4. Modify work procedures that may have contributed to the exceedance(s) such as installing additional turbidity or erosion protection devices; repairing any non-functional turbidity containment devices, stabilizing exposed soils, and checking calibration of the meter.
5. Work shall not resume until the activities can be conducted in compliance with the turbidity standards and the DISTRICT indicates to the CONTRACTOR that WORK can resume.

END OF SECTION

APPENDIX A

DAILY TURBIDITY MONITORING LOG

Multiple work areas that may contribute to turbidity in receiving waters must be monitored separately. A Site map depicting sampling locations must accompany the quarterly turbidity monitoring reports.

Project Name:	Permit No.:
Collector Name:	Collection Date:
Meter/Sonde Identification No.	

Water Observations		Weather Observations
Water Level Stages		Temperature:
Direction of Flow		Conditions:
Water Depth		

Activity Taking Place During Sampling	Yes	No
Excavation or Filling within 50 ft radius of surface waters or wetlands?		
Please describe:		
Other In-Water Work? (e.g., dewatering; installing piling or forms; injecting concrete; sand blasting; painting)		
Please describe:		
Other Activity? (e.g., materials transfer; washdown; interim stabilization)		
Please describe:		

Turbidity Monitoring Data						
Background Location Description:	**Background**	**Compliance**	**Background**	**Compliance**	**Background**	**Compliance**
Compliance Location Description:	**A.M. Mid-Depth**		**Mid-Day Mid-Depth**		**P.M. Mid-Depth**	
Collection Time						
Analysis Time						
Turbidity (NTU)						
Did Compliance Sample exceed 29 NTU's above Background Sample?	☐ Yes* ☐ No		☐ Yes* ☐ No		☐ Yes* ☐ No	

***If the 29 NTU limitation is exceeded, please describe cause and corrective actions taken on reverse side of this form. Immediately stop activities contributing to turbidity and notify the SFWMD Construction Manager and Permit Compliance Staff.**

Explanation of gaps in sampling activity (e.g., rained out, phased activity, etc.):

Construction activity complete and slopes stabilized? ☐ Yes ☐ No

Statement of Authenticity	
I certify this test was performed as required by Chapter 62-160, F.A.C., conducted with an approved instrument calibrated in accordance with the appropriate FDEP-SOPs. The results are complete and accurate.	
Print Name:	
Signature:	Date:

Additional Comments:

***Explain turbidity water quality standard exceedance (>29 NTU above background for Class III or > 0 NTU above background for an Outstanding Florida Water (OFW)) and describe corrective actions taken.**

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SECTION 02436 ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The CONTRACTOR shall provide all labor, equipment and materials necessary for the prevention of environmental damage as the result of construction operations under this Contract and for those measures set forth in other requirements of the Technical Specifications.

B. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals

2. SECTION 02435 Turbidity Control and Monitoring

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the standards of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. Environmental Protection Agency (EPA):
    a. Clean Air Act (CAA)
    b. Clean Water Act (CWA)
    c. Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
    d. Executive Orders and EPA requirements, as appropriate; and all general and specific Federal Permit Conditions as applicable.
    e. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)
    f. National Environmental Laboratory Accreditation Conference (NELAC)
    g. National Environmental Policy Act (NEPA)
    h. National Pollution Discharge Elimination System (NPDES)
    i. Resource Conservation and Recovery Act (RCRA)
    j. Safe Drinking Water Act
    k. Toxic Substance Control Act (TSCA)
2. Code of Federal Regulations (CFR):
    a. 40 CFR - Parts 109, 261.10, 260-268, 273, 279
3. Florida Department of Environmental Protection (FDEP):
    a. Florida Administrative Code (FAC)
        i. 62-770, 62-780
    b. Florida Stormwater, Erosion and Sedimentation Control Inspector’s Manual
4. Florida Department of Transportation (FDOT):
    a. Standard Specification for Road and Bridge Construction - Sections 104-1, 2, 3, 4, 6 and 7
5. Florida Statutes
    a. Chapter 403
6. National Oceanic and Atmospheric Administration (NOAA):
    a. Coastal Zone Management Act (CZMA)
7. National Park Service (NPS):
    a. Native American Graves Protection and Repatriation Act (NAGPRA)
    b. National Historic Preservation Act (NHPA)
8. U.S. Army Corps of Engineer (USACE)
9. U.S. Fish & Wildlife Service (FWS):
    a. Endangered Species Act (ESA)

b. Fish and Wildlife Coordination Act (FWCA)

c. Migratory Bird Treaty Act (MBTA)

B. State and local codes, permits, regulations and ordinances as applicable.

1.03 DEFINITIONS: For the purpose of this SECTION, environmental damage is defined as the presence of hazardous, physical, or biological elements or agents which alter the physical, chemical or biological integrity of the environment in such a way that it represents an unacceptable risk to public health, safety 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.

1.04 SUBMITTALS: Within 20 calendar days after the Notice to Proceed (NTP), the CONTRACTOR shall submit an Environmental Protection Plan (Plan) for review and acceptance by the DISTRICT in accordance with SECTION 01300. Approval of the Plan shall not relieve the CONTRACTOR of its 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 DISTRICT reserves the right to require the CONTRACTOR to modify the 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 Plan. The Plan shall include, but not be limited to the following:

A. Submittals shall be in accordance with SECTION 01300.

B. 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.

C. 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).

D. Procedures to be implemented are to provide all necessary environmental protection and to comply with permits and applicable laws and regulations: The CONTRACTOR shall provide written assurance that immediate corrective action will be taken to correct any environment damage due to accident, natural causes or failure to follow the procedures set out in accordance with the Plan.

E. Environmental monitoring plans, if applicable.

F. Traffic control plan, if applicable.

G. Drawings showing locations of proposed temporary activities, such as material storage areas or stockpiles of excess spoil or materials.

H. Erosion and sediment control methods, for protecting surface waters, wetlands, and groundwater during construction. All stormwater and erosion control methods shall be in accordance with the FDEP Florida Stormwater, Erosion and Sedimentation Control Inspector's Manual. The CONTRACTOR shall prevent and control erosion and water pollution as per FDOT Specification Sections 104-1, 2, 3, 4, 6 and 7 and all applicable FDEP regulations and permit conditions.

I. Spill Prevention Methods: The CONTRACTOR shall identify any hazardous or potentially hazardous substances to be used on the 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.

J. Spill Contingency Plan for hazardous, toxic or petroleum material.

K. 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.

L. Identification of the person who shall be responsible for implementation of the Plan. This person shall have authority to respond for the CONTRACTOR in all environmental protection matters.

M. A recycling and waste management plan. The CONTRACTOR shall include waste minimization efforts in the Plan.

1.05 QUALIFICATIONS:

A. The CONTRACTOR shall provide access to the WORK for the DISTRICT as requested for inspection. The CONTRACTOR shall provide at least 48 hours advance notice of its intention to begin new WORK activities.

B. When the Eastern Indigo Snake is identified as a species of concern in the environmental permits the CONTRACTOR shall supply qualified eastern indigo snake observers during ground clearing activities. Qualified Observers are defined as individuals who have been instructed by the DISTRICT on proper techniques and protocols for protection of the Eastern Indigo Snake during Site activities. The observer's names and documentation showing completion of the DISTRICT's instruction shall be provided to the DISTRICT at least 2 weeks prior to the commencement of ground clearing activities.

1.06 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 applicable laws, regulations and ordinances, and corrective action(s) taken.

B. Permits and Authorizations: The CONTRACTOR shall apply for and obtain all necessary permits or licenses unless the DISTRICT has already acquired them. The CONTRACTOR shall be responsible for implementing and complying with all terms, conditions and requirements of all permits issued for construction of the Project, including conditions, restrictions, or work limitations as specified in permit documents, including but not limited to, Biological Opinions and Mitigation Plans. The CONTRACTOR shall install speed limit signs for off-road and improved road travel for construction equipment and employee vehicles that identify speeds protective of wildlife. The CONTRACTOR shall also provide all necessary signage describing all Threatened and/or Endangered species which are identified in applicable environmental permits.

C. Training: Prior to the onset of construction activities the CONTRACTOR and all personnel shall be trained on how to identify and implement the Standard Protection Measures and Guidelines for Threatened and Endangered Species and ground-nesting birds. The Standard Protection Measures for the Eastern Indigo Snake dated August 12, 2013, is attached in Appendix C.

1.07 CERTIFICATIONS AND TESTINGS: All physical, chemical, and biological measurements and analyses that are necessary to comply with the monitoring requirements in all applicable permits or in this Contract must be performed according to approved methods and procedures by a commercial laboratory that is certified to perform the required analyses according to the approved methods and procedures by the National Environmental Laboratory Accreditation Conference (NELAC).

1.08 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the DISTRICT as requested for inspection. The CONTRACTOR shall provide to the DISTRICT at least 48 hours advance notice of its intention to begin new WORK activities.

PART 2 - PRODUCT (ENVIRONMENTAL PROTECTION PLAN)

2.01 NOTIFICATION:

A. In the event that the DISTRICT notifies the CONTRACTOR of any non-compliance with federal, state or local laws, permits or other elements of the CONTRACTOR's Environmental Protection Plan, the CONTRACTOR shall without delay inform the DISTRICT of the proposed correction action and take such action as approved.

B. The CONTRACTOR shall notify the DISTRICT immediately of any warnings or notices of noncompliance, fines, citations or tickets issued directly to the CONTRACTOR by any federal, state, or local environmental protection, waste management, code enforcement, or fire, police, or public health agency.

C. If the CONTRACTOR fails to comply, the DISTRICT 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.

D. A Notice of Termination (NOT) shall be sent to the applicable federal, state, and local permit-issuing authorities with a copy to the DISTRICT within 14 days of final stabilization

2.02 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 reported or unreported environmental incidents during the course of the Project.

2.03 TRAINING:

A. 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.

B. Due to the probability that wildlife species of concern, including but not limited to Threatened and/or Endangered species and Protected Migratory Bird species may be present within or adjacent to construction sites, it is the CONTRACTOR(s) responsibility to ensure that all personnel working on the project receive Threatened and Endangered Species Training, Qualified Eastern Indigo Snake Training, and Ground Nester Training obtained from the DISTRICT's Permitting and Compliance Section, or DISTRICT's approved designee, as necessary and in accordance with applicable laws or regulations.

PART 3 - EXECUTION (PROTECTION OF ENVIRONMENTAL RESOURCES)

3.01 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 construction. The CONTRACTOR shall confine its activities to the areas defined by the Drawings and specifications. Any deviations from the Drawings including, but not limited to borrow areas, disposal areas, staging areas, and alternate access routes will require additional review by the DISTRICT to ensure compliance with applicable environmental rules and regulations prior to implementation/or commencement of those deviations.

3.02 PROTECTION OF LAND RESOURCES: Prior to the beginning of any construction the CONTRACTOR shall delineate, install protection and be responsible for preservation of 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 Drawings or specifically authorized by the DISTRICT. All damaged areas shall be restored to original or better condition, to the satisfaction to the DISTRICT.

3.03 DISTURBED AREAS: The CONTRACTOR shall effectively prevent erosion and control sedimentation through approved materials and methods as identified in the Environmental Protection Plan. Disturbed areas will include areas of ingress and egress, construction materials storage, staging, washdown areas, and toxic, hazardous, and solid materials/waste storage areas. Disturbed areas shall be temporarily stabilized within 7 days of cessation of phased construction activity and permanently stabilized within 14 days of cessation of all phases of construction activity. Temporary Best Management Practices (BMPs) shall remain in place and in effect until the final Site inspection is complete and Site is certified as stabilized.

3.04 PROTECTION OF WATER RESOURCES:

A. The CONTRACTOR shall conduct all activities in a manner to avoid pollution of surface water, 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 a permit for the Project.

B. 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. The CONTRACTOR shall monitor water quality of dewatering discharge into water bodies or leaving the Site in accordance with applicable environmental permits. All monitoring of any water areas that are affected by construction activities shall be the responsibility of the CONTRACTOR.

3.05 OIL, FUEL AND HAZARDOUS SUBSTANCE SPILL PREVENTION:

A. 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 clean up the spill and report the spill immediately to the DISTRICT and to other appropriate federal, state, and local agency contacts. Reportable quantities (greater than 25 gallons) of petroleum-based fluids must be reported within 1 hour to the National Response Center (800-424-8802) and State Warning Point (800-320-0519) if it reaches the waters of the state

or, if not, within 24 hrs to State Warning Point. Toxic and hazardous substance spills directly into waters of the state, in any quantity, must be reported immediately to the DISTRICT and those federal and state points of contact listed above.

B. The CONTRACTOR shall submit a written report to the DISTRICT and to the State of Florida Bureau of Emergency Response providing certification of commitment of manpower, equipment and materials necessary to prevent the spread and effect expeditious cleanup and disposal. This report shall be submitted within 48 hours of the spill event.

3.06 MATERIALS AND WASTE MANAGEMENT:

A. For sanitary waste management, the CONTRACTOR shall ensure that portable restrooms will be anchored on level ground with at least a 15-foot set-back from water bodies or banks or slopes thereto. For solid waste management, dumpster(s) will either be outfitted with a water-tight cover or be covered with a tarpaulin when not in use to minimize infiltration and leaching of rain with at least a 15-foot set-back from water bodies, conveyances thereto, or banks or slopes thereto. Hazardous materials storage areas and liquid refuse and hazardous waste collection and storage areas shall be denoted on the Plan.

B. The CONTRACTOR shall ensure toxic substances and hazardous materials are stored in a locked, blast-resistant shed anchored to a bermed concrete or asphalt pad on level ground with at least a 15-foot setback from any water bodies, conveyances thereto, or banks or slopes thereto.

C. For solid and/or hazardous waste disposal involving lead-based paint, the CONTRACTOR shall ensure containers with Toxicity Characteristic Leaching Procedure – Tetraphenylborate (TCLP TPb) concentrations in excess of the Resource Conservation and Recovery Act (RCRA) action level will be transported by a licensed hazardous waste hauler to a licensed hazardous waste disposal facility within the time limit appropriate to the generation rate and accumulated volume of hazardous waste material. Containers with TCLP TPb concentrations less than the RCRA action level shall be transported by a licensed solid waste hauler to a licensed Class I solid waste disposal facility. In either case, the CONTRACTOR shall obtain and transmit signed and dated copies of the transport and disposal manifests to the DISTRICT's for records retention.

D. The CONTRACTOR is prohibited from the on-site burning of hazardous wastes (aerosol cans, oil filters, etc.). All hazardous wastes shall be disposed of as required by law. Copies of relevant Material Safety Data Sheets (MSDSs) shall be appended to the Environmental Protection Plan, Safety Plan, Spill Prevention Plan, and Stormwater Pollution Prevention Plan (SWPPP).

E. The CONTRACTOR is responsible for the materials and processes where wastes may be generated under the contracted activities. The CONTRACTOR is responsible for providing the materials in order to implement the Contract and is responsible for operating and maintaining any processes from which waste material may be generated.

F. The CONTRACTOR is deemed to be the "generator" as defined in 40 CFR 261.10 for any hazardous wastes or spill residue that is generated during the activities encompassed in this Contract. It is recognized that it is the CONTRACTOR's or a subcontractor of the CONTRACTOR whose act first causes a hazardous waste to become subject to regulation. The CONTRACTOR is a different legal entity from the owner/operator of the physical location/property where the contracted activities will be conducted. CONTRACTOR is a "person" within the meaning of Section 403.031(5), Florida Statutes.

G. The CONTRACTOR is responsible for compliance with applicable standards of 40 CFR 260-268 and 40 CFR 273 and 279 and state regulations which adopt or reference these federal standards.

H. The CONTRACTOR is responsible for the generation and retention of records associated with waste management practices and disposition. All records shall be maintained for a minimum of 3 years from the date of generation. All records will be made available to the DISTRICT or regulatory agencies upon request.

I. In the event of any chemical discharges associated with CONTRACTOR's or subcontractor's activities, CONTRACTOR shall be responsible for reporting, assessment and remediation of such discharges in accordance with applicable federal, state or local regulations and/or guidelines including, but not limited to, 40 CFR 264/265, Chapter 62-770, Florida Administrative Code (F.A.C.) and Chapter 62-780, F.A.C.

3.07 FISH AND WILDLIFE RESOURCE PROTECTION: The CONTRACTOR shall control and minimize interference with, disturbance to, and damage of fish and wildlife resources.

A. If adverse impacts occur to fish and wildlife species of concern, including but not limited to Threatened and/or Endangered Species and Protected Migratory Bird Species, the CONTRACTOR shall immediately notify the DISTRICT and provide details of adverse impacts for determination of further action that may be required. Adverse impact is defined as any harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such activity. Threatened and/or Endangered Species that require specific protection measures as identified in the environmental permits shall be listed in the Environmental Protection Plan.

B. In the event that the DISTRICT determines that an adverse impact to species of concern, including but not limited to Threatened and/or Endangered Species and Protected Migratory Bird Species occur as a result of the construction activities, the DISTRICT shall notify the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service for determination of further action and possibly to determine if seasonal or daily timing restrictions on construction activities is needed.

C. The CONTRACTOR and all personnel shall be familiar with the Plan shall be able to identify the threatened and endangered species listed in the Plan. Any activity observed by the CONTRACTOR that may result in adverse impact to threatened or endangered species shall be reported immediately to the DISTRICT, who shall have sole authority for any WORK stoppages, creation of a buffer area, or restart of construction activities.

D. Any Threatened and/or Endangered Species and species of concern observed at the Site will be recorded and logged. The logs shall be provided to the DISTRICT on a bi-weekly basis. See attached Wildlife Log, Appendix A. If nesting activity is detected within and/or adjacent to the Site, the CONTRACTOR shall immediately contact the DISTRICT for determination of further action and possibly to determine if seasonal or daily timing restrictions on construction activities is needed.

E. The CONTRACTOR shall keep construction activities under surveillance, management, and control to prevent impacts to migratory birds and their nests. The CONTRACTOR may be held responsible for harming or harassing the birds, their eggs or their nests as a result of the construction. Any nesting activity observed by the CONTRACTOR shall be reported immediately to the DISTRICT's Construction Manager who shall have sole authority for any WORK stoppages, creation of the buffer area, or restart of construction activities.

3.08 ENVIRONMENTAL PROTECTION RETENTION RECORD RETENTION: The CONTRACTOR shall retain a copy of all required permits, the Plan, the SWPPP, the Spill Prevention Plan, and all associated reports, records and documentation required by these permits or the Contract at the construction Site or an appropriate alternative location as specified in the Notice of Intent (NOI) from NTP through Notice of Termination (NOT). Such documentation includes but is not limited to soil disturbance and stabilization logs, inspection and corrective action logs, turbidity monitoring logs, wildlife observation logs and reports, TCLP and Synthetic Precipitation Leaching Procedure (SPLP) assay results, sanitary, solid, and hazardous waste transport and disposal manifests, spill reports, material safety data sheets, and any warnings, citations or notices of noncompliance, or fees, levees, fines or penalties. A copy of all such records shall be submitted to the DISTRICT at the time of Contract close-out.

3.09 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 – Environmental Control and F.A.C. Section 200 – Recirculation Chiller) and all Federal emission and performance laws and standards as applicable. This includes, but is not limited to, control of particulates, dust generated by or incidental to construction activities, burning and odors.

3.10 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 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 construction or other activities, the CONTRACTOR observes items that may have historic or archeological value, such observations shall be reported immediately to the DISTRICT so that the appropriate staff may be notified and a determination made 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 DISTRICT.

END OF SECTION

Appendix A
Wildlife Log

For Threatened and/or Endangered Species and Species of Concern Listed in Permit

Wood Storks Sightings, since they are so abundant, will be logged on a bi-weekly basis in coordination with Bi-weekly Construction Progress Meetings and will be reported quarterly along with other sightings.

☐ **Eastern Indigo Snake** ☐ **Bald Eagle** ☐ **Wood Stork** ☐ **Florida Panther** ☐ **Caracara** ☐ **Gopher Tortoise** ☐ **Other_____**	
Project Name	
Date of Sighting	
Time of Sighting	
Temperature	
Wind (mph)	
Weather Conditions (ex: note sky cover, raining, humid, cloudy, sunny, cool, hot, etc)	
Construction Activity Occurring	
Equipment being Used	
Condition of Animal (ex: injured, unharmed, etc)	
Behavior of Animal (ex: disoriented, aggressive, etc)	
Actions taken after sighting	
Size of Animal	
GPS Coordinates/Specific Location	
Pictures Taken (Attach pictures)	
Date this form was completed	
Observers Company/Agency	
Observers Name	Print Name:
	Signature:
Observers Contact Info	Office:
	Cell:
	Email:

EXAMPLE FORM
Wildlife Log

For Threatened and/or Endangered Species and Species of Concern Listed in Permit

Wood Storks Sightings, since they are so abundant, will be logged on a bi-weekly basis in coordination with Bi-weekly Construction Progress Meetings and will be reported quarterly along with other sightings.

☑ **Eastern Indigo Snake** ☐ **Bald Eagle** ☐ **Wood Stork** ☐ **Florida Panther** ☐ **Caracara** ☐ **Gopher Tortoise** ☐ **Other**_____	
Project Name	C-44 Reservoir
Date of Sighting	Tuesday, January 29, 2008
Time of Sighting	0900
Temperature	75°
Wind (mph)	5-10 mph
Weather Conditions (ex: note sky cover, raining, windy, humid, cloudy, sunny, cool, hot, etc)	Partial cloud/Sunny
Construction Activity Occurring	Demobilization of Construction Trailers, nothing near the area snakes were sighted
Equipment being Used	n/a
Condition of Animal (ex: injured, unharmed, etc)	Good
Behavior of Animal (ex: disoriented, aggressive, etc)	under a door in an abandoned citrus office
Actions taken after sighting	Determined sex, took photos, estimated size
Size of Animal	Approx 6’
GPS Coordinates/Specific Location	N 27 05 33.59 W 80 26 59.90 NE Corner of Project along Eastern Levee
Pictures Taken (Attach pictures)	Yes, attached
Date this form was completed	Tuesday, February 5, 2008
Observers Company/Agency	Land Clearing Inc.
Observers Name	Print Name:
	Signature:
Observers Contact Info	Office:
	Cell:
	Email:

Appendix B

Killing, harming, or harassing indigo snakes is strictly prohibited and punishable under State and Federal Law.

Only individuals currently authorized through an issued Incidental Take Statement in association with a USFWS Biological Opinion, or by a Section 10(a)(1)(A) permit issued by the USFWS, to handle an eastern indigo snake are allowed to do so.

LEGAL STATUS: The eastern indigo snake is classified as a Threatened species by both the USFWS and the Florida Fish and Wildlife Conservation Commission. "Taking" of eastern indigo snakes is prohibited by the Endangered Species Act without a permit. "Take" is defined by the USFWS as an attempt to kill, harm, harass, pursue, hunt, shoot, wound, trap, capture, collect, or engage in any such conduct. Penalties include a maximum fine of $25,000 for civil violations and up to $50,000 and/or imprisonment for criminal offenses, if convicted.

August 12, 2013

ATTENTION:

THREATENED EASTERN INDIGO SNAKES MAY BE PRESENT ON THIS SITE!!!

Please read the following information provided by the U.S. Fish and Wildlife Service to become familiar with standard protection measures for the eastern indigo snake.

IF YOU SEE A LIVE EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and allow the eastern indigo snake sufficient time to move away from the site without interference.
- Personnel must NOT attempt to touch or handle snake due to protected status.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Immediately notify supervisor or the applicant's designated agent, **and** the appropriate U.S. Fish and Wildlife Service (USFWS) office, with the location information and condition of the snake.
- If the snake is located in a vicinity where continuation of the clearing or construction activities will cause harm to the snake, the activities must halt until such time that a representative of the USFWS returns the call (within one day) with further guidance as to when activities may resume.

IF YOU SEE A DEAD EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and immediately notify supervisor or the applicant's designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Thoroughly soak the dead snake in water and then freeze the specimen. The appropriate wildlife agency will retrieve the dead snake.

USFWS Florida Field Offices to be contacted if a live or dead eastern indigo snake is encountered:

North Florida ES Office – (904) 731-3336
Panama City ES Office – (850) 769-0552
South Florida ES Office – (772) 562-3909

DESCRIPTION: The eastern indigo snake is one of the largest non-venomous snakes in North America, with individuals often reaching up to 8 feet in length. They derive their name from the glossy, blue-black color of their scales above and uniformly slate blue below. Frequently, they have orange to coral reddish coloration in the throat area, yet some specimens have been reported to only have cream coloration on the throat. These snakes are not typically aggressive and will attempt to crawl away when disturbed. Though indigo snakes rarely bite, they should NOT be handled.

SIMILAR SNAKES: The black racer is the only other solid black snake resembling the eastern indigo snake. However, black racers have a white or cream chin, thinner bodies, and WILL BITE if handled.

LIFE HISTORY: The eastern indigo snake occurs in a wide variety of terrestrial habitat types throughout Florida. Although they have a preference for uplands, they also utilize some wetlands and agricultural areas. Eastern indigo snakes will often seek shelter inside gopher tortoise burrows and other below- and above-ground refugia, such as other animal burrows, stumps, roots, and debris piles. Females may lay from 4 - 12 white eggs as early as April through June, with young hatching in late July through October.

Appendix C
STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE
U.S. Fish and Wildlife Service
August 12, 2013

ATTENTION:
THREATENED EASTERN INDIGO SNAKES MAY BE PRESENT ON THIS SITE!!!

IF YOU SEE A LIVE EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and allow the eastern indigo snake sufficient time to move away from the site without interference.
- Personnel must NOT attempt to touch or handle snake due to protected status.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Immediately notify supervisor or the applicant's designated agent, **and** the appropriate U.S. Fish and Wildlife Service (USFWS) office, with the location information and condition of the snake.
- If the snake is located in a vicinity where continuation of the clearing or construction activities will cause harm to the snake, the activities must halt until such time that a representative of the USFWS returns the call (within one day) with further guidance as to when activities may resume.

IF YOU SEE A DEAD EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and immediately notify supervisor or the applicant's designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Thoroughly soak the dead snake in water and then freeze the specimen. The appropriate wildlife agency will retrieve the dead snake.

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Killing, harming, or harassing indigo snakes is strictly prohibited and punishable under State and Federal Law.

DESCRIPTION: The eastern indigo snake is one of the largest non-venomous snakes in North America, with individuals often reaching up to 8 feet in length. They derive their name from the glossy, blue-black color of their scales above and uniformly slate blue below. Frequently, they have orange to coral reddish coloration in the throat area, yet some specimens have been reported to only have cream coloration on the throat. These snakes are not typically aggressive and will attempt to crawl away when disturbed. Though indigo snakes rarely bite, they should NOT be handled.

SIMILAR SNAKES: The black racer is the only other solid black snake resembling the eastern indigo snake. However, black racers have a white or cream chin, thinner bodies, and WILL BITE if handled.

LIFE HISTORY: The eastern indigo snake occurs in a wide variety of terrestrial habitat types throughout Florida. Although they have a preference for uplands, they also utilize some wetlands and agricultural areas. Eastern indigo snakes will often seek shelter inside gopher tortoise burrows and other below- and above-ground refugia, such as other animal burrows, stumps, roots, and debris piles. Females may lay from 4 - 12 white eggs as early as April through June, with young hatching in late July through October.

PROTECTION: The eastern indigo snake is classified as a Threatened species by both the USFWS and the Florida Fish and Wildlife Conservation Commission. "Taking" of eastern indigo snakes is prohibited by the Endangered Species Act without a permit. "Take" is defined by the USFWS as an attempt to kill, harm, harass, pursue, hunt, shoot, wound, trap, capture, collect, or engage in any such conduct. Penalties include a maximum fine of $25,000 for civil violations and up to $50,000 and/or imprisonment for criminal offenses, if convicted.

Only individuals currently authorized through an issued Incidental Take Statement in association with a USFWS Biological Opinion, or by a Section 10(a)(1)(A) permit issued by the USFWS, to handle an eastern indigo snake are allowed to do so.

August 12, 2013

SECTION 03100 CONCRETE FORMWORK AND ACCESSORIES

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The CONTRACTOR shall provide all labor, materials and equipment for the following:

1. Design and construction of all necessary formwork including the required bracing, supports, scaffolding, shoring, and other falsework to produce cast-in-place concrete in the finished structure within the required tolerances for line, grade dimension and detail.

2. Joints in concrete, complete and in place, in accordance with the Contract Documents. Joints in concrete structures shall be the types defined below and will be permitted only where indicated, unless specifically accepted by the DISTRICT.

B. Related Work Specified Elsewhere:

1. SECTION 01300 – Submittals

2. SECTION 03300 - Cast-in-Place Concrete

3. SECTION 07921 – Joint Sealants

1.02 APPLICABLE STANDARDS AND PUBLICATIONS: The following standard specifications shall apply to the WORK of this SECTION:

A. Standards or Codes: The edition of the standards of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. American Concrete Institute (ACI)

a. 347 - Guide to Formwork for Concrete

b. 117 - Specification for Tolerances for Concrete Construction and Materials

2. American Society of Testing and Materials (ASTM)

a. A775 – Standard Specification for Epoxy Coated Reinforcing Steel Bars

b. C920 – Standard Specification for Elastomeric Joint Sealant

c. D412 - Standard Test Method for Vulcanized Rubber and Thermoplastic Elastomers - Tension

d. D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

e. D638 - Standard Test Method for Tensile Properties of Plastics

f. D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact

g. D747 - Standard Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam

h. D1056 – Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber

i. D1752 – Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

j. D2000 - Standard Classification System for Rubber Products in Automotive Applications

k. D2240 - Standard Test Method for Rubber Property - Durometer Hardness

l. D2241 – Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)

3. US Product Standards (PS)

a. PS-1 - Construction and Industrial Plywood for Concrete Forms

b. PS-20 - American Softwood Lumber Standard

4. NSF International

a. 61 - Drinking Water System Components - Health Effects

5. United States Army Corps of Engineers (USACE)

a. CRD-C572 - PVC Waterstops

6. Federal Specifications

a. TT-S-0227 E(3) - Sealing Compound, Elastomeric Type, Multicomponent, for Caulking, Sealing, and Glazing Buildings and Other Structures

7. Occupational Safety and Health Association (OSHA)

a. CFR Title 29 Part 1926 - Safety and Health Regulations for Construction

1.03 DEFINITIONS:

A. Construction Joints:

1. When fresh concrete is placed against a hardened concrete surface, the joint between the two pours is called a construction joint. If indicated on the drawings, joints in water bearing members shall be provided with a waterstop and/or sealant groove of the shape indicated. The surface of the first pour may also be required to receive a coating of bond breaker as indicated.

B. Contraction Joints: Contraction joints are similar to construction joints except that the fresh concrete shall not bond to the hardened surface of the earlier pour, which shall be coated with a bond breaker. The slab reinforcement shall be stopped 4-1/2 inches from the joint, which is provided with a sleeve-type dowel, to allow shrinkage of the concrete of the later pour. Waterstop and/or sealant groove shall also be provided when indicated.

C. Expansion Joints:

1. To allow the concrete to expand freely, a space is provided between the two pours, and the joint shall be formed as indicated. The space is obtained by placing a filler joint material against the earlier pour, to act as a form for the later pour. Unless otherwise indicated, expansion joints in water bearing members shall be provided with a center-bulb type waterstop as indicated.

2. Premolded expansion joint material shall be installed with the edge at the indicated distance below or back from finished concrete surface, and shall have a slightly tapered, dressed, and oiled wood strip secured to or placed at the edge thereof during concrete placement, which shall later be removed to form space for sealing material.

3. The space so formed shall be filled with a joint sealant material as indicated herein. In order to keep the two walls or slab elements in line the joint shall also be provided with a sleeve-type dowel as indicated.

D. Control Joints: The function of the control joint is to provide a weaker plane in the concrete, where shrinkage cracks will probably occur. A groove, of the shape and dimensions indicated, is formed or saw-cut in the concrete. This groove is afterward filled with a joint sealant material.

1.04 SUBMITTALS:

A. Submittals shall be in accordance with SECTION 01300.

B. Falsework Calculations and Drawings: The CONTRACTOR shall submit calculations and drawings prepared and sealed by a Professional Civil Engineer registered in the State of Florida, which indicate the falsework complies with the requirements of OSHA Title 29, Part 1926.703. The submission of design details and calculations for falsework is for information only.

C. The plans of falsework proposed to be used shall be in sufficient detail to indicate the general layout, sizes of members, anticipated stresses, grade of materials to be used in the falsework, means of protecting existing construction which supports falsework, and typical soil conditions.

D. The CONTRACTOR shall submit placement drawings showing the location and type of all joints for each structure.

E. Prior to production of the waterstop materials required under this SECTION, qualification samples of waterstops shall be submitted which represent in all respects the material proposed. Such samples shall consist of extruded or molded sections of each size or shape to be used. The balance of the material to be used shall not be produced until after the DISTRICT has reviewed the qualification samples.

F. Prior to use of the waterstop material in the field, a sample of a prefabricated (shop made fitting) mitered cross and a tee constructed of each size or shape of material to be used shall be submitted. These samples shall be prefabricated (shop made fitting) so that the material and workmanship represent in all respects the fittings to be provided. Field samples of prefabricated (shop made fitting) fittings (crosses, tees, etc.) may also be selected at random by the DISTRICT for testing by a laboratory at the DISTRICT's expense. When tested, tensile strength across the joints shall be at least 1120 psi.

G. The CONTRACTOR shall submit MANUFACTURER’s information demonstrating compliance with requirements for the following:

1. Form ties and related accessories, including taper tie plugs, if taper ties are used
2. Form gaskets
3. Form release agent, including NSF certification if not using mineral oil
4. List of form materials and locations for use
5. Bearing Pads
6. Neoprene Sponge
7. Preformed Joint Filler
8. Backing Rod
9. Bond Breaker
10. Waterstops
11. Slip Dowels
12. PVC Tubing

1.05 RESPONSIBILITIES:

A. The CONTRACTOR is fully responsible for the design and construction of all forms and falsework to be in compliance with all applicable OSHA requirements, and the requirements of all agencies having jurisdiction on the project. The submission of design details and calculations for falsework is for information only.

B. The CONTRACTOR shall prepare adhesion and cohesion test specimens for construction joint sealant as required herein, at intervals of 5 working days while sealants are being installed.

C. The sealant material shall show no signs of adhesive or cohesive failure when tested in accordance with the following procedure in laboratory and field tests:

1. Sealant specimen shall be prepared between 2 concrete blocks (1-inch by 2-inch by 3-inch). Spacing between the blocks shall be 1-inch. Coated spacers (2-inch by 1-1/2-inch by 1/2-inch) shall be used to insure sealant cross-sections of 1/2-inch by 2 inches with a width of 1-inch.

2. Sealant shall be cast and cured according to MANUFACTURER's recommendations except that curing period shall be not less than 24 hours.

3. Following curing period, the gap between blocks shall be widened to 1-1/2-inch. Spacers shall be used to maintain this gap for 24 hours prior to inspection for failure.

1.06 CERTIFICATIONS:

A. Form materials, which may remain or leave residues on or in the concrete, shall be certified as compliant with NSF 61.

B. Joint materials shall be certified as compliant with NSF 61.

C. The CONTRACTOR shall submit certified test reports from the sealant MANUFACTURER on the actual batch of material being supplied indicating compliance with requirements herein before the sealant is used on the job.

D. The CONTRACTOR shall provide copies of the Waterstop Welding Certifications provided by MANUFACTURER or authorized agent of MANUFACTURER for every person who is to be involved with waterstop installation.

1.07 INSPECTIONS:

A. Falsework shall be inspected for conformance with the accepted submittal. No workers will be allowed to use falsework for access and no concrete placement to related forms will be permitted until the falsework is inspected by the CONTRACTOR for conformance with the submittals and appropriately tagged. No variations or alterations to falsework, as compared to the reference submittal, will be allowed without certification of the variation by the original Professional Engineer.

B. All waterstop field joints shall be subject to rigid inspection, and no such WORK shall be scheduled or started without having made prior arrangements with the DISTRICT for the required inspections. Not less than 24 hours advance notice shall be given for scheduling such inspections.

C. Field joints in waterstops shall be subject to rigid inspection for misalignment, bubbles, inadequate bond, porosity, cracks, offsets, and other defects, which would reduce the potential resistance of the material to water pressure at any point. Defective joints shall be replaced with material, which passes inspection; faulty material shall be removed from the site and properly disposed of.

D. The following waterstop defects represent a partial list of defects which shall be grounds for rejection:

1. Offsets at joints greater than 1/16-inch or 15 percent of material thickness, at any point, whichever is less

2. Exterior crack at joint, due to incomplete bond, which is deeper than 1/16-inch or 15 percent of material thickness, at any point, whichever is less

3. Any combination of offset or exterior crack which will result in a net reduction in the cross section of the waterstop in excess of 1/16-inch or 15 percent of material thickness at any point, whichever is less

4. Misalignment of joint which results in misalignment of the waterstop in excess of 1/2-inch in 10 feet

5. Porosity in the welded joint as evidenced by visual inspection

6. Bubbles or inadequate bonding which can be detected with a penknife test (If, while prodding the entire joint with the point of a penknife, the knife breaks through the outer portion of the weld into a bubble, the joint shall be considered defective.)

7. Visible signs of separation when the cooled splice is bent by hand at any sharp angle

8. Any evidence of burned material

1.08 WARRANTY: The CONTRACTOR shall warrant the WORK against defects for one year from the date of Substantial Completion and as described in Article 13 of Section 00700 - General Terms and Conditions.

PART 2 - PRODUCTS

2.01 FORM AND FALSEWORK MATERIALS:

A. Except as otherwise expressly accepted by the DISTRICT, lumber brought on the Site for use as forms, shoring, or bracing shall be new material. Forms shall be smooth surface forms and shall be of the following materials:

Walls	-	Steel, fiberglass, or plywood panel
Columns	-	Steel, plywood, PVC, fiberglass, or spiral wound fiber forms
Roof and floor	-	Plywood
All other work	-	Steel panels, fiberglass, or plywood

B. Materials for concrete forms, formwork, and falsework shall conform to the following requirements:

1. Plywood shall be new, waterproof, synthetic resin bonded, exterior type, manufactured especially for concrete formwork and shall conform to Plyform Class I, B-B EXT, of PS-1, and shall be edge sealed.

2. Lumber shall be Douglas Fir or Southern Yellow Pine, construction grade or better, in conformance with PS 20.

3. Form materials shall be metal, wood, plywood, or other material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade indicated. Metal forms shall accomplish such results. Wood forms for surfaces to be painted shall be Medium Density Overlaid plywood, MDO EXT Grade.

C. Unless otherwise indicated, exterior corners in concrete members shall be provided with 3/4-inch chamfers or be tooled to 1/2-inch radius. Re-entrant corners in concrete members shall not have fillets unless otherwise indicated.

D. Forms and falsework to support the roof and floor slabs shall be designed in accordance with ACI 347.

2.02 FORM TIES:

A. Ties shall be standard crimped snap ties with one-inch (1”) snapback. Ties shall be provided with a plastic cone or other suitable means for forming a conical hole to insure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form-tie fasteners having a circular cross-section, shall not exceed 1-1/2 inches; and all such fasteners shall be such as to leave holes of regular shape for reaming. Form ties for water-retaining structures shall have integral waterstops that tightly fit the form tie so that they cannot be moved from mid-point of the tie.

B. Removable taper ties may be used when approved by the DISTRICT. A preformed neoprene or polyurethane tapered plug sized to seat at the center of the wall shall be inserted in the hole left by the removal of the taper tie.

2.03 FORM RELEASING AGENT: Form release agent shall be non-staining and shall leave no residues on or in the concrete unless certified as compliant with NSF 61 and shall not adversely affect the adhesion of paint or other coatings.

2.04 WATERSTOPS:

A. PVC Waterstops:

1. PVC Waterstops shall be extruded from an elastomeric polyvinyl chloride compound containing the plasticizers, resins, stabilizers, and other materials necessary to meet the requirements of this SECTION. No reclaimed or scrap material shall be used. The CONTRACTOR shall obtain from the waterstop MANUFACTURER and shall furnish to the DISTRICT for review, current test reports and a written certification of the MANUFACTURER that the material to be shipped to the job meets the physical requirements as outlined in the USACE CRD-C572, and those listed herein.

2. Flatstrip and Center-Bulb Waterstops: The thickness of waterstops, including the center bulb, shall not be less than 3/8-inch. Waterstop shall be provided with factory installed hog rings at 12 inches on centers along the waterstop.

3. Multi-Rib Waterstops: Multi-rib waterstops where required shall have prefabricated (shop made fitting) joint fittings at all intersections of the ribbed-type waterstops.

4. Retrofit Waterstops: Retrofit waterstops and batten bars shall be manufactured as a complete system including waterstop, SS batten bar, SS anchor bolts, and epoxy gel.

5. Waterstop Testing Requirements: When tested in accordance with the test standards, the waterstop material shall meet or exceed the following requirements:

Property	Value	ASTM Standard
Physical Property, Sheet Material		
Tensile Strength-min (psi)	2000	D 638, Type IV
Ultimate Elongation-min (percent)	350	D 638, Type IV
Low Temp Brittleness-max (degrees F)	-35	D 746
Stiffness in Flexure-min (psi)	600	D 747
Accelerated Extraction (CRD-C572)		
Tensile Strength-min (psi)	1500	D 638, Type IV
Ultimate Elongation-min (percent)	300	D 638, Type IV
Effect of Alkalies (CRD-C572)		
Change in Weight (percent)	+ 0.25/- 0.10	------
Change in Durometer, Shore A	+/- 5	D 2240
Finish Waterstop		
Tensile Strength-min (psi)	1400	D 638, Type IV
Ultimate Elongation-min (percent)	280	D 638, Type IV

B. Pre-formed Hydrophilic Waterstops:

1. Hydrophilic (bentonite-free) waterstops shall be the type that expands in the presence of water to form a watertight joint seal without damaging the concrete in which it is cast.

2. Waterstop shall be manufactured from chloroprene rubber and modified chloroprene rubber with hydrophilic properties. Waterstop shall have a delay coating to inhibit initial expansion

due to moisture present in fresh concrete. The minimum expansion ratio of modified chloroprene shall be not less than 2 to 1 volumetric change in distilled water at 70 degrees F (21 degrees C).

3. Hydrophilic Waterstop shall meet the following minimum requirements:

Property	Value	ASTM Standard
Physical Property, Chloroprene		
Tensile Strength-min (psi)	1275	D 412
Ultimate Elongation-min (percent)	350	D 412
Hardness, Shore A	55 +/- 5	D 2240
Physical Property, Modified Chloroprene		
Tensile Strength-min (psi)	300	D 412
Ultimate Elongation-min (percent)	600	D 412
Hardness, Shore A	55 +/- 5	D 2240

4. Bonding agent for hydrophilic waterstop shall be the MANUFACTURER's recommended adhesive for wet, rough concrete.

C. Other Types of Waterstops:

1. When types of waterstops not listed above are indicated, they shall be subjected to the same requirements as those listed herein.

2.05 JOINT SEALANT FOR WATER BEARING JOINTS:

A. Joint sealant shall be polyurethane polymer designed for bonding to concrete, which is continuously submerged in water. No material will be acceptable which has an unsatisfactory history as to bond or durability when used in the joints of water retaining structures.

B. Joint sealant material shall meet the following requirements (73 degrees F and 5percent R.H.):

Requirement	Value	ASTM Standard
Work Life (minutes)	45 - 180	-----
Time to Reach 20 Shore "A" Hardness (at 77 degrees F, 200 gr quantity) - max (hours)	24	-----
Ultimate Hardness	20 - 45 Shore "A"	D 2240
Tensile Strength - min (psi)	175	D 412
Ultimate Elongation - min (percent)	400	D 412
Tear Resistance - min (pounds per inch of thickness)	75	D 624 (Die C)
Color	Light Gray	-----

C. Polyurethane sealants for waterstop joints in concrete shall conform to the following requirements:

1. Sealant shall be 2-part polyurethane with the physical properties of the cured sealant conforming to or exceeding the requirements of ASTM C 920, or TT-S-0227 E(3) for 2-part material, as applicable.

2. For vertical joints and overhead horizontal joints, only "non-sag" compounds shall be used; all such compounds shall conform to the requirements of ASTM C 920 Class 25, Grade NS, or TT-S-0227 E(3), Type II, Class A.

3. For plane horizontal joints, the self-leveling compounds which meet the requirements of ASTM C 920 Class 25, Grade P, or TT-S-0227 E(3), Type I shall be used. For joints subject to either pedestrian or vehicular traffic, a compound providing non-tracking characteristics, and having a Shore "A" hardness range of 35 to 45, shall be used.

4. Primer materials, if recommended by the sealant MANUFACTURER, shall conform to the printed recommendations of the MANUFACTURER.

2.06 JOINT MATERIALS:

A. Bearing Pad: Bearing pad shall be neoprene conforming to ASTM D 2000, BC 420, 40 durometer hardness unless otherwise indicated.

B. Neoprene Sponge: Sponge shall be neoprene, closed-cell, expanded, conforming to ASTM D 1056, Type 2C5-E1.

C. Joint Filler

1. Joint filler for expansion joints in waterholding structures shall be neoprene conforming to ASTM D1056, Type 2C5-E1.

2. Joint filler material in other locations shall be of the preformed non-extruding type joint filler constructed of cellular neoprene sponge rubber or polyurethane of firm texture. Bituminous fiber type will not be permitted. All non-extruding and resilient-type preformed expansion joint fillers shall conform to the requirements and tests set forth in ASTM D 1752, for Type I, except as otherwise indicated.

2.07 BACKING ROD: Backing rod shall be an extruded closed-cell, polyethylene foam rod. The material shall be compatible with the joint sealant material and shall have a tensile strength of not less than 40 psi and a compression deflection of approximately 25 percent at eight (8) psi. The rod shall be 1/8-inch larger in diameter than the joint width except that a one-inch diameter rod shall be used for a 3/4-inch wide joint.

2.08 BOND BREAKER:

A. Bond breaker shall contain a fugitive dye so that areas of application will be readily distinguishable.

B. Bonding agent for hydrophilic waterstop shall be the MANUFACTURER’s recommended adhesive for wet, rough concrete.

2.09 SLIP DOWELS: Slip dowels in joints shall be smooth epoxy-coated bars, conforming to ASTM A 775.

2.10 PVC TUBING: PVC tubing in joints shall be Schedule SDR 13.5, conforming to ASTM D 2241.

2.11 CHAMFER STRIP: Provide three quarter inch triangular fillets, milled clear straight grained wood, surfaced each side, or extruded vinyl type, with or without nail flange to form all exposed concrete edges such as columns, pilasters, beams, curbs, equipment pads, tops of walls, and as indicated. Unless otherwise indicated, exterior corners in concrete members shall be provided with 3/4” chamfers. Re-entrant corners in concrete members shall not have fillets, unless otherwise indicated.

PART 3 - EXECUTION

3.01 FORMS:

A. Forms shall conform to the shape, lines, and dimensions as shown on the Drawings and shall be substantial and sufficiently tight to prevent leakage. Forms shall be properly braced or tied so as to maintain position and shape. Plumb and string lines shall be installed before concrete placement and shall be maintained during placement. Such lines shall be used by CONTRACTOR's personnel and by the DISTRICT and shall be in sufficient number and properly installed. During concrete placement, the CONTRACTOR shall continually monitor plumb and string line form positions and immediately correct deficiencies.

B. The CONTRACTOR shall be fully responsible for the adequacy of the formwork in its entirety and any forms that are unsafe or inadequate in any respect shall promptly be removed from the WORK and replaced. The CONTRACTOR shall provide worker protection from protruding reinforcement bars in accordance with applicable safety codes.

C. The CONTRACTOR may reuse forms only if in good condition and only if acceptable to the DISTRICT. Reused forms shall be thoroughly cleaned and may require light sanding between uses to obtain a uniform surface texture on all exposed concrete surfaces. Forms shall not be reused if they have developed defects that would affect the surface texture of exposed concrete. Exposed concrete surfaces are defined as surfaces, which are permanently exposed to view. In the case of forms for the inside wall surfaces of hydraulic/water retaining structures, unused tie rod holes in forms shall be covered with metal caps or shall be filled by other methods acceptable to the DISTRICT.

D. Forms shall be sufficiently tight to prevent leakage. Forms shall be properly braced or tied together to maintain their position and shape under a load of freshly-placed concrete. If adequate foundation for shores cannot be secured, trussed supports shall be provided.

E. Immediately before the placing of reinforcing, faces of all forms in contact with concrete shall receive a thorough coating of form release agent. Any excess agent shall be satisfactorily removed before placing concrete. If using mineral oil, the CONTRACTOR shall oil the forms at least two weeks in advance of their use. Care shall be exercised to keep oil/release agent off the surfaces of steel reinforcement and other items to be embedded in concrete.

F. The CONTRACTOR shall supply sufficient number of forms of each kind to permit the required rate of progress to be maintained.

G. The design and inspection of concrete forms, falsework, and shoring shall comply with applicable local, state, and Federal regulations.

3.02 WATERSTOPS:

A. Waterstops shall be embedded in the concrete across joints as indicated. Waterstops shall be fully continuous for the extent of the joint. Splices necessary to provide such continuity shall be accomplished in conformance to printed instructions of MANUFACTURER of the waterstops. The CONTRACTOR shall take suitable precautions and means to support and protect the waterstops during the progress of the WORK and shall repair or replace at its own expense any waterstops damaged during the progress of the WORK. Waterstops shall be stored so as to permit free circulation of air around the waterstop material.

B. When any waterstop is installed in the concrete on one side of a joint, while the other half or portion of the waterstop remains exposed to the atmosphere for more than 2 days, suitable precautions shall be taken to shade and protect the exposed waterstop from direct rays of the sun during the entire exposure and until the exposed portion of the waterstop is embedded in concrete.

3.03 SPLICES IN PVC WATERSTOPS:

A. Splices in PVC waterstops shall be performed by heat sealing the adjacent waterstop sections in accordance with the MANUFACTURER's printed recommendations. It is essential that:

1. The material not be damaged by heat sealing.

2. The splices have a tensile strength of not less than 80 percent of the unspliced material tensile strength.

3. The continuity of the waterstop ribs and of its tubular center axis be maintained. No edge welding is allowed.

B. Butt joints of the ends of 2 identical waterstop sections may be made while the material is in the forms.

C. All joints with waterstops involving more than 2 ends to be jointed together, and all joints which involve an angle cut, alignment change, or the joining of 2 dissimilar waterstop sections shall be prefabricated (shop made fitting) prior to placement in the forms, allowing not less than 24-inch long strips of waterstop material beyond the joint. Upon being inspected and approved, such prefabricated

(shop made fitting) waterstop joint assemblies shall be installed in the forms and the ends of the 24-inch strips shall be butt welded to the straight run portions of waterstop in place in the forms.

D. Where a centerbulb waterstop intersects and is jointed with a non-centerbulb waterstop, care shall be taken to seal the end of the centerbulb, using additional PVC material if needed.

3.04 FORM DESIGN:

A. Forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. Suitable and effective means shall be provided on all forms for holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets, or similar surface defects in the finished concrete.

B. Plywood, 5/8-inch and greater in thickness, may be fastened directly to studding if the studs are spaced close enough to prevent visible deflection marks in the concrete. The forms shall be tight so as to prevent the loss of water, cement, and fines during placing and vibrating of the concrete. Specifically, the bottom of wall forms that rest on concrete footings or slabs shall be provided with a gasket to prevent loss of fines and paste during placement and vibration of concrete. Such gasket may be a 1- to 1-1/2-inch diameter polyethylene rod held in position to the underside of the wall form.

C. The CONTRACTOR shall provide adequate clean-out holes at the bottom of each lift of forms. The size, number, and location of such clean-outs shall be as acceptable to the DISTRICT. Whenever concrete cannot be placed from the top of a wall form in a manner that meets the requirements of the Contract Documents, form windows shall be provided in the size and spacing needed to allow placement of concrete to the requirements of SECTION 03300. The size, number, and location of such form windows shall be as acceptable to the DISTRICT.

3.05 FORM CONSTRUCTION:

A. Vertical Surfaces: All vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is indicated. Not less than 1-inch of concrete shall be added to the indicated thickness of a concrete member, where concrete is permitted to be placed against trimmed ground, in lieu of forms. Permission to do this on other concrete members will be granted only for members of comparatively limited height and where the character of the ground is such that it can be trimmed to the required lines and will stand securely without caving or sloughing until the concrete has been placed.

B. Construction Joints: Concrete construction joints will not be permitted at locations other than those indicated, except as may be acceptable to the DISTRICT. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete. Pipe stubs and anchor bolts shall be set in the forms where required.

C. Form Ties

1. Embedded Ties: Holes left by the removal of form tie cones shall be reamed with suitable toothed reamers so as to leave the surface of the holes clean and rough before being filled with mortar. Wire ties for holding forms will not be permitted. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete members. The use of snap-ties, which cause spalling of the concrete upon form stripping or tie removal, will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 1-inch back from the formed face or faces of the concrete.

2. Removable Ties: Where taper ties are approved for use, the larger end of the taper tie shall be on the wet side of walls in water retaining structures. After the taper tie is removed, the hole shall be thoroughly cleaned and roughened for bond. A precast neoprene or polyurethane tapered plug shall be located at the wall centerline. The hole shall be completely filled with non-shrink grout for water bearing and below-grade walls. The hole shall be completely filled with non-shrink or regular cement grout for above-grade walls, which are dry on both sides. Exposed faces of walls shall have the outer 2 inches of the exposed face filled with a cement grout, which shall match the color and texture of the surrounding wall surface.

3.06 JOINT CONSTRUCTION:

A. Setting Waterstops:

1. In order to eliminate faulty installation that may result in joint leakage, the CONTRACTOR shall be particularly careful to get the correct positioning of the waterstops during installation. Adequate provisions must be made to support and anchor the waterstops during the progress of the WORK and to insure the proper embedment in the concrete. The symmetrical halves of the waterstops shall be equally divided between the concrete pours at the joints. The center axis of the waterstops shall be coincident with the joint openings. Maximum density and imperviousness of the concrete shall be insured by thoroughly working it in the vicinity of all joints.

2. In placing PVC waterstops in the forms, the CONTRACTOR shall provide means to prevent the waterstop from being folded over by the concrete as it is placed. Waterstops shall be held in place with light wire ties on 12-inch centers which shall be passed through hog rings at the edge of the waterstop and tied to the curtain of reinforcing steel. Horizontal waterstops, with their flat face in a vertical plane, shall be held in place with continuous supports to which the top edge of the waterstop shall be tacked. In placing concrete around horizontal waterstops, with their flat face in a horizontal plane, the CONTRACTOR shall work concrete under the waterstops by hand so as to avoid the formation of air and rock pockets.

3. In placing centerbulb waterstops in expansion joints, the centerbulb shall be centered on the joint filler material.

4. Waterstop in vertical wall joints shall stop 6 inches from the top of the wall where such waterstop does not connect with any other waterstop and is not to be connected to a future concrete placement.

B. Joint Location:

1. Construction joints and other types of joints shall be provided where indicated. When not indicated, construction joints shall be provided at 25-foot maximum spacing for all concrete construction. Where joints are indicated spaced greater than 40 feet apart, additional joints shall be provided to maintain the 25-foot maximum spacing. The location of all joints, of any type, shall be submitted for acceptance by the DISTRICT.

C. Joint Preparation:

1. The CONTRACTOR shall take special care in preparing concrete surfaces at joints where bonding between 2 sections of concrete is required. Unless otherwise indicated, such bonding will be required at all horizontal joints in walls. Surfaces shall be prepared in accordance with the requirements of SECTION 03300. Except on horizontal wall construction joints, wall to slab joints, or where otherwise indicated, at all joints where waterstops are required, the joint face of the first pour shall be coated with a bond breaker as indicated herein.

D. Retrofit Joint Preparation:

1. Existing surfaces to receive a retrofit waterstop shall be clean and free from any loose or foreign material. Surface shall be given a light sandblast or hydroblast finish to 1/8-inch amplitude prior to application of epoxy and waterstop.

E. Construction Joint Sealant:

1. Construction joints in water-bearing floor slabs, and elsewhere as indicated, shall be provided with tapered grooves which shall be filled with a construction joint sealant. The material used for forming the tapered grooves shall be left in the grooves until just before the grooves are cleaned and filled with joint sealant. After removing the forms from the grooves, all laitance and fins shall be removed, and the grooves shall be sandblasted. The grooves shall be allowed to become thoroughly dry, after which they shall be blown out; immediately thereafter, they shall be primed, bond breaker tape placed in the bottom of the groove, and filled with the construction joint sealant. The primer shall be furnished by the sealant MANUFACTURER. No sealant will be permitted to be used without a primer. Care shall be used to completely fill the sealant grooves. Areas designated to receive a sealant fillet shall be thoroughly cleaned, as outlined for the tapered grooves, prior to application of the sealant.

2. The primer and sealant shall be placed strictly in accordance with the printed recommendations of the MANUFACTURER, taking special care to properly mix the sealant prior to application. The sides of the sealant groove shall not be coated with bond breaker, curing compound, or any other substance which would interfere with proper bonding of the sealant. Sealant shall achieve final cure at least 7 days before the structure is filled with water.

3. Sealant shall be installed by a competent waterproofing specialty contractor who has a successful record of performance in similar installations.

4. Thorough, uniform mixing of 2-part, catalyst-cured materials is essential; special care shall be taken to properly mix the sealer before its application. Before any sealer is placed, the CONTRACTOR shall arrange to have the crew doing the WORK carefully instructed on the proper method of mixing and application by a representative of the sealant MANUFACTURER.

5. Any joint sealant which fails to fully and properly cure after the MANUFACTURER's recommended curing time for the conditions of the WORK hereunder shall be completely removed; the groove shall be thoroughly sandblasted to remove all traces of the uncured or partially cured sealant and primer, and shall be re-sealed with the indicated joint sealant. Costs of such removal, joint treatment, re-sealing, and appurtenant WORK shall be the CONTRACTOR's responsibility.

F. Hydrophilic Waterstop

1. Where a hydrophilic waterstop is called for in the Contract Documents, it shall be installed with the MANUFACTURER's instructions and recommendations except as modified herein.

2. When requested by the DISTRICT, the CONTRACTOR shall arrange for the MANUFACTURER to furnish technical assistance in the field.

3. Hydrophilic waterstop shall only be used where complete confinement by concrete is provided. Hydrophilic waterstop shall not be used in expansion or contraction joints or in the first 6 inches of any non-intersecting joint.

4. The hydrophilic waterstop shall be located as near as possible to the center of the joint and it shall be continuous around the entire joint. The minimum distance from the edge of the waterstop to the face of the member shall be 5 inches.

5. Where the thickness of the concrete member to be placed on the hydrophilic waterstop is less than 12 inches, the waterstop shall be placed in grooves formed or ground into the concrete. The groove shall be at least 3/4 inch deep and 1-1/4 inches wide. When placed in the groove, the minimum distance from the edge of the waterstop to the face of the member shall be 2.5 inches.

6. Where a hydrophilic waterstop is used in combination with PVC waterstop, the hydrophilic waterstop shall overlap the PVC waterstop for a minimum of 6 inches and shall be adhered to PVC waterstop with single component water-swelling sealant as recommended by MANUFACTURER.

7. The hydrophilic waterstop shall not be installed where the air temperature falls outside the MANUFACTURER's recommended range.

8. The concrete surface under the hydrophilic waterstop shall be smooth and uniform. The concrete shall be ground smooth if needed. Alternately, the hydrophilic waterstop shall be bonded to the surface using an epoxy grout which completely fills all voids and irregularities beneath the waterstop material. Prior to installation, the concrete surface shall be wire brushed to remove any laitance or other materials that may interfere with the bonding of epoxy.

9. The hydrophilic waterstop shall be secured in place with concrete nails and washers at 12-inch maximum spacing. This shall be in addition to the adhesive recommended by the MANUFACTURER

G. Retrofit Waterstop:

1. Retrofit waterstops shall be set in a bed of epoxy over a sandblasted surface with stainless steel batten bars and 1/4-inch diameter stainless steel anchors at 6 inches on center, staggered, and in accordance with the MANUFACTURER's written recommendations.

3.07 REMOVAL OF FORMS:

A. Careful procedures for the removal of forms shall be strictly followed, and this WORK shall be done with care so as to avoid injury to the concrete or workers. In the case of roof slabs and above-ground floor slabs, forms shall remain in place until test cylinders for the roof concrete attain a minimum compressive strength of 75 percent of the 28-day strength (0.75f'c) in SECTION 03300. No forms shall be disturbed or removed under an individual panel or unit before the concrete in all the adjacent panels or units have attained 0.75f'c strength and have been in place for a minimum of 7 days. The time required to establish said strength shall be determined by the DISTRICT, who will make several test cylinders for this purpose from concrete used in the first group of roof panels placed. If the time so determined is more than the 7-day minimum, then that time shall be used as the minimum length of time. Forms for vertical walls of waterholding structures shall remain in place at least 36 hours after the concrete has been placed.

B. Forms for parts of the WORK not specifically mentioned herein shall remain in place for periods of time as recommended in ACI 347.

3.08 FALSEWORK:

A. The CONTRACTOR shall be responsible for the design, engineering, construction, maintenance, and safety of all falsework, including staging, walkways, forms, ladders, and similar appurtenances, which shall equal or exceed the applicable requirements of the provisions of the OSHA Safety and Health Standards for Construction, and the requirements herein.

B. The CONTRACTOR shall design and construct falsework to provide the necessary rigidity and to support the loads. Falsework for the support of a superstructure shall be designed to support the loads that would be imposed if the entire superstructure were placed at one time.

C. The CONTRACTOR shall place falsework upon a solid footing, safe against undermining, and protected from softening. When the falsework is supported on timber piles, the maximum calculated pile loading shall be as recommended by the CONTRACTOR's geotechnical engineer and shall not exceed 20 tons. When falsework is supported on any portion of the structure which is already constructed, the load imposed by the falsework shall be spread, distributed, and braced in such a way as to avoid any possibility of damage to the structure.

3.09 TOLERANCES:

A. The variation from plumb, level and required lines shall not exceed 1/4-inch in any ten feet (10') of length, non cumulative, and there shall be no offsets or visible waviness in the finished surface. All

other tolerances shall be within the tolerances of ACI 117 - Standard Tolerances for Concrete Construction and Materials.

END OF SECTION

SECTION 03200 CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The CONTRACTOR shall furnish all labor, materials and equipment to provide and properly place all concrete reinforcement steel, welded wire fabric, couplers, and concrete inserts for use in the reinforced concrete and masonry construction and all appurtenant work, including all the wires, clips, supports, chairs, spacers, and other accessories as shown on the Drawings and as specified herein.

B. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals
2. SECTION 03100 Concrete Formwork and Accessories
3. SECTION 03300 Cast-In-Place Concrete

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the standards of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. See the various paragraphs for the specified standard. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. American Concrete Institute (ACI):
   a. 318 Building Code Requirements for Reinforced Concrete
   b. SP-66 Detailing Manual
2. ASTM International (ASTM):
   a. A82 Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
   b. A185 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
   c. A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
3. Concrete Reinforcing Steel Institute (CRSI):
   a. Recommended Practice for Placing Reinforcing Bars
4. Florida Building Code, Latest Edition

1.03 SUBMITTALS: Submittals shall be in accordance with SECTION 01300. The CONTRACTOR shall submit the following:

A. Mill Certifications of Grade 60 reinforcing steel or stainless steel, as required

B. Complete bar schedule, bar details and erection drawings in conformance with ACI SP-66

C. Mill certificates shall be delivered with each shipment of reinforcing bars.

1.04 RESPONSIBILITIES:

A. The CONTRACTOR shall perform Pull tests to 50 percent of five percent of drilled dowels, randomly selected by the DISTRICT. If any tested dowels slip or yield, an additional five percent of drilled dowels shall be tested until an entire five percent sample is tested without slipping or yielding.

1.05 INSPECTION COORDINATION: The CONTRACTOR shall provide sufficient notice and opportunity to the DISTRICT to review the placement of the reinforcing steel before the concrete is placed. The CONTRACTOR shall provide access to the WORK for the DISTRICT as requested for inspection. The CONTRACTOR shall provide 48 hours advance notice of its intention to begin new WORK activities.

1.06 WARRANTY: The CONTRACTOR shall warrant the WORK against defects for one (1) year from the date of Substantial Completion and as described in Article 13 of Section 00700 - General Terms and Conditions.

PART 2 - PRODUCTS

2.01 REINFORCING BARS:

A. Metal reinforcement shall be deformed type bars conforming to ASTM A615, Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement, Grade 60, unless otherwise specified. Reinforcing steel shall be fabricated for the shapes and dimensions indicated on the Drawings and in compliance with ACI 318. All bars shall be bent cold.

B. Replace all reinforcement with bends and kinks not shown on fabrication Shop Drawings. Remove from job Site all such reinforcing and replace with new fabricated steel. Field bending of reinforcement at the work Site is prohibited.

C. Welded wire fabric reinforcement shall conform to the requirements of ASTM A185, and the details indicated. Do not use fabric that has been rolled. Install flat sheets only.

D. Spiral reinforcement shall be cold-drawn steel wire conforming to the requirements of ASTM A82.

E. Mechanical couplers shall be provided where indicated and where approved by the DISTRICT. The couplers shall develop a tensile strength that exceeds 125 percent of the yield strength of the reinforcement bars being spliced at each splice. Where the type of coupler used is composed of more than one component, all components required for a complete splice shall be provided. This shall apply to all mechanical splices, including those splices intended for future connections. Reinforcement steel and coupler used shall be compatible for obtaining the required strength of the connection. Straight threaded type couplers shall require the use of the next larger size reinforcing bar or shall be used with reinforcing bars with specially forged ends which provide upset threads which do not decrease the basic cross section of the bar.

F. Epoxy for grouting reinforcing bars shall be specifically formulated for such application, for the moisture condition, application temperature, and orientation of the hole to be filled.

2.02 ACCESSORIES: All chairs and bolsters shall conform to ACI SP-66 and the CRSI Manual of Standard Practices and shall have galvanized or plastic legs.

PART 3 - EXECUTION

3.01 PLACEMENT AND ANCHORAGE:

A. Bar supports shall be spaced in accordance with CRSI.

1. Reinforcement steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers that are strong and rigid enough to prevent any displacement of the reinforcement steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. Concrete blocks used to support reinforcement steel shall be tied to the steel with wire ties that are embedded in the blocks. For concrete over formwork, the CONTRACTOR shall provide concrete, metal, plastic, or other acceptable bar chairs and spacers.

2. Limitations on the use of bar support materials shall be as follows.

   a. Concrete Dobies: permitted at all locations except where architectural finish is required.

   b. Wire Bar Supports: permitted only at slabs over dry areas, interior non-hydraulic wall surfaces, and exterior wall surfaces.

   c. Plastic Bar Supports: permitted at all locations except on grade.

B. Reinforcement shall be accurately placed in accordance with the Drawings and shall be adequately secured in position with not less than 16-gauge annealed wire. The placement tolerances shall be in accordance with ACI 318 and the CRSI Manual of Standard Practices.

C. Tie wires shall be bent away from the forms in order to provide the required concrete coverage.

D. Bars additional to those indicated which may be found necessary or desirable by the CONTRACTOR for the purpose of securing reinforcement in position shall be provided by the CONTRACTOR at its own expense.

E. Additional reinforcement around openings:

1. Place an equivalent area of steel around pipe or opening and extend on each side and top and bottom sufficiently to develop bond in each bar.

2. Refer to details on Drawings for bar extension length on each side of opening.

3. Where welded wire fabrics are used, provide extra reinforcing using fabric or deformed bars.

F. Unless otherwise indicated, reinforcement placing tolerances shall be within the limits in Section 7.5 of ACI 318 except where in conflict with the requirements of the Building Code.

G. Bars may be moved as necessary to avoid interference with other reinforcement steel continuously across the entire width of the reinforcement mat, and shall support the reinforcement mat in the plane indicated.

H. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than three (3) feet on centers in any direction. Welded wire fabric shall not be placed on the ground and hooked into place in the freshly placed concrete.

I. Welded wire fabric reinforcement placed over horizontal forms shall be supported on slab bolsters. Slab bolsters shall be spaced not more than 30-inches on center. The construction practice of placing welded wire fabric on the ground and hooking it into place in the freshly placed concrete shall not be used.

3.02 CONCRETE COVER: The concrete cover over reinforcement shall conform to ACI 318, paragraph 7.7, Concrete Protection for Reinforcement, unless otherwise indicated. Tie wires shall be bent away from the forms in order to provide the required concrete coverage.

3.03 SPLICING:

A. All lap splices of bar reinforcement shall be as indicated and conform to Chapter 12 of ACI 318 or as otherwise approved by the DISTRICT. Unless otherwise indicated, dowels shall match the size and spacing of the spliced bar.

B. Laps of welded wire fabric shall be in accordance with ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each two running feet. Wires shall be staggered and tied in such a manner that they cannot slip.

C. Splices in column spiral reinforcement, when necessary, shall be made by a lap of 1-1/2 turns.

D. Reinforcing shall not be straightened or rebent in a manner which will injure the material. Bars shall be bent or straight as indicated. Do not use bends different from the bends indicated. Bars shall be bent cold, unless otherwise permitted by the DISTRICT. No bars partially embedded in concrete shall be field-bent except as indicated or specifically permitted by the DISTRICT.

E. Couplers which are located at a joint face shall be a type which can be set either flush or recessed from the face as indicated. The couplers shall be sealed during concrete placement to completely eliminate concrete or cement paste from entering. Couplers intended for future connections shall be recessed a minimum of 1/2-inch from the concrete surface. After the concrete is placed, the coupler shall be plugged with plastic plugs which have an O-ring seal and the recess filled with sealant to prevent any contact with water or other corrosive materials. Threaded couplers shall be plugged.

3.04 CLEANING AND PROTECTION:

A. Unless indicated otherwise, mechanical coupler spacing and capacity shall match the spacing and capacity of the reinforcing indicated for the adjacent section.

B. Reinforcement shall be free of all materials that will reduce bond.

C. Reinforcement steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.

D. The surfaces of reinforcement steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcement shall be re-inspected and, if necessary, re-cleaned or sandblasted.

E. Properly cap all vertical reinforcement steel if area is subject to having workers above the reinforcement area.

END OF SECTION

SECTION 03300 CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The WORK of this SECTION consists of furnishing all labor, equipment, supplies, and materials necessary for the proper placement, curing, finishing, protection, and repair of the cast-in-place concrete required by the Contract Documents.

B. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals
2. SECTION 01410 Testing and Quality Control
3. SECTION 03100 Concrete Formwork and Accessories
4. SECTION 03200 Concrete Reinforcement
5. SECTION 03700 Concrete Restoration

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the standards of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. See the various paragraphs for the specified standard. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. American Concrete Institute (ACI)
    a. 117 Specification for Tolerances for Concrete Construction and Materials
    b. 301 Specifications for Structural Concrete for Buildings
    c. 304.2R Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete
    d. 305 Committee Report on Hot-Weather Concreting
    e. 306 Committee Report on Cold-Weather Concreting
    f. 308 Standard Practice for Curing Concrete
    g. 309 Guide for Consolidation of Concrete
    h. 318 Building Code Requirements for Reinforced Concrete
    i. 350 Code Requirements for Environmental Engineering Concrete Structures
2. ASTM International (ASTM):
    a. C31 Making and Curing Concrete compression and Flexure Test Specimens in the Field
    b. C33 Standard Specification for Concrete Aggregates
    c. C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
    d. C94 Standard Specification for Ready-Mixed Concrete
    e. C127 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
    f. C128 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate
    g. C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

h. C143 Standard Test Method for Slump of Hydraulic-Cement Concrete

i. C150 Standard Specification for Portland Cement

j. C156 Test Method for Water Retention by Concrete Curing Materials

k. C157 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

l. C173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

m. C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

n. C260 Standard Specification for Air Entraining Admixtures for Concrete

o. C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

p. C494 Standard Specification for Chemical Admixtures for Concrete

q. C566 Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying

r. C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete

s. C881 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

t. C1077 Practice for Laboratories Testing Concrete and Concrete Aggregates for use in Construction and Criteria for Laboratory Evaluation

u. C1157 Standard Performance Specification for Hydraulic Cements

v. C1240 Standard Specification for Silica Fume for Use as a Mineral Admixture in Hydraulic-Cement Concrete, Mortar, and Grout

w. D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

x. D2419 Standard Test Methods for Sand Equivalent Value of Soils and Fine Aggregate

y. E96 Standard Test Methods for Water Vapor Transmission of Materials

z. E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

3. Federal Specifications

a. UU-B-790A Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellant and Fire Resistant)

4. Florida Building Code and Local Building Codes as appropriate

5. Florida Department of Transportation (FDOT)

a. Standard Specifications for Road and Bridge Construction, latest edition.

1.03 DEFINITIONS:

A. Structural Concrete: Concrete to be used in all cases except where indicated otherwise in the Contract Documents.

B. Pea Gravel Concrete: Concrete in thin sections and areas with congested reinforcing, at the option of the CONTRACTOR and with written approval of the DISTRICT for the specific location.

C. Sitework Concrete: Concrete to be used for curbs, gutters, catch basins, sidewalks, pavements, fence and guard post embedment, underground pipe encasement, underground duct bank encasement and all other concrete appurtenant to electrical facilities unless otherwise indicated.

D. Lean Concrete: Concrete to be used for thrust blocks, pipe trench cut-off blocks and cradles that are indicated on the Drawings as unreinforced. Lean concrete shall be used as protective cover for dowels intended for future connection.

E. Hydraulic Structure: A concrete structure for the containment, treatment, or transmission of water, wastewater, other fluids, or gases.

1.04 SUBMITTALS:

A. Submittals shall be in accordance with SECTION 01300.

B. Mix Designs:

1. Prior to beginning the WORK and within 14 days after issuance of the Notice to Proceed, the CONTRACTOR shall submit preliminary concrete mix designs which shall show the proportions and gradations of all materials proposed for each class and type of concrete. Mix designs shall be tested by an independent testing laboratory acceptable to the DISTRICT. All costs related to such testing shall be CONTRACTOR'S responsibility.

2. Test data relating to the cement, aggregate, and admixtures shall be less than six months old. Furnish the submittals in accordance with ACI 301 for the following:

a. Mill tests for cement

b. Admixture certification. Chloride ion content shall be included.

c. Aggregate gradation test results and certification

3. Where ready-mix concrete is used, the CONTRACTOR shall furnish delivery tickets at the time of delivery of each load of concrete. Each ticket shall show the state certified equipment used for measuring and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, and the amounts of water in the aggregate added at the batching plant, and the amount allowed to be added at the Site for the specific design mix. In addition, each ticket shall state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to the times when the batch was dispatched, when it left the plant, when it arrived at the Site, when unloading began, and when unloading was finished.

C. Other

1. The CONTRACTOR shall submit materials and methods for curing.

2. The CONTRACTOR shall submit product specifications, data, and installation instructions for all miscellaneous products called for in this specification.

1.05 QUALIFICATIONS: Truck mixers shall be equipped with electrically actuated counters by which the number of revolutions of the drum or blades may be readily verified. The counter shall be of the resettable, recording type, and shall be mounted in the driver's cab. The counters shall be actuated at the time of starting mixers at mixing speeds.

1.06 RESPONSIBILITIES: (Not Applicable)

1.07 CERTIFICATIONS AND TESTING:

A. General

1. Concrete and other materials for testing shall be furnished by the CONTRACTOR, and the CONTRACTOR shall assist the DISTRICT in obtaining samples, and disposal and cleanup of excess material.

2. The testing laboratory will meet or exceed the requirements of ASTM C1077.

3. The cost of trial batch, laboratory, and shrinkage tests on cement, aggregates, and concrete, will be the CONTRACTOR'S responsibility.

B. Trial Batch and Laboratory Tests

1. Tests for determining slump shall be in accordance with the requirements of ASTM C143.

2. Testing for aggregate shall include sand equivalence, reactivity, organic impurities, abrasion resistance, and soundness, according to ASTM C33.

3. A testing laboratory approved by the DISTRICT shall prepare a trial batch of each class of concrete, based on the preliminary concrete mixes submitted by the CONTRACTOR. During the trial batch the aggregate proportions may be adjusted by the testing laboratory using the two coarse aggregate size ranges to obtain the required properties. If one size range produces an acceptable mix, a second size range need not be used. Such adjustments will be considered refinements to the mix design and will not be the basis for extra compensation to the CONTRACTOR. Concrete shall conform to the requirements of this SECTION, whether the aggregate proportions are from the CONTRACTOR'S preliminary mix design, or whether the proportions have been adjusted during the trial batch process. The trial batch shall be prepared using the aggregates, cement, and admixture proposed for the Project. The trial batch materials shall be of a quantity such that the testing laboratory can obtain 3 drying shrinkage, and 6 compression test specimens from each batch.

4. The determination of compressive strength shall be made in accordance with ACI 318, Section 5.3.

5. A sieve analysis of the combined aggregate for each trial batch shall be performed according to the requirements of ASTM C136. Values shall be given for percent passing each sieve.

C. Field Tests

1. The responsibility to retain the services of an independent testing laboratory shall be as defined in SECTION 01410.

2. The CONTRACTOR shall pay the cost of any additional tests and investigation on WORK that does not meet the specifications.

3. Tests on pumped concrete shall be taken at the point of final placement.

4. Compressive Test: Compressive test specimens shall be taken during construction from the first placement of each class of concrete placed each day and for each 150 cubic yards or fraction thereof each day.

   a. Each set of test specimens shall consist of five (5) cylinders. Specimens shall be made in accordance with ASTM C31. Specimens shall be 6-inch diameter by 12-inch high cylinders.

   b. Compression tests shall be performed in accordance with ASTM C39. Two (2) cylinders shall be broken at seven (7) days and two (2) at 28 days, and the remaining cylinder shall be held to verify test results, if needed.

   c. The acceptance of the test results shall be the average of the strengths of the two specimens tested at 28 days as per ACI 318. Evaluation and acceptance of the concrete shall be per ACI 318, Chapter 5.

5. Slump Tests: One (1) slump test shall be taken per truckload in accordance with ASTM C143.

6. Air Content: Air content shall be determined for each compressive test taken in accordance with ASTM C231 or by ASTM C173.

7. Aggregate testing shall be made every 12 months during construction to insure continued compliance with these Specifications.

8. Concrete that fails to meet the ACI requirements and these Specifications is subject to removal and replacement.

9. Temperature: Concrete temperature shall be recorded in accordance with ASTM C1064.

1.08 WARRANTY: The CONTRACTOR shall warrant the WORK against defects for one (1) year from the date of Substantial Completion and as described in Article 13 of Section 00700 - General Terms and Conditions.

PART 2 - MATERIALS

2.01 GENERAL:

A. All materials shall be classified as acceptable for potable water use according to NSF Standard 61.

B. Cement for concrete that will contact potable water shall not be obtained from kilns that burn metal rich hazardous waste fuel.

C. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Cement reclaimed from cleaning bags or leaking containers shall not be used. Cement shall be used in the sequence of receipt of shipments.

D. Materials shall comply with the requirements of Sections 201, 203, and 204 of ACI 301, as applicable.

E. Storage of materials shall conform to the requirements of Section 205 of ACI 301.

2.02 CEMENT:

A. Cement shall be standard Portland Cement Type II conforming to ASTM C150 and C1157.

B. A minimum of 85 percent of cement by weight shall pass a 325 screen.

C. A single brand of cement shall be used throughout the WORK, and prior to its use, the brand shall be accepted by the DISTRICT.

D. Sacked cement shall be stored in such a manner so as to permit access for inspection and sampling. Certified mill test reports, including fineness, for each shipment of cement to be used shall be submitted to the DISTRICT, if requested, regarding compliance with these Specifications.

2.03 AGGREGATES:

A. Aggregates shall be obtained from pits acceptable to the DISTRICT, shall be non-reactive, and shall conform to the requirements of ASTM C33.

B. When tested in accordance with ASTM C33, the loss resulting after five (5) cycles of the soundness test, shall not exceed ten (10) percent for fine aggregate and twelve (12) percent for coarse aggregate, when using sodium sulfate.

C. When tested in accordance with ASTM C33, the ratio of silica released to reduction in alkalinity shall not exceed 1.0.

D. Coarse Aggregates:

1. Coarse aggregates shall be crushed stone, gravel or other approved inert material having clean, hard, durable, uncoated particles conforming to ASTM C33.

2. The coarse aggregates shall be prepared and handled in two (2) or more size groups for combined aggregates with a maximum size greater than 3/4-inch. When the aggregates are proportioned for each batch of concrete, the 2 size groups shall be combined.

3. When tested in accordance with ASTM C33, the coarse aggregate shall show a loss not exceeding 42 percent after 500 revolutions, or 10.5 percent after 100 revolutions.

E. Fine Aggregates:

1. Fine aggregates shall be clean sand conforming to ASTM C33.

2. When tested in accordance with ASTM D2419, the sand equivalency shall not be less than 75 percent for an average of three (3) samples, nor less than 70 percent for an individual test. Gradation of fine aggregate shall conform to ASTM C33 when tested in accordance with ASTM C136 for the fineness modulus of the sand used, including the optional grading in Section 6.2. The fineness modulus of sand used shall not be over 3.1.

3. When tested in accordance with ASTM C33, the fine aggregate shall produce a color in the supernatant liquid no darker than the reference standard color solution.

2.04 WATER:

A. The water used in the concrete mix and for curing shall be clean, potable, and in accordance with ACI 318. Water shall be free from objectionable quantities of silty organic matter, alkali, salts, and other impurities.

B. The water shall be considered potable, for the purposes of this SECTION only, if it meets the requirements of the local governmental agencies. Agricultural water with high total dissolved solids (over 1000 mg/l TDS) shall not be used.

2.05 ADMIXTURES:

A. General: All admixtures shall be compatible and be furnished by a single MANUFACTURER capable of providing qualified field service representation. Admixtures shall be used in accordance with MANUFACTURER's recommendations. If the use of an admixture is producing an inferior end result, the CONTRACTOR shall discontinue use of the admixture. Admixtures shall not contain thiocyanates or more than 0.05 percent chloride ion and shall be non-toxic after 30 days.

B. Air Entraining Admixtures:

1. Air entraining admixture shall conform to ASTM C260. Air content shall be tested at the point of placement.

2. The air-entraining agent shall be added to the batch in a portion of the mixing water. The solution shall be batched by means of a mechanical batcher capable of accurate measurement.

3. Sufficient air-entraining agent shall be used to provide a total air content of 3 percent. Concrete floors to receive a shake-on floor hardener shall have an air content not to exceed three (3) percent or as recommended by the hardener MANUFACTURER.

C. Set Controlling and Water Reducing Admixtures:

1. Admixtures may be added at the CONTRACTOR'S option, subject to the DISTRICT's approval, to control the set, effect water reduction, and increase workability. The cost of adding an admixture shall be the CONTRACTOR'S responsibility. Concrete containing an admixture shall be first placed at a location determined by the DISTRICT. Admixtures shall conform to the requirements of ASTM C494. The required quantity of cement shall be used in the mix regardless of whether or not an admixture is used.

2. The set retarding admixture may be either with or without water-reducing properties. Where the air temperature at the time of placement is expected to be consistently greater than 80

degrees F, a set retarding admixture shall be used. The set retarding admixture shall conform to ASTM C494 Type D unless accepted otherwise by the District.

3. Set accelerating admixture may be either with or without water-reducing properties. Where the air temperature at the time of placement is expected to be consistently less than 40 degrees F, a non-corrosive set accelerating admixture shall be used. Set accelerating admixture shall conform to ASTM C494 Type C or E.

4. Normal range water reducer shall conform to ASTM C494, Type A. The quantity of admixture used and the method of mixing shall be in accordance with the MANUFACTURER's instructions and recommendations.

5. High range water reducer shall conform to ASTM C494 Type F. High range water reducer shall be added to the concrete after all other ingredients have been mixed and initial slump has been verified. No more than fourteen (14) ounces of water reducer per sack of cement shall be used. Water reducer shall be considered as part of the mixing water when calculating the water/cement ratio.

   a. If the high range water reducer is added to the concrete at the Site, it may be used in conjunction with the same water reducer added at the batch plant. Concrete shall have a slump of three (3) inches plus or minus 1/2-inch prior to adding the high range water reducing admixture at the Site. The high range water reducing admixture shall be accurately measured and pressure injected into the mixer as a single dose by an experienced technician. A standby system shall be provided and tested prior to each day's operation of the primary system.

   b. Concrete shall be mixed at mixing speed for a minimum of 70 mixer revolutions or five (5) minutes after the addition of the high range water reducer, unless recommended otherwise by the MANUFACTURER.

2.06 CURING MATERIALS:

A. Curing compound shall conform to ASTM C309, Type I, Class B. The initial color of the curing compound shall be white, off white or pale yellow without the use of a pigment. The compound shall be resin based and compliant with local VOC requirements. When curing compound must be removed for finishes or grouting, it shall be of a dissipating type. Sodium silicate compounds shall not be allowed.

B. Polyethylene sheet for use as concrete curing blanket shall be white and shall have a nominal thickness of 6 mils. The loss of moisture when determined in accordance with the requirements of ASTM C156, shall not exceed 0.055 grams per square centimeter of surface.

C. Polyethylene-coated waterproof paper sheeting for use as concrete curing blanket shall consist of white polyethylene sheeting free of visible defects, uniform in appearance, have a minimum thickness of two (2) mils, and be permanently bonded to waterproof paper conforming to the requirements of Federal Specification UU-B-790A. The loss of moisture, when determined in accordance with the requirements of ASTM C156, shall not exceed 0.055 gram per square centimeter of surface.

D. Polyethylene-coated burlap for use as concrete curing blanket shall be minimum 4-mil thick, white opaque polyethylene film impregnated or extruded into one side of the burlap. Burlap shall weigh not less than 9 ounces per square yard. The loss of moisture, when determined in accordance with the requirements of ASTM C156, shall not exceed 0.055 grams per square centimeter of surface.

E. Curing mats for use in Curing Method 6 below, shall be heavy shag rugs or carpets or cotton mats quilted at 4-inches on center. Curing mats shall weigh a minimum of 12 ounces per square yard when dry.

2.07 MISCELLANEOUS MATERIALS:

A. Damp proofing agent shall be an asphalt emulsion conforming to ASTM D1227, Type III, Class 1.

B. Evaporation retardant shall create a monomolecular film on the concrete. The retardant shall have no effect on cement hydration and shall meet local VOC requirements. Evaporation retardant shall not affect adhesion of curing compounds or other treatments and shall not affect the color of the concrete.

C. Reinforcement shall be per SECTION 03200.

D. Water Stops shall be per SECTION 03100.

E. Damp proofing agent shall be a waterborne emulsified-asphalt. Damp proofing shall be suitable for "green" or slightly damp surfaces and shall withstand normal expansion and contraction of the concrete. Damp proofing agent shall breath to allow vapors to escape. Damp proofing agent shall meet local VOC requirements.

F. Bonding agents shall be 100% solids, epoxy adhesives conforming to the following:

1. For bonding freshly-mixed, plastic concrete to hardened concrete, bonding agent shall be a medium viscosity adhesive conforming to ASTM C881 Type II, Grade 2, Class C,

2. For bonding hardened concrete or masonry to steel, bonding agent shall be a non-sagging gel adhesive conforming to ASTM C881 Type I or IV, Grade 3, Class C.

G. Vapor Barrier:

1. Vapor Barrier shall consist of a composite of heavy kraft paper, asphalt, fiberglass reinforcement, and polyethylene film. The composite shall be laminated under heat and pressure.

2. Vapor Barrier shall comply with federal specification UU-B-790A, Type I, Grade A, Style 4. Vapor Barrier shall have a water vapor permeance of less than 0.30 perms when tested per ASTM E96.

3. Vapor Barrier shall be installed under concrete slabs of all habitable spaces. Barrier shall be installed per the MANUFACTURER recommendations and per ASTM E1643.

H. Non-Waterstop Joint Material:

1. Preformed Joint Material: Preformed asphalt-impregnated fiber conforming to ASTM D1751.

2. Bond Breaker: All bond breakers shall be roofing felt or 15 mils minimum dry film thickness of bituminous paint as indicated.

2.08 CONCRETE DESIGN REQUIREMENTS:

A. General: Concrete shall be composed of cement, admixtures, aggregates, and water of the qualities indicated. The exact proportions in which these materials are to be used for different parts of the WORK will be determined during the trial batch process. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage, and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface. The aggregate gradations shall be formulated to provide fresh concrete that will not promote rock pockets around reinforcing steel or embedded items. The proportions shall be changed whenever necessary or desirable to meet the required results. All changes shall be subject to review by the DISTRICT.

B. Fine Aggregate Composition:

1. In mix designs for structural concrete, the percentage of fine aggregate in total aggregate by weight shall be as indicated in the following table.

Fine Aggregate	
Fineness Modulus	**Maximum Percent**
2.7 or less	41
2.7 to 2.8	42
2.8 to 2.9	43
2.9 to 3.1	44

2. For other concrete, the maximum percentage of fine aggregate of total aggregate, by weight, shall not exceed 50.

C. Duct bank concrete shall contain an integral red-oxide coloring pigment. Concrete shall be dyed red throughout. Surface treatment to color duct banks will not be acceptable.

D. Water/Cement Ratio and Compressive Strength:

1. Water/cement ratio is given for aggregates in saturated-surface dry condition, and total moisture of all aggregates, calculated by ASTM C566, less the absorption of the aggregate as calculated by ASTM C127 and C128, shall represent total free moisture in the aggregate to determine the water/cement ratio. Total free moisture of aggregates shall be added to batch water to estimate water content of concrete. Concrete shall have the following minimum properties:

E. Concrete Proportions:

Type of Work	**Min 28-Day Compressive Strength (psi)**	**Maximum Size Aggregate (in)**	*** Cement Content per cubic yd (lbs)**	*** Maximum W/C Ratio (by weight)**
Pea Gravel Concrete				
Sitework concrete	3,000	1	470 (min)	0.50

* The cement content and water cement ratio are based on total cementitious material including silica fume, slag or flyash.

NOTE: The CONTRACTOR is cautioned that the limiting parameters above are not a mix design. Admixtures may be required to achieve workability required by the CONTRACTOR'S construction methods and aggregates. The CONTRACTOR is responsible for providing concrete with the required workability and strength.

F. Adjustments to Mix Design: The CONTRACTOR may elect to decrease the water/cement ratio to achieve the strength and shrinkage requirements and/or add water reducers, as required to achieve workability. The mixes shall be changed whenever such change is necessary or desirable to secure the required strength, density, workability, and surface finish, and the CONTRACTOR shall be entitled to no additional compensation because of such changes. Any changes to the accepted concrete mix design shall be submitted to the DISTRICT for review and shall be tested again in accordance with these Specifications.

G. When using a floor hardener, the water/cement ratio shall not be greater than specified by the hardener MANUFACTURER.

2.09 CONSISTENCY: The quantity of water in a batch of concrete shall be just sufficient, with a normal mixing period, to produce a concrete which can be worked properly into place without segregation and which can be compacted by vibratory methods to give the desired density, impermeability, and smoothness of surface. The quantity of water shall be changed as necessary, with variations in the nature or moisture content of the aggregates, to maintain uniform production of a desired consistency. The consistency of the concrete in

successive batches shall be determined by slump tests in accordance with ASTM C143. The slumps shall be as follows:

Part of Work	Slump (in)
All concrete, unless indicated otherwise	3-inches plus or minus 1-inch
With high range water reducer added	7-inches plus or minus 2-inches
Pea gravel mix	7-inches plus or minus 2-inches
Ductbank and pipe encasement	5-inches plus or minus 1-inch
Concrete with hardener	Per Hardener MANUFACTURER

2.10 MEASUREMENT:

A. The amount of cement and of each separate size of aggregate entering into each batch of concrete shall be determined by direct weighing equipment furnished by the CONTRACTOR and acceptable to the DISTRICT.

B. Weighing tolerances:

Material	Percent of Total Weight
Cement	1
Aggregates	3
Admixtures	3

C. The quantity of water entering the mixer shall be measured by a suitable water meter or other measuring device of a type acceptable to the DISTRICT and capable of measuring the water in variable amounts within a tolerance of one percent. The water feed control mechanism shall be capable of being locked in position so as to deliver constantly any required amount of water to each batch of concrete. A positive quick-acting valve shall be used for a cut-off in the water line to the mixer. The operating mechanism shall prevent leakage when the valves are closed.

PART 3 - EXECUTION

3.01 PROPORTIONING AND MIXING:

A. Proportioning of the mix shall conform to the requirements of Chapter 3 "Proportioning" of ACI 301.

B. Mixing shall conform to the requirements of Chapter 7 of ACI 301.

C. Slumps shall be as indicated herein.

D. Retempering of concrete or mortar that has partially hardened shall not be permitted.

3.02 PREPARATION OF SURFACES FOR CONCRETING:

A. General: Earth surfaces shall be thoroughly wetted by sprinkling prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

B. Vapor Barrier

1. Vapor Barrier shall be installed under on-grade building floor slabs of occupiable (non-hydraulic) structures and at other locations indicated.

2. Base shall be leveled, compacted, and tamped. Remove sharp edges, projection materials and roughness that might penetrate vapor barrier. Install barrier with width parallel with the direction of the pour of the concrete.

3. Place, protect, and repair defects in sheet according to ASTM E1643, and the MANUFACTURER's written instructions. Seams shall be lapped and sealed in accordance with ASTM E1643.

4. The CONTRACTOR shall exercise care to avoid puncturing or tearing the vapor barrier during installation. Patch punctures and tears as they occur.

C. Joints in Concrete:

1. All joints shall be installed where indicated on the Drawings or where otherwise approved by the DISTRICT. The surface of the construction joint shall be rough and prior to placement shall be cleaned and moistened with water.

2. Concrete surfaces upon or against which new concrete is to be placed, where the placement of the concrete has been stopped or interrupted so that, as determined by the DISTRICT, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be given a compacted, roughened surface for good bonding. Except where the Drawings call for joint surfaces to be coated, the joint surfaces shall be cleaned of all laitance, loose or defective concrete, foreign material, and be roughened to a minimum 1/4-inch amplitude. Such cleaning and roughening shall be accomplished by hydroblasting, sandblasting or chipping (exposing aggregate) followed by thorough washing. Pools of water shall be removed from the surface of construction joints before the new concrete is placed.

3. After the surfaces have been prepared, all approximately horizontal construction joints shall be covered with a 6-inch lift of a pea gravel mix. The mix shall be placed and spread uniformly. Wall concrete shall follow immediately and shall be placed upon the fresh pea gravel mix. If high range water reducer is used in the wall concrete, then the pea gravel joint topping does not need to be used.

D. Placing Interruptions: When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means that will secure proper union with subsequent work; provided that construction joints shall be made only where acceptable to the DISTRICT.

E. Embedded Items:

1. No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcement steel, and preparation of surfaces involved in the placing have been completed and accepted by the DISTRICT at least four (4) hours before placement of concrete. Surfaces of forms and embedded items that have become encrusted with dried grout from previous usage shall be cleaned before the surrounding or adjacent concrete is placed.

2. Inserts or other embedded items shall conform to the requirements herein.

3. Reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms at locations indicated on the Drawings or shown by Shop Drawings and shall be acceptable to the DISTRICT before any concrete is placed. Accuracy of placement is the responsibility of the CONTRACTOR.

F. Placing New Concrete Against Old: Where new concrete is to be placed against old concrete (any concrete which is greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by hydroblasting, sandblasting or chipping to expose aggregate. The joint surface shall be coated with an epoxy bonding agent unless indicated otherwise by the DISTRICT.

G. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the WORK. No concrete shall be deposited underwater nor shall the CONTRACTOR allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure

the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, shall be the CONTRACTOR's responsibility and shall be subject to the review of the DISTRICT.

H. Corrosion Protection: Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2-inches clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.

I. Openings for pipes, inserts for pipe hangers and brackets, and anchors shall, where practicable, be provided during the placing of concrete.

J. Anchor bolts shall be accurately set and shall be maintained in position by templates while being embedded in concrete.

K. Cleaning: The surfaces of metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

3.03 CONVEYING:

A. Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent separation or loss of material.

B. No aluminum materials shall be used in conveying any concrete.

C. Ends of chutes, hopper gates, and all other points of concrete discharge throughout the CONTRACTOR'S conveying, hoisting, and placing system shall be designed and arranged so that concrete passing from them will not fall separated into whatever receptacle immediately receives it. Conveyor belts, if used, shall be of a type acceptable to the DISTRICT. Chutes longer than 50 feet will not be permitted. Minimum slopes of chutes shall be such that concrete of the indicated consistency will readily flow in them. If a conveyor belt is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted. All conveyor belts and chutes shall be covered.

D. Pumping:

1. If the pumped concrete does not produce satisfactory end results, the CONTRACTOR shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

2. The pumping equipment shall have two (2) cylinders and be designed to operate with one cylinder in case the other one is not functioning. In lieu of this requirement, the CONTRACTOR may have a standby pump on the Site during pumping.

3. The minimum diameter of the hose conduits shall be in accordance with ACI 304.

4. Pumping equipment and hose conduits that are not functioning properly shall be replaced.

5. Aluminum conduits for conveying the concrete shall not be permitted.

6. Concrete samples for slump, air content, and test cylinders will be taken at the placement end of the hose.

3.04 DELIVERY:

A. Ready-mixed concrete shall be batched, mixed, transported and delivered in accordance with these specifications and ASTM C94 including the following supplementary requirements.

1. Concrete shall be discharged within 1-1/2 hours from the time concrete was mixed, if centrally mixed, or from the time the original water was added, if transit-mixed, or before the drum has been revolved 300 revolutions, whichever is first.

2. Truck mixers and their operation shall be such that the concrete throughout the mixed batch as discharged is within acceptable limits of uniformity with respect to consistency, mix, and grading. If slump tests taken at approximately the 1/4 and 3/4 points of the load during discharge give slumps differing by more than one-inch when the required slump is 3-inches or less, or if they differ by more than 2-inches when the required slump is more than 3-inches, the mixer shall not be used on the WORK unless the causative condition is corrected and satisfactory performance is verified by additional slump tests. Mechanical details of the mixer, such as water measuring and discharge apparatus, condition of the blades, speed of rotation, general mechanical condition of the unit, and clearance of the drum, shall be checked before a further attempt to use the unit will be permitted.

3. The use of non-agitating equipment for transporting ready-mixed concrete will not be permitted. The quality and quantity of materials used in ready-mixed concrete and in batch aggregates shall be subject to continuous inspection at the batching plant by the DISTRICT.

4. Each batch of concrete shall be mixed in a truck mixer for not less than 70 revolutions of the drum or blades at the rate of rotation designated by the MANUFACTURER of equipment. Additional mixing, if any, shall be at the speed designated by the MANUFACTURER of the equipment as agitating speed. All materials including mixing water shall be in the mixer drum before actuating the revolution counter for determining the number of revolution of mixing.

3.05 PLACING:

A. Non-Conforming Work or Materials: Concrete which during or before placing is found not to conform to the requirements indicated herein shall be rejected and immediately removed from the WORK. Concrete which is not placed in accordance with these Specifications, or which is of inferior quality, shall be removed and replaced.

B. Unauthorized Placement: No concrete shall be placed except in the presence of a duly authorized representative of the DISTRICT. The CONTRACTOR shall notify the DISTRICT in writing at least 24 hours in advance of placement of any concrete.

C. Concrete shall not be dropped more than four (4) feet without use of chutes or tremies. Concreting shall be a continuous operation until placement of the section is complete. All concrete shall be worked around reinforcement and embedded items. If vibrators are used, care shall be taken not to segregate concrete. Vibrators will not be allowed to move concrete within the form. All forms and subgrade shall be dampened prior to placement and excess water removed.

D. Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this SECTION.

E. Placement in Slabs: Concrete placed in sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement. As the WORK progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screeded in an up-slope direction.

F. Concrete shall not be dropped through reinforcement steel or into any deep form, nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such cases, means such as hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. Concrete shall be uniformly distributed during the process of depositing and in no case after depositing shall any portion be displaced in the forms more than 6-feet in horizontal direction. Concrete in wall forms shall be deposited in uniform horizontal layers not deeper than 2-feet; and care shall be taken to avoid inclined layers or inclined construction joints except where such are required for sloping members. Each layer shall be placed while the previous

layer is still soft. The rate of placing concrete in wall forms shall not exceed 5-feet of vertical rise per hour. Sufficient illumination shall be provided in the interior of all forms so that the concrete at the places of deposit is visible from the deck or runway.

G. Concrete with hardener shall be placed per the hardener MANUFACTURERs written recommendations.

H. Placing New Concrete Against Old: Epoxy adhesive bonding agent shall be applied to the old surfaces according to the MANUFACTURER's written recommendations. This provision shall not apply to joints where waterstop is provided, see SECTION 03100.

I. Temperature of Concrete: The temperature of concrete when it is being placed shall be not more than 90 degrees F or less than 55 degrees F for sections less than 12-inches thick, nor less than 50 degrees for all other sections. The CONTRACTOR shall be entitled to no additional compensation on account of the temperature requirements.

J. Concrete of structure slab shall be poured immediately on top of tremie concrete if tremie is selected for dewatering. No stone or any other materials shall be filled in between the tremie and the structure slab.

K. Hot Weather Placement

1. Placement of concrete in hot weather shall conform to ACI 305 and the following:

2. When the temperature of the concrete is 85 degrees F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 60 minutes.

3. If concrete is placed when the weather is such that the temperature of the concrete would exceed 90 degrees F, the CONTRACTOR shall employ effective means, such as pre-cooling of aggregates and mixing water using ice or placing at night, as necessary to maintain the temperature of the concrete below 90 degrees F as it is placed.

L. Cold Weather Placement

1. Placement of concrete in cold weather shall conform to ACI 306.1, and the following:

2. Concrete ingredients shall not be heated to a temperature higher than that necessary to keep the temperature of the mixed concrete, as placed, from falling below the minimum temperature.

3. Remove all ice and frost from the surfaces, including reinforcement, against which concrete is to be placed. Before beginning concrete placement, thaw the subgrade to a minimum depth of 6-inches. Reinforcement and embedded items shall be warmed to above 32 degrees F prior to concrete placement.

4. Maintain the concrete temperature above 50 degrees F for at least 72 hours after placement.

M. Order of Placing Concrete

1. The order of placing concrete in all parts of the WORK shall be acceptable to the DISTRICT. In order to minimize the effects of shrinkage, the concrete shall be placed in units as bounded by construction joints at the indicated locations. The placing of units shall be done by placing alternate units in a manner such that each unit placed shall have cured at least five (5) days for hydraulic structures and two (2) days for all other structures before the contiguous unit or units are placed, except that the corner sections of vertical walls shall not be placed until the two (2) adjacent wall panels have cured at least ten (10) days for hydraulic structures and 4 days for all other structures.

2. The surface of the concrete shall be level whenever a run of concrete is stopped. To insure a level, straight joint on the exposed surface of walls, a wood strip at least 3/4-inch thick shall be tacked to the forms on these surfaces. The concrete shall be carried about 1/2-inch above the underside of the strip. About one hour after the concrete is placed, the strip shall be removed

and any irregularities in the edge formed by the strip shall be leveled with a trowel and laitance shall be removed.

3.06 TAMPING AND VIBRATING:

A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted throughout the entire depth of the layer which is being consolidated, into a dense, homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete. Vibrators shall be Group 3 per ACI 309, high speed power vibrators (8,000 to 12,000 rpm) of an immersion type in sufficient number and with at least one standby unit as required. Group 2 vibrators may be used only at specific locations when accepted by the DISTRICT.

B. Care shall be used in placing concrete around waterstops. The concrete shall be carefully worked by rodding and vibrating to make sure that all air and rock pockets have been eliminated. Where flat-strip type waterstops are placed horizontally, the concrete shall be worked under the waterstops by hand, making sure that air and rock pockets have been eliminated. Concrete surrounding the waterstops shall be given additional vibration over and above that used for adjacent concrete placement to assure complete embedment of the waterstops in the concrete.

C. Concrete in walls shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the required results within 15 minutes after concrete of the prescribed consistency is placed in the forms. The vibrating head shall not contact the surfaces of the forms. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.07 CURING AND DAMPPROOFING: Concrete shall be cured for a minimum of five (5) days after placement in accordance with the methods indicated below for the different parts of the WORK.

Surface to be Cured or Dampproofed	Method
Unstripped forms	1
Wall sections with forms removed	6
Construction joints between footings and walls, and between floor slab and columns	2
Encasement and ductbank concrete and thrust blocks	3
All concrete surfaces not specifically indicated in this Paragraph	4
Floor slabs on grade in hydraulic structures	5
Slabs on grade to receive an adhered floor finish	6 (Omit curing compound)
Slabs not on grade	6

A. Method 1: Wooden forms shall be wetted immediately after concrete has been placed and shall be kept wet with water until removal. If steel forms are used the exposed concrete surfaces shall be kept continuously wet until the forms are removed. If forms are removed within 7 days of placing the concrete, curing shall be continued in accordance with Method 6 below.

B. Method 2: The surface shall be covered with burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed. No curing compound shall be applied to surfaces cured under Method 2.

C. Method 3: The surface shall be covered with moist earth not less than 4 hours or more than 24 hours after the concrete is placed. Earthwork operations that may damage the concrete shall not begin until at least 7 days after placement of concrete.

D. Method 4: The surface shall be sprayed with a liquid curing compound.

1. It shall be applied in accordance with the MANUFACTURER's printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film that will seal thoroughly.

2. Where the curing compound method is used, care shall be exercised to avoid damage to the seal during the 7-day curing period. If the seal is damaged or broken before the expiration of the curing period, the break shall be repaired immediately by the application of additional curing compound over the damaged portion.

3. Wherever curing compound has been applied by mistake to surfaces against which concrete subsequently is to be placed and to which it is to adhere, compound shall be entirely removed by wet sandblasting just prior to the placing of new concrete.

4. Curing compound shall be applied as soon as the concrete has hardened enough to prevent marring on unformed surfaces and within two (2) hours after removal of forms. Repairs to formed surfaces shall be made within the two (2) hour period; provided, however, that any such repairs which cannot be made within the said two (2) hour period shall be delayed until after the curing compound has been applied. When repairs are to be made to an area on which curing compound has been applied, the area involved shall first be wet-sandblasted to remove the curing compound.

5. At locations where concrete is placed adjacent to a panel which has been coated with curing compound, the panel shall have curing compound reapplied to an area within 6-feet of the joint and to any other location where the curing membrane has been disturbed.

6. Prior to final acceptance of the WORK, all visible traces of curing compound shall be removed from all surfaces in such a manner that does not damage the surface finish.

E. Method 5:

1. Until the concrete surface is covered with curing compound, the entire surface shall be kept damp by applying water using nozzles that atomize the flow so that the surface is not marred or washed. The concrete shall be given a coat of curing compound in accordance with Method 4 above. Not less than one hour or more than four (4) hours after the curing compound has been applied, the surface shall be wetted with water delivered through a fog nozzle, and concrete-curing blankets shall be placed on the slabs. The curing blankets shall be polyethylene sheet, polyethylene-coated waterproof paper sheeting, or polyethylene-coated burlap. The blankets shall be laid with the edges butted together and with the joints between strips sealed with 2-inch wide strips of sealing tape or with edges lapped not less than 3-inches and fastened together with a waterproof cement to form a continuous watertight joint.

2. The curing blankets shall be left in place during the seven (7) day curing period and shall not be removed until after concrete for adjacent work has been placed. If the curing blankets become torn or otherwise ineffective, the CONTRACTOR shall replace damaged sections. During the first three (3) days of the curing period, no traffic of any nature and no depositing, temporary or otherwise, of any materials shall be permitted on the curing blankets. During the remainder of the curing period, foot traffic and temporary depositing of materials that impose light pressure will be permitted only on top of plywood sheets 5/8-inch minimum thickness, laid over the curing blanket. The CONTRACTOR shall add water under the curing blanket as often as necessary to maintain damp concrete surfaces at all times.

F. Method 6: This method applies to both walls and slabs.

1. The concrete shall be kept continuously wet by the application of water for a minimum period of at least seven (7) consecutive days beginning immediately after the concrete has reached final set or forms have been removed.

2. Until the concrete surface is covered with the curing medium, the entire surface shall be kept damp by applying water using nozzles that atomize the flow so that the surface is not marred or washed.

3. Heavy curing mats shall be used as a curing medium to retain the moisture during the curing period. The curing medium shall be weighted or otherwise held substantially in contact with the concrete surface to prevent being dislodged by wind or any other causes. Edges shall be continuously held in place.

4. The curing blankets and concrete shall be kept continuously wet by the use of sprinklers or other means both during and after normal working hours.

5. Immediately after the application of water has terminated at the end of the curing period, the curing medium shall be removed, the entire concrete surface shall be wetted, and curing compound shall be immediately applied to the entire surface in accordance with Method 4 above.

6. The CONTRACTOR shall dispose of excess water from the curing operation to avoid damage to the WORK.

G. Damp proofing:

1. The exterior surfaces of backfilled dry well walls and buried roof slabs shall be damp proofed as follows.

2. Immediately after completion of curing the surface shall be sprayed with a damp proofing agent consisting of an asphalt emulsion. Application shall be in 2 coats. The first coat shall be diluted to one-half strength by the addition of water and shall be sprayed on so as to provide a maximum coverage rate of 100 square feet per gallon of dilute solution. The second coat shall consist of an application of the undiluted material and shall be sprayed on so as to provide a maximum coverage rate of 100 square feet per gallon. Damp proofing material shall be as indicated above.

3. As soon as the material has taken an initial set, the entire area thus coated shall be coated with whitewash. Any formula for mixing the whitewash may be used if it produces a uniformly coated white surface and remains until placing of the backfill. If the whitewash fails to remain on the surface until the backfill is placed, the CONTRACTOR shall apply additional whitewash.

3.08 CONCRETE FINISHES:

A. General: Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions indicated are defined as tolerances and are indicated herein. These tolerances are to be distinguished from irregularities in finish as described herein. Aluminum finishing tools shall not be used.

B. Formed Surfaces: No tr treatment is required after form removal except for curing, repair of defective concrete, and treatment of surface defects. Where architectural finish is required, it shall be as indicated.

C. Unformed Surfaces:

After proper and adequate vibration and tamping, unformed top surfaces of slabs, floors, walls, and curbs shall be brought to a uniform surface with suitable tools. Immediately after the concrete has been screeded, it shall be treated with a liquid evaporation retardant. The retardant shall be used again after each WORK operation as necessary to prevent drying shrinkage cracks. The classes of finish for unformed concrete surfaces are designated and defined as follows: Unformed Surface Finish Schedule	
Area	**Finish**

Grade slabs and foundations to be covered with concrete or fill material	U1
Floors to be covered with grouted tile or topping grout	U2
Water bearing slabs with slopes 10 percent and less	U3
Water bearing slabs with slopes greater than 10 percent	U4
Slabs not water bearing	**U4**
Slabs to be covered with built-up roofing	U2
Interior slabs and floors to receive architectural finish	U3
Top surface of walls subject to foot traffic	U4
Top surface of walls not subject to foot traffic	U3
Floors to receive surface hardener	U5

1. Finish U1 - Sufficient leveling and screeding to produce an even, uniform surface with surface irregularities not to exceed 3/8-inch. No further special finish is required.

2. Finish U2 - (Float Finish)

   a. Compact, accurately screed and float to a true uniform surface.

   b. Surfaces shall be floated with wood or metal floats or a finishing machine using float blades. Excessive floating of surfaces while the concrete is plastic and dusting of dry cement and sand on the concrete surface to absorb excess moisture will not be permitted.

   c. Floating shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Test surface with straightedge and eliminate high and low spots of more than 1/8-inch in ten (10) feet. Surface irregularities shall not exceed 1/4-inch.

   d. Joints and edges shall be tooled where indicated or as determined by the DISTRICT.

3. Finish U3 - (Hand-Troweled Finish)

   a. Finish surface as in Finish U2 - Float Finish and after the surface has hardened sufficiently to prevent excess of fine material from being drawn to the surface, trowel with steel trowel to obtain a smooth dense finish after concrete has hardened to ring under the trowel.

   b. The finish shall produce a smooth dense uniform surface free of all irregularities, blemishes, ripples, and trowel marks.

4. Finish U4 - (Nonskid Finish)

   a. Trowel the Finish U3 - Hand-trowel Finish surface to remove local depressions or high points. In addition, the surface shall be given a light broom finish with brooming perpendicular to drainage unless otherwise indicated.

   b. The resulting surface shall be rough enough to provide a nonskid finish.

5. Finish U5 - (Surface hardener)

   a. Immediately after screeding, shake on hardener shall be applied per the MANUFACTURER's written recommendations.

   b. Surface shall receive a minimum of two coats of a liquid hardener per the MANUFACTURER's written recommendations.

   c. CONTRACTOR shall notify hardener MANUFACTURER three (3) working days prior to hardened concrete floor being placed.

   d. Hardener MANUFACTURER shall provide continuous supervision of concrete and hardener placements, supplying DISTRICT with a report of each day's placement. Cost of supervision is to be borne by CONTRACTOR.

3.09 ARCHITECTURAL FINISH:

A. General: Architectural finishes shall be provided only where specifically indicated below. In all other locations, the paragraph entitled Concrete Finishes shall apply.

B. Immediately after the forms have been stripped, the concrete surface shall be inspected and any poor joints, voids, rock pockets, or other defective areas shall be repaired and form-tie holes filled as indicated herein.

C. Architectural finishes shall not be applied until the concrete surface has been repaired as required and the concrete has cured at least 14 days.

D. Architecturally treated concrete surfaces shall conform to the accepted sample in texture, color, and quality. It shall be the CONTRACTOR'S responsibility to maintain and protect the concrete finish.

3.10 PROTECTION:

A. The CONTRACTOR shall protect concrete against damage until final acceptance.

B. Fresh concrete shall be protected from damage due to rain, hail, sleet, or snow. The CONTRACTOR shall provide such protection while the concrete is still plastic and whenever precipitation is imminent or occurring.

3.11 DEFECTIVE SURFACE TREATMENTS:

A. Patching Concrete:

1. Patch all tie holes, honeycombs or other defects with a Portland Cement and sand grout.

2. Defective surfaces to be repaired shall be cut back from trueline a minimum depth of 1/2-inch over the entire area. Feathered edges will not be permitted. Where chipping or cutting tools are not required in order to deepen the area properly, the surface shall be prepared for bonding by the removal of all laitance or soft material, plus not less than 1/32-inch depth of the surface film from all hard portions by means of an efficient sandblast.

3. After cutting and sandblasting, the surface shall be wetted sufficiently in advance of shooting with shotcrete or with cement mortar so that while the repair material is being applied, the surfaces underneath will remain moist but not so wet as to overcome the suction upon which a good bond depends.

4. Holes left by tie-rod cones shall be reamed with suitable toothed reamers so as to leave the surfaces of the holes clean and rough. Holes then shall be repaired in an approved manner with dry-packed cement grout. Holes left by form-tying devices having a rectangular cross-section and other imperfections having a depth greater than their least surface dimension shall not be reamed but shall be repaired in an approved manner with dry-packed cement grout.

5. The grout shall not be richer than one (1) part cement and three (3) parts sand with the amount of mixing water enough to produce a workable mix. For exposed walls, the cement shall contain such a proportion of white Portland cement as is required to make the color of the patch match the color of the surrounding concrete. The patch shall be finished in such a manner as to match the adjoining surfaces.

6. Surfaces of repairs shall receive the same kind and amount of curing treatment as required for the concrete in the repaired section.

B. Defective Concrete:

1. Any concrete which is not formed as shown on the Drawings or does not conform to the Contract tolerances or shows defects which reduce its structural adequacy, shall be removed from the job by the CONTRACTOR at his expense unless the DISTRICT grants written permission to patch the defective area.

C. Exposed Concrete Surfaces:

1. As soon as forms are removed, exposed surfaces shall be carefully examined and all ridges, ribs and other imperfections shall be rubbed with an abrasive stone or ground in a satisfactory manner in order to secure a smooth, uniform and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted

2. No repairs shall be made until after inspection by the DISTRICT.

3. In no case will extensive patching of honeycombed concrete be permitted

4. Concrete containing minor voids, pinholes, honeycombing, or similar depression defects shall be repaired as indicated below.

5. Concrete containing extensive voids, holes, honeycombing, or similar depression defects shall be completely removed and replaced. Repairs and replacements shall be performed promptly.

3.12 REINFORCEMENT: Reinforcement shall be in accordance with SECTION 03200, of these Specifications. Concrete protection for the reinforcement shall conform to the requirements ACI 318, paragraph 7.7.1.

3.13 CONSTRUCTION TOLERANCES:

A. The CONTRACTOR shall set and maintain concrete forms and perform finishing operations to ensure that the completed WORK is within tolerances. Surface defects and irregularities are defined as finishes and are to be distinguished from tolerances. Tolerance is the permissible variation from lines, grades, or dimensions indicated on the Drawings. Where tolerances are not stated in the specifications, permissible deviations will be in accordance with ACI 117.

B. The following non-cumulative construction tolerances apply to finished walls and slab unless otherwise indicated:

Item	Tolerance
Variation of the constructed linear outline from the established position in plan.	In 10-feet: 1/4-inch; In 20-feet or more: 1/2-inch
Variation from the level or from the grades indicated.	In 10-feet: 1/4-inch; In 20-feet or more: 1/2-inch
Variation from plumb	In 10-feet: 1/4-inch; In 20-feet or more: 1/2-inch
Variation in the thickness of slabs and walls.	Minus 1/4-inch; Plus 1/2-inch
Variation in the locations and sizes of slabs and wall openings	Plus or minus 1/4-inch

3.14 CARE AND REPAIR OF CONCRETE: The CONTRACTOR shall protect concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed WORK, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with acceptable concrete.

END OF SECTION

SECTION 03700 CONCRETE RESTORATION

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work:

1. The CONTRACTOR shall provide all labor, materials and equipment to perform concrete restoration and repairs as indicated on the Drawings. The Work may include, but not be limited to repairing spalled areas, epoxy injection of cracks, replacement of expansion joint material and application of a protective concrete coating to the exterior flatwork.

2. All damage to concrete and concrete surfaces which results from the required removal of embedded items, from any construction activity required by the Contract Documents, from any other CONTRACTOR activities, or which existed previously in structures identified to be repaired by the Contract Documents shall be repaired as specified herein.

3. The following existing structure locations shall be repaired:

   The upstream bridge deck shall have spalled areas of concrete removed and repaired in accordance with the Drawings. All exterior expansion joint material shall be removed and replaced in accordance with the Drawings, no interior or roof top expansion material shall be addressed at this time. The upstream balcony cantilevered slab shall have cracks injected with epoxy and the topside of the slab shall have a protective coating applied. Both the upstream and downstream decks shall have a protective concrete coating applied in accordance with the Drawings.

4. Deteriorated / Delaminated Concrete:

   a. All of the concrete surfaces which show signs of deterioration / delamination shall be repaired on the upstream and downstream decks.

B. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals

2. SECTION 07921 Joint Sealants

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the standards of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. American Concrete Institute (ACI)

   a. 546R Guide to Concrete Repair

2. ASTM International (ASTM)

   a. C109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens)

   b. C157 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

   c. C881 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

   d. C882 Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear

3. American Welding Society (AWS)

   a. D1.4 Structural Welding Code - Reinforcing Steel

4. International Concrete Repair Institute (ICRI)

   a. 03730 Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting From Reinforcing Steel Corrosion

1.03 DEFINITIONS: (Not Applicable)

1.04 SUBMITTALS: The CONTRACTOR shall submit the following in accordance with SECTION 01300:

A. Materials specification sheets including product information and recommended placement procedures and material safety data sheets shall be submitted for all products used for this Project.

B. MANUFACTURER's warranty.

1.05 QUALIFICATIONS:

A. Applicators shall be licensed in the State of Florida for no less than five (5) years and shall be certified by the repair product MANUFACTURER.

B. A pre-installation meeting shall be held with applicator, material supplier and the DISTRICT prior to commencement of the Work.

C. If reinforcement steel is spliced by welding at any location, the CONTRACTOR shall submit certifications of procedure qualifications for each welding procedure and certification of welder qualifications, for each welding procedure, and for each welder performing the Work.

1.06 RESPONSIBILITIES: (Not Applicable)

1.07 CERTIFICATIONS AND TESTING:

A. Field Tests of Cement Based Grouts:

1. Compression test specimens will be taken during construction from the first placement of each type of mortar or grout and at intervals thereafter as selected by the DISTRICT to insure continued compliance with these specifications. The test specimens will be prepared by the DISTRICT or its representative.

2. Compression tests and fabrication of specimens for repair mortar and non-shrink grout will be performed as specified in ASTM C109. A set of three (3) specimens will be prepared for testing at seven (7) days, 28 days, and additional time periods as appropriate.

3. All material, already placed, which fails to meet the requirements of these specifications, is subject to removal and replacement at the cost of the CONTRACTOR.

4. The cost of all laboratory tests on mortar and grout will be borne by the DISTRICT, but the CONTRACTOR shall assist the DISTRICT in obtaining specimens for testing. The CONTRACTOR shall be charged for the cost of any additional tests and investigation on Work performed which does not meet the specifications. The CONTRACTOR shall supply all materials necessary for fabricating the test specimens.

5. A sample of the pumped and cured injection epoxy shall be made and kept for each day of epoxy injection pumping.

1.08 INSPECTION COORDINATION: (Not Applicable)

A. WARRANTY: The MANUFACTURER shall warrant the EQUIPMENT, MATERIALS and PRODUCTS specified in this SECTION against defective materials and workmanship with the

MANUFACTURER's standard warranty, but for no less than five (5) years from the date of Substantial Completion. If the MANUFACTURER's standard warranty is less than the stipulated period, the MANUFACTURER shall provide a special MANUFACTURER's extended warranty for the stipulated period, or provide a Maintenance Bond, to extend the MANUFACTURER's warranty period for the stipulated period.

B. The CONTRACTOR shall warranty the WORK against defects for one (1) year from the date of Substantial Completion

PART 2 - MATERIALS

2.01 DELIVERY AND STORAGE:

A. All MANUFACTURER's materials shall be delivered in original packaging.

B. Materials shall be stored in a covered, protected area away from moisture and damp surroundings.

2.02 CONCRETE MATERIALS:

A. Repair Mortar shall be a prepackaged cement-based product specifically formulated for the repair of surface defects Sikatop 122 extended with aggregate or approved equal. Where the basic repair material has different formulations for application conditions such as overhead and shotcrete type application, the formulation recommended by the MANUFACTURER for the specific application conditions shall be used. The minimum repair thickness shall be 2-inches. The repair mortar shall have the following properties:

Physical Property	Value	ASTM Standard
Compressive Strength (min)		C109
at 1 day	4000 psi	
at 28 days	6000 psi	
Shrinkage (max)	0.0 percent	C157
at 28 days drying		
Bond Strength (min)		C882
at 1 day	1500 psi	
at 7 days	2500 psi	

2.03 EXPANSION JOINT MATERIAL:

A. Backer rod shall consist of closed cell type. Expansion joint sealant shall be Sikadur Sika-flex 1A or approved equal.

2.04 EXPOSED CONCRETE COATING MATERIAL:

A. Cementitous protective coating used on horizontal exposed concrete surfaces shall be Master Builders Master Seal 581 or approved equal.

2.05 CONCRETE REFURBISHMENT:

A. Surface Preparation:

1. The entire area to be repaired shall be cleaned of all laitance and foreign material by chipping using lightweight demolition hammers, not to exceed 15 pounds in weight, and/or a heavy sandblasting. All removals are to be performed in accordance with ICRI guidelines. The surface shall be further roughened as specified herein. Where repair mortar is used, any additional surface preparation steps recommended by the MANUFACTURER or as shown on the Drawings shall be performed.

2. Where repair mortar is used, the MANUFACTURER recommends a wet or saturated surface dry SSD surface shall be provided. All standing water in areas to be repaired shall be removed prior to placement of repair material. Means to remove excess water from the structure shall be provided. Immediately prior to the placement of the repair mortar the receiving substrate shall receive a slurry mix of the repair mortar scrubbed into the substrate with a stiff bristle brush.

B. Care shall be taken to fully consolidate the repair material, completely filling all portions of the area to be filled. In accordance with MANUFACTURER installation recommendations, the repair mortar shall be extended with the proper aggregate based upon depth of placement.

C. The repair surface shall be brought into alignment with the adjacent existing surfaces to provide a uniform, even surface. The repair surface shall match adjacent existing surfaces in texture and shall receive any coatings or surface treatments which had been provided for the existing surface.

D. The CONTRACTOR shall halt WORK when weather conditions may detrimentally affect the quality of the repair. Follow MANUFACTURER's instructions for weather conditions and temperature ranges.

E. Curing:

1. Curing of repair mortar shall be in accordance with the MANUFACTURER's recommendations except that the minimum cure period shall be three (3) days.

F. All products are to be mixed following the specific guideline of each product.

G. All products are to be applied by following the specified data sheets of each particular product.

2.06 TREATMENT OF SURFACE DEFECTS:

A. Surface defects are depressions in a concrete surface which do not extend all the way through the member. The depressions can result from the removal of an embedded item, the removal of an intersecting concrete member, physical damage, unrepaired rock pockets created during original placement, or spalls from corroded reinforcing steel or other embeds.

B. Preparation:

1. All loose, damaged concrete shall be removed by chipping to sound material.

2. Where existing reinforcing bars are exposed, concrete shall be removed to a minimum of one (1) inch all around the bars. If the existing bars are cut through, cracked, or the cross sectional area is reduced by more than 25 percent, the DISTRICT shall be notified immediately.

3. The perimeter of the damaged area shall be score cut to a minimum depth of 0.5-inch and a maximum depth so as to not cut any existing reinforcing steel. Existing concrete shall be chipped up to the score line so that the minimum thickness of repair mortar is 0.5-inch.

C. Repair Material:

1. Repair of surface defects in members which are normally in contact with water or soil or in the interior surfaces of enclosed chambers which contain water shall be made only with repair mortar.

2.07 GENERAL CRACK REPAIR:

A. All cracks identified by the DISTRICT as caused by shrinkage shall be repaired with sealant as specified herein. At the CONTRACTOR's option, these cracks may be repaired with chemical grout as specified herein.

B. All cracks which are not caused by shrinkage shall be repaired as indicated by the DISTRICT.

2.08 EPOXY CRACK REPAIR:

A. Epoxy shall be injected into all cracks in the upstream damaged concrete cantilevered balcony slab as indicated by the DISTRICT. Installation instructions and recommendations by the epoxy MANUFACTURER shall be followed.

B. Cracks shall be injected with sufficient pressure to ensure full penetration of the epoxy but without causing further damage.

C. The location, drilling, and preparation of ports for injection shall be a maximum of 6” as required for epoxy injection.

D. Epoxy Injection:

1. The CONTRACTOR shall follow the instructions of the epoxy MANUFACTURER and their representatives for all mixing and injection procedures.

2. All cracks shall be sealed at the surface where needed to provide for complete penetration of the injected epoxy and to prevent loss of material.

3. Beginning at the lowest injection port, in the case of vertical or inclined cracks, inject the epoxy until it begins to flow from an adjacent or nearby port. Repeat the process until the crack is completely filled.

4. If port to port continuity does not occur, mark the location and notify the DISTRICT.

5. Avoid sudden application of high pressures during the injection process.

6. After completion of the injection operation, all ports and surface sealing materials shall be removed so as to leave an undamaged surface.

END OF SECTION

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SECTION 05060 STEEL WELDING

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The CONTRACTOR shall provide all labor, equipment, and materials for all shop and field steel welding as required by the Drawings and Specifications. Welding shall be in accordance with AISC 360 and as specified below.

B. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals
2. SECTION 05100 Structural Steel and Miscellaneous Metals

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the publications of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. American Institute of Steel Construction (AISC) – www.aisc.org/publications/steel-standards
   a. 303 Code of Standard Practice for Steel Buildings and Bridges
   b. 360 Specification for Structural Steel Buildings
   c. Steel Construction Manual
2. American Welding Society (AWS) – www.aws.org/store/page/bookstore-free-downloads
   a. A2.4 Standard Symbols for Welding, Brazing and Nondestructive Examination
   b. B5.1 Specification for the Qualification of Welding Inspectors
   c. D1.1 Structural Welding Code–Steel
3. ASTM International (ASTM)
   a. A380 Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
   b. A967 Standard Specification for Chemical Passivation Treatments for Stainless Steel Parts

B. Structural steel welding shall be in accordance with the AISC publications listed above for the applicable steel alloys. Other steel welding shall be in accordance with the applicable AWS publications listed above. Structural steel shall be as defined in SECTION 05100.

1.03 SUBMITTALS:

A. Submittals shall be in accordance with SECTION 01300.

B. The CONTRACTOR shall submit:

1. Shop Drawings shall include all shop and erection details, including welds. All welds, both shop and field, shall be indicated by standard welding symbols as noted by AWS A2.4 with the size, length and type of each weld included. Continuous fillet welds shall be shown and match the locations indicated on the Drawings.
2. The product data for proposed welding electrodes and filler metals shall include the filler metal classification strength.

3. Welding procedure specifications and procedure qualification records shall be submitted for welds that are not prequalified.

4. Welding personnel qualification records shall be submitted for all personnel performing shop or field welds. The qualification testing record shall include the name of the welder, name of the testing facility or other certifier, tested processes and positions, date of the testing and the results of the testing for each welder.

5. Continuity records shall be submitted for each welder and welding operator having a qualification record older than six months.

6. Documentation for the shop and erection quality control inspector qualification shall state the inspector has the training and experience required by AISC 360 and this specification. The documentation shall also include the name of the inspector's employer.

1.04 WELDING PERSONNEL AND INSPECTOR QUALIFICATIONS:

A. All welding personnel, including tack welders, shall be qualified in accordance with the AWS publications listed above. Qualification documentation shall be in accordance with one of the two below options.

1. The qualification test record shall be from a testing facility listed on the AWS Accredited Test Facilities Listing located at www.aws.org/certification.

2. The qualification test record shall have all of the applicable information indicated on the AWS supplied forms located at go.aws.org/d1forms.

B. The test record for welders and welding operators showing a successful result for all applicable welding positions shall be no more than six (6) months old, or continuity records shall show no gap exceeding six (6) months without performing the applicable welding process.

C. All welders employed in the shop on the fabrication of the steel work shall be qualified for the most difficult welding position during shop fabrication.

D. All welders employed in the field on the erection of the steel work shall be qualified for the most difficult welding position during field erection.

E. The CONTRACTOR shall require any welder to retake the test, when, in the opinion of the DISTRICT, the Work of the welder creates reasonable doubt as to the proficiency of the welder. Recertification of the welder shall be made to the DISTRICT only after the welder has taken and passed the specified test. The DISTRICT may require radiographic or ultrasonic testing or may require coupons to be cut from any location in any joint for testing.

F. Should any two radiographic or ultrasonic tests or coupons cut from the work of any welder show strengths, under tests, less than that of the base metal, it will be considered evidence of negligence or incompetence and such welder shall be removed from the Work.

G. When coupons are removed from any part of a structure, the members cut shall be repaired, at no additional cost to the DISTRICT, in a neat and workmanlike manner with joints of type to develop the full strength of the members and joints cut, with peening to relieve residual stress. All sections of welds found defective shall be chipped or cut out to base metal and rewelded before proceeding with the Work.

H. Inspections by quality control inspectors shall be implemented by the fabricator or erector, as applicable. Quality control inspectors shall meet the qualification requirements of AISC 360 and this specification. Quality control inspectors shall be associate welding inspectors, welding inspectors, or senior welding inspectors as defined in AWS B5.1.

1.05 INSPECTIONS AND TESTING:

A. Inspection tasks shall be in accordance with AISC 360 as indicated below and the applicable AWS publications listed above. The DISTRICT will waive the required quality assurance inspections of welds

performed in the fabrication shop as specified in SECTION 05100. The CONTRACTOR shall be responsible for providing advanced notification for quality assurance inspections as specified in SECTION 05100.

B. Inspection tasks prior to welding:

1. Welder qualification records and continuity records
2. WPS available
3. Manufacturer certifications for welding consumables available
4. Material identification
5. Welder identification system
6. Connecting elements size, thickness, and section types, as applicable
7. Fit-up of groove welds, as applicable, including joint geometry, including joint preparation, dimensions, cleanliness, tack welds, and backing type and fit
8. Fit-up of CJP groove welds of HSS T-, Y- and K-joints without backing, as applicable, including joint geometry, joint preparation, dimensions, cleanliness, and tack welds
9. Configuration and finish of access holes, as applicable
10. Fit-up of fillet welds, including dimensions, cleanliness, and tack welds
11. Welding equipment

C. Inspection tasks during welding:

1. Control and handling of welding consumables, including packaging and exposure control
2. No welding over cracked tack welds
3. Environmental conditions, including wind speed within limits, rain and temperature
4. WPS followed, including equipment settings, travel speed, welding materials, shielding gas type and flow, preheat, interpass temperature, and proper position
5. Welding techniques, including interpass and final cleaning, profile limits, and quality
6. Placement and installation of steel headed stud anchors

D. Inspection tasks after welding:

1. Welds cleaned
2. Size, length and location of welds
3. Welds meet visual acceptance criteria, including no cracks, fusion, crater section, profile, size, undercut, and porosity
4. Arc strikes
5. Web k-area crack prohibition
6. Weld access holes in rolled heavy shapes and built-up heavy shapes, as applicable
7. Backing removed and weld tabs removed where required
8. Repair activities
9. No prohibited welds have been added
10. Document acceptance or rejection of welded joint and connecting elements

E. All shop and field welds shall be tested in accordance with AISC 360 where indicated below and as specified. The quality assurance inspector shall review all test results. All testing documentation shall be

submitted to the DISTRICT. The DISTRICT will waive the required shop quality assurance testing indicated below as specified in SECTION 05100. The required shop quality control tests shall not be waived, and the results shall be reviewed by the quality assurance inspector.

F. Nondestructive testing personnel shall be qualified for Level II and the qualification shall conform to the American Society for Nondestructive Testing Recommended Practice SNT-TC-1A or as specified in AISC 360, as applicable. The testing service provider may optionally be listed on www.asnt.org.

1.06 WARRANTY: The CONTRACTOR shall warrant the Work against defects for one (1) year from the date of Substantial Completion and as described in Article 13 of Section 00700 - General Terms and Conditions.

PART 2 - MATERIALS

2.01 WELD METAL: The chemical and mechanical properties of all deposited weld metal shall be compatible with the base metal and conform to AWS specifications for applicable electrodes. Use only filler metal and base metal combinations that may be used in a prequalified welding procedure specification unless accepted otherwise by the DISTRICT. The minimum listed tensile strength of the filler metal used to weld the structural steel shape materials listed in Section 05100 shall be 70 ksi.

2.02 BASE METAL:

A. The parent steel shall be a weldable grade with the chemical and mechanical properties to produce a sound and serviceable welded joint.

B. Stainless steel shall meet the requirements of Type 304L or Type 316L as specified in AWS D1.6 unless accepted otherwise by the DISTRICT. The stainless steel type shall match the type specified for the component base metal or as shown on the Drawings.

2.03 FABRICATION:

A. Welded joint surfaces shall be clean, bright metal.

B. Welded connections will be permitted only where indicated on the Drawings unless accepted otherwise by the DISTRICT.

C. Weld access holes shall be in accordance with AISC, including the following:

1. All access holes shall be detailed in the Shop Drawings, and the size shall provide room for weld backing where needed.

2. The access hole height shall not be less than the thickness of the material in which the hole is through, and the height shall not be less than 3/4-inch.

3. The arcs forming the hole shall have a radius not less than 3/8-inch.

4. Weld access holes shall not be filled with weld metal unless indicated otherwise.

D. Prequalified welds shall be in accordance with the applicable AWS publication listed above, including all figures in AWS D1.1 Clauses 3 and 9 as partially reprinted in AISC Steel Construction Manual Part 8, as applicable. Fillet welds not meeting the indicated geometrical constraints shall be unacceptable. Complete joint penetration welds without the indicated root opening or backing shall be unacceptable. Flare-bevel groove welds with a root opening or without the indicated root face length shall be unacceptable. Prequalified welding procedure specifications shall be available to be submitted to the DISTRICT if requested.

E. Welds that are not prequalified, shall be qualified with the testing and procedures specified in the applicable AWS publication listed above. The welding procedure specification and procedure qualification records shall contain a notation that they have been reviewed by an AWS certified welding inspector, and they shall be signed, dated and stamped accordingly.

F. No preheat shall be used when welding stainless steel except as specified in AWS D1.6. Stainless steel welds shall be treated to restore corrosion resistance in the affected areas in accordance with ASTM A380. Stainless steel fabrications and welds shall be passivated after all welding is complete to remove surface iron and contamination in accordance with ASTM A967.

PART 3 - EXECUTION

3.01 WELDING METHODS: Unless otherwise approved by the DISTRICT, welding of steel shall be by an electric arc welding process and shall conform to the AISC and AWS publications listed above except where indicated otherwise.

3.02 WELDING EQUIPMENT: Welding equipment shall be capable of providing the welding required by the Drawings and Specifications herein in accordance with the requirements of joint qualifications in the applicable AWS publication listed above.

3.03 WELDING ELECTRODES:

A. Electrodes and flux used for submerged arc welding shall be of the same manufacture. The flux shall be free of contamination from dirt, mill scale and foreign material. Fused flux used in welding shall not be reused. Bare electrodes and flux used in combination shall conform to the requirements of the applicable AWS publication listed above.

B. Electrodes for manual shielded metal-arc welding shall conform to the applicable AWS publication listed above.

3.04 QUALIFIED WELDS: Only qualified welded joints shall be permitted in accordance with the AWS and AISC publications listed above.

3.05 REPAIR:

A. The repair of defective welds, including welds repaired by removing weld metal and rewelding, shall be performed only where accepted by the DISTRICT.

B. The removal of weld metal shall be performed in accordance with the applicable AWS publication listed above. Oxygen gouging shall not be acceptable except on as-rolled steels with no heat treatment after rolling.

3.06 PAINTING:

A. After cleaning and connections are approved, all surfaces within two (2) inches of a location to be field welded and painted shall be given a shop coat of primer that will not affect weld quality. After erection, all field connections shall be cleaned, and damaged coatings shall be repaired.

B. For components to be painted, all connections, including welds, and all abraded surfaces on the shop primer shall be painted to give one complete primer coat. Paint for field touch-up shall be the same paint used for the shop coat.

END OF SECTION

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SECTION 05100 STRUCTURAL STEEL AND MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The Work of this SECTION shall consist of furnishing all the labor, materials, and equipment necessary for installation of structural steel and miscellaneous metals as shown on the Drawings and as specified herein.

B. The requirements in this SECTION refer to structural steel and other metals as indicated. Structural steel shall be as defined in AISC 303 except that any component of a structure, including catwalks and platforms, exposed to wind or water loading constructed using standard structural shapes shall also be considered structural steel. Standard structural shapes shall be as defined in AISC 303.

C. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals
2. SECTION 05060 Steel Welding
3. SECTION 09900 Protective Coatings

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the standards of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. American Institute of Steel Construction (AISC) – www.aisc.org/publications/steel-standards
   a. 303 Code of Standard Practice for Steel Buildings and Bridges
   b. 360 Specification for Structural Steel Buildings
   c. Steel Construction Manual
2. ASTM International (ASTM) Standard Specifications
   a. A27 Steel Castings, Carbon, for General Application
   b. A36 Carbon Structural Steel
   c. A47 Ferritic Malleable Iron Castings
   d. A48 Gray Iron Castings
   e. A53 Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless
   f. A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
   g. A148 Steel Castings, High Strength, for Structural Purposes
   h. A240 Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
   i. A276 Stainless Steel Bars and Shapes
   j. A500 Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
   k. A536 Ductile Iron Castings

l. A514 High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding

m. A554 Welded Stainless Steel Mechanical Tubing

n. A572 High-Strength Low-Alloy Columbium-Vanadium Structural Steel

o. A653 Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

p. A668 Steel Forgings, Carbon and Alloy, for General Industrial Use

q. A743 Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application

r. A992 Structural Steel Shapes

3. ASTM Standard Practices and Guides

a. A143 Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement

b. A380 Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems

c. A385 Providing High-Quality Zinc Coatings (Hot-Dip)

d. A780 Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

e. E94 Radiographic Examination Using Industrial Radiographic Film

f. E446 Radiographs for Steel Castings Up to 2 Inches in Thickness

4. Florida Building Commission, Florida Building Code: Building (FBC) – https://floridabuilding.org

5. Florida Department of Transportation Standard Specifications for Road and Bridge Construction (FDOT) – www.fdot.gov

6. Master Painters Institute (MPI): MPI 79 – Alkyd Anti-Corrosive Metal Primers

7. Research Council on Structural Connections, Specification for Structural Joints Using High Strength Bolts (RCSC) – www.aisc.org/publications/steel-standards

8. The Society for Protective Coatings (SSPC)

a. PA 1 Shop, Field, and Maintenance Painting of Steel

b. SP 6 Commercial Blast Cleaning

B. Unless otherwise indicated on the Drawings or specified herein, AISC 303 and AISC 360 shall govern structural steel Work.

1.03 SUBMITTALS:

A. Submittals shall be in accordance with SECTION 01300.

B. The CONTRACTOR shall submit:

1. Erection bracing drawings

2. AISC fabrication plant certification or fabricator’s quality control manual

3. Shop and erection quality control inspector qualifications

4. Color selections as applicable

5. Non-shrink grout product information from the MANUFACTURER

6. Name and address of galvanizing facility if galvanizing is indicated on the Drawings

7. Certification from galvanizing facility indicating conformance with indicated ASTM specifications if galvanizing is indicated on the Drawings

8. Galvanizing repair product information from the MANUFACTURER if galvanizing is indicated on the Drawings

9. Charpy V-notch impact test results for heavy shapes with a flange thickness exceeding two (2) inches where indicated on the Drawings.

10. Shop primer product information from MANUFACTURER for components that will be coated as applicable.

11. Coating class test report for slip-critical joint faying surfaces when using a product that is not prequalified as applicable

12. Radiographic inspection results for steel castings as applicable

C. The dimensioned Drawings are provided to convey the quantity and complexity of the components to be fabricated. The CONTRACTOR shall be responsible for proper checking and coordination of dimensions, details, member sizes and fit-up, and quantities of materials as required to facilitate the preparation of Shop Drawings that are complete and accurate. All details, notes and schedules appearing on the Drawings and giving information for fabrication or erection shall also be shown on the shop or erection drawings with dimensions either verified or with proposed dimensions needed for accurate fit-up of all components. Shop Drawings shall include all required member sizes, member shapes, member lengths, connections, cuts, copes and holes for all shop fabricated metal items.

D. The erection bracing drawings shall include the sequence of erection with all temporary staying and bracing.

E. The DISTRICT will waive the requirement for quality assurance inspections in the fabrication shop by an inspector appointed by the DISTRICT if valid AISC fabricator certification is submitted. This waiver shall not eliminate any required quality control inspection or test. The DISTRICT's quality assurance inspection waiver shall not relieve the CONTRACTOR's responsibility to meet all inspection requirements of other permit providers and authorities having jurisdiction.

F. No waiver for the inspection of the erected steel by the quality assurance inspector shall be permissible.

1.04 SUBSTITUTIONS OF SECTIONS:

A. Substitution of sections or modification of details, or both, and the reasons therefore, shall be submitted with the Shop Drawings for approval.

B. Approved substitutions, modifications, and changes in related portions of the Work shall be coordinated by the CONTRACTOR and shall be accomplished at no additional cost to the DISTRICT.

1.05 RESPONSIBILITY FOR ERRORS:

A. The CONTRACTOR shall be responsible for all errors of detailing, fabrication, and for correct fitting measurements in the field to verify or supplement dimensions shown on the Drawings and shall assume responsibility for fitting new Work to existing work.

B. The acceptance of Shop Drawings shall not relieve the CONTRACTOR of the responsibility for either the accuracy of the detailed dimensions in the Shop Drawings or the general fit-up of parts that are to be assembled in the field.

1.06 TEMPLATES:

A. Templates necessary for proper positioning shall be furnished by the fabricator, together with instructions for the setting of anchors, anchor bolts and bearing plates.

B. The CONTRACTOR shall ascertain that the items are set during the progress of the Work.

1.07 QUALIFICATION:

A. Fabrication shop and erection personnel shall have fabricated and erected projects of similar size and complexity for at least five (5) years.

B. Fabrication must be completed in a Category AISC certified fabrication plant except as specified otherwise.

1.08 INSPECTION AND TESTING:

A. Inspections by the quality control inspector shall be implemented by the fabricator or erector, as applicable. All inspections by the quality control inspector shall be paid for by the CONTRACTOR.

B. All Work shall be subject to quality assurance inspections by an inspector paid for by the District.

C. Reports of shop and field inspections and testing shall be made by the quality control inspector on a weekly basis and submitted directly to the DISTRICT, CONTRACTOR, fabricator and erector.

D. The quality control inspector shall perform all inspections required by AISC 360 and as specified in the Contract Documents, and reports shall be submitted by the inspector to the parties listed above for all inspections. Coordinate with the quality assurance inspector for all required inspections. The CONTRACTOR shall not request a substantial completion inspection until the quality assurance inspector provides notice to the DISTRICT that all steel framing has been installed in accordance with the Contract Documents.

E. Qualification documentation for the quality control inspector shall state the inspector has the training and experience required by AISC 360 with four (4) years minimum related experience.

1.09 WARRANTY: The CONTRACTOR shall warrant the Work against defects for one (1) year from the date of Substantial Completion and as described in Article 13 of Section 00700 - General Terms and Conditions.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR ALL METALS:

A. All metal items shall be of domestic manufacture, within trade tolerances, new, undamaged, without splices, and of the best commercial quality for the intended purposes unless accepted otherwise by the DISTRICT.

B. Provide handling and transportation methods that prevents damage and facilitates subsequent inspections in a safe manner.

C. All metal items, plain or fabricated, shall be stored above the ground upon platforms, skids or supports. Material shall be kept free of dirt, grease and foreign matter and shall be protected from corrosion.

D. Like items of material provided shall be the end products of one MANUFACTURER in order to achieve standardization for appearance, maintenance, and replacement.

E. Provide the material types where specified on the Drawings.

F. The use of a MANUFACTURER's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired only. Products of other MANUFACTURERS will be considered in accordance with the General Terms and Conditions.

G. Dress exposed edges and ends of fabricated metal smooth, with no sharp edges and with corners slightly rounded.

H. Provide clips, lugs, brackets, straps, plates, bolts, nuts, washers, and similar items, as required for fabrication and erection.

I. Provide holes required for the connection of adjacent or adjoining work wherever noted on the Drawings. Locate holes for bolting to supports to a tolerance of +1/16-inch of exact dimensions indicated on the Drawings.

J. Individual equipment and/or each field disassembling part over 100 pounds in weight shall be provided with proper lifting lugs for easy handling.

2.02 STRUCTURAL STEEL SHAPES AND PLATES:

A. Refer to the Drawings for the size, section, and location of all structural steel components.

B. The materials for structural shapes and plates shall conform to the following ASTM specifications:

1. W shapes – A992, 50 ksi minimum yield stress
2. M shapes – A36, 36 ksi minimum yield stress
3. S shapes – A36, 36 ksi minimum yield stress
4. HP shapes – A572, 50 ksi minimum yield stress
5. C shapes – A36, 36 ksi minimum yield stress
6. MC shapes – A36, 36 ksi minimum yield stress
7. L shapes – A36, 36 ksi minimum yield stress
8. Rectangular HSS shapes – A500, Grade C, welded or seamless, 50 ksi minimum yield stress
9. Round HSS shapes – A500, Grade C, welded or seamless, 46 ksi minimum yield stress
10. Pipe shapes – A53, Grade B, Type E or S, 35 ksi minimum yield stress
11. Plates and bars up to 8 inches thick – A36, 36 ksi minimum yield stress
12. Plates and bars greater than 8 eight inches thick – A36, 32 ksi minimum yield stress
13. High strength plates up to 2.5 inches thick – A514, 100 ksi minimum yield stress
14. High strength plates greater than 2.5 inches thick – A514, 90 ksi minimum yield stress

C. Bent plates shall be bent cold unless hot bending is accepted by the DISTRICT for a specific application. ASTM A36 plates shall have a minimum cold inside bending radius of 1.5 times the plate thickness for up to a two-inch plate thickness when the bend line is perpendicular to the direction of final rolling. ASTM A36 plates shall have a minimum cold inside bending radius of 2.25 times the plate thickness for up to a two (2) inch plate thickness when the bend line is parallel to the direction of final rolling. Cold bending radii shall be in accordance with Part 10 of the AISC Steel Construction Manual.

D. Rolled and built-up heavy shapes with a flange thickness exceeding two (2) inches shall have a minimum average Charpy V-notch impact submitted test value of 20 ft-lb absorbed energy where required and as specified by AISC 360.

E. Dimensional tolerances for member depth, width, length, out of square, camber and sweep shall be in accordance with Chapter 6 of the AISC Code of Standard Practice for Steel Buildings and Bridges. When using heat to correct straightness, the temperature of heated areas shall not exceed 1,100°F for ASTM A514 steel nor 1,200°F for other steels. Non-straight or damaged steel shall not be straightened and shall be rejected unless accepted otherwise by the DISTRICT.

2.03 MISCELLANEOUS METALS:

A. Provide grey cast iron gratings in accordance with ASTM A48 Class 40.

B. Provide grey cast iron components other than gratings where shown on the Drawings in accordance with ASTM A48 Class 30.

C. Provide ductile iron castings in accordance with ASTM A536, Grade 60-40-18 unless indicated otherwise.

D. Provide malleable iron castings in accordance with ASTM A47, Grade 35018 unless indicated otherwise.

E. The materials for stainless steel components shall conform to the following ASTM specifications:

1. Bars and shapes – A276 Type 304L, 25 ksi minimum yield stress, annealed, hot or cold finished
2. Hollow tubing – A554 Type 304L, 25 ksi minimum yield stress, annealed, cold reduced
3. Plates – A240 Type 304L, 25 ksi minimum yield stress, annealed, hot or cold rolled
4. Strips – A240 Type 304L, 25 ksi minimum yield stress, annealed, cold rolled
5. Sheets – A240 Type 304L, 25 ksi minimum yield stress, annealed, cold rolled, polished finish unless indicated otherwise
6. Pipes – A312 Type 304L, 25 ksi minimum yield stress, annealed, seamless

F. Dual certified 304/304L and 316/316L stainless steel may be substituted for the applicable indicated stainless steel type.

G. Stainless steel components shall be descaled and passivated to remove exogenous iron and iron compounds from exposed surfaces in accordance with ASTM A380.

H. Corner guards and other shapes to be embedded in concrete shall be Type 304L stainless steel unless indicated otherwise on the Drawings. At corners, miter, weld and grind smooth where applicable. Follow basic material requirements.

I. Square mesh wire cloth shall be Type 304 stainless steel. The size shall be 1/2-inch expanded mesh with 16-gauge wire and 70 percent open area. Bond edges of wire cloth with rolled Type 304 stainless steel, 24-gauge band.

J. Steel forgings shall meet the requirements of ASTM A668, Class F with a carbon content not exceeding 0.35 percent. Steel-forged clevises shall be tapped oversized as appropriate where hot-dip galvanized rods are used.

K. Steel castings shall be provided where shown on the Drawings in accordance with ASTM A27, Grade N-2, Class 2.

L. High strength steel castings shall be provided where shown on the Drawings in accordance with ASTM A148, Grade 60, with full annealing.

M. Steel castings shall be corrosion resistant iron-chromium or iron-chromium-nickel that conform to the requirements of ASTM A743. Unless otherwise specified, all castings are to be Grade CA 15M.

N. Radiographic inspection of steel castings shall be performed at the casting plant as designated on the Drawings or as described in the section of these specifications covering the particular item of work. The procedure for making, evaluating and reporting the radiographic inspection must conform to the requirements of ASTM E94. The castings will be unacceptable if shown to have defects of greater severity than as indicated in the applicable referenced standards as illustrated in ASTM E446.

2.04 CONNECTIONS:

A. All connections shall be as indicated on the Drawings and as specified. Shop welded connections may be used in lieu of bolted connections only where accepted by the DISTRICT.

B. Holes shall be cut, drilled or punched at right angles to the surface of the metal and shall not be made or enlarged by burning. Holes in base or bearing plates shall be drilled. Holes shall be clean-cut without torn or ragged edges. Outside burrs resulting from drilling or reaming operation shall be removed.

C. Permanent bracing, openings in the steel for other trades, connections to existing construction, and all other special details shall be as indicated on the Drawings. Development of the Shop Drawings for connections and members shall account for all special details indicated. The CONTRACTOR shall be responsible for verifying all necessary field measurements.

D. Bolts shall be tightened to the snug-tight condition unless indicated otherwise on the Drawings.

2.05 GALVANIZING:

A. Where galvanizing is indicated, hot-dip galvanize the iron and steel products made from rolled, pressed and forged shapes, castings, plates, bars, and strips in accordance with ASTM A123 except where specified otherwise. All roll-formed steel 0.074 inches (14 gauge) and thicker shall be galvanized in accordance with ASTM A123. Sheet steel which will not have exterior exposure or will receive an additional protective coating, will not be subject to abrasion, and is manufactured on a continuous hot-dip coating line may be galvanized before fabrication in conformance with the requirements of ASTM A653, coating designation G210 minimum.

B. Galvanizing will not be required for stainless steel, monel metal, and similar corrosion-resistant parts.

C. The galvanizing facility shall be listed on the Production Facility Listing located at mac.fdot.gov/smoreports as specified in FDOT Section 962, or the facility shall be a member of the American Galvanizers Association as indicated at www.galvanizeit.org.

D. The minimum average coating thickness for individual specimens shall be Grade 100 for structural shapes, plates, strips and bars having a thickness of 0.25 inch or greater. The minimum average coating thickness for individual specimens shall be Grade 75 for pipes and tubes having a wall thickness of 0.25 inch or greater. The minimum average coating thickness for individual specimens shall be Grade 80 for wire having a diameter of 0.25 inch or greater. Products with a thickness less than 0.25 inch shall have a minimum coating thickness grade as specified in ASTM A123.

E. Galvanize frames after all shop welding is complete when possible. Galvanizing prior to the completion of all shop welding shall be performed only with DISTRICT approval.

F. Galvanize components of bolted assemblies separately before assembly.

G. Galvanizing of tapped holes will not be required, except as indicated otherwise, where fasteners will be installed through the full depth of the hole and where fasteners will be installed in holes that do not fully penetrate the steel component.

H. All welded areas shall be thoroughly cleaned prior to galvanizing to remove all slag or other material that would interfere with the adherence of the zinc. When it is necessary to straighten any sections after galvanizing, such Work shall be performed without damage to the zinc coating.

I. Galvanizing touch-up:

1. Field welded, cut, abraded or blemished areas of all galvanized steel components shall receive a zinc-based coating in accordance with ASTM A780. Repair procedures shall be in strict accordance with the MANUFACTURER's instructions.

2. All damaged galvanized coatings shall be repaired using a zinc-tin-copper solder except where surfaces are sensitive to high heat or otherwise not applicable or accessible with solder equipment. The solder product shall be Galvanite by Kapp Alloy & Wire, Incorporated or a DISTRICT approved equivalent product. Apply the product in accordance with the MANUFACTURER's instructions and the following procedures:

a. Mechanically clean the surface to be reconditioned using a wire brush or a light grinding action. To ensure a smooth reconditioned coating can be affected, surface preparation shall extend into the surrounding, undamaged galvanized coating.

b. Where the area to be repaired includes welds, all weld flux residue and weld spatter shall be removed by wire brush, chipping or grinding.

c. Preheat the repair surface to at least 600°F. The surface shall not be heated to over 750°F as verified by a heat stick or heat gun. The surrounding galvanized coating shall not be burned. Wire brush the surface to be reconditioned again during the preheating and pre-flux if needed. Pre-flux is needed when there is an adhesion problem.

d. Rub the cleaned, preheated area with the soldering rod to deposit an evenly distributed layer of zinc alloy. Blend the solder into the undamaged galvanized coating.

e. The thickness shall be adequate and as originally specified.

f. When the repair is complete, rinse with water or wipe with a damp cloth to remove flux residue.

3. Only damaged galvanized coatings that are not applicable for a zinc-tin-copper solder shall be repaired using a zinc-rich coating applied without heating.

4. The non-heated galvanizing touch-up repair product, where applicable with prior DISTRICT written approval, shall be in accordance with SECTION 09900.

J. Galvanized faying surfaces in slip-critical joints shall be roughened by means of hand wire brushing as applicable. Power wire brushing shall not be permitted. The galvanized coating shall not be removed.

K. All procedures specified in ASTM A143 shall be followed to safeguard against possible embrittlement of steel that is hot-dip galvanized. The galvanizer shall have a demonstrated history for the specific steel products being galvanized, with the processes and procedures being employed having no incidence of embrittlement. In the absence of a demonstrated history, samples from the hot-dip galvanized steel shall be tested in accordance with ASTM A143, and the test results shall be submitted to the DISTRICT.

L. Provide galvanizing drain and vent holes in accordance with ASTM A385 where applicable. Provide a submittal for proposed hole locations if not located as shown on the Drawings and for proposed hole diameters larger than the minimum specified by ASTM A385. Plug all exposed vent and drain holes other than permanent weep holes with cold-applied zinc plugs as produced by thesteelsupplyco.com or an equivalent product.

M. Coat galvanized surfaces to be cast in concrete using Carboline Carboguard 890 or an equivalent accepted product unless indicated otherwise. Provide a minimum of two coats with no less than eight mils total dry thickness.

2.06 PAINT:

A. Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating. Steel surfaces shall be prepared in

accordance with the coating MANUFACTURER's instructions, but in no case less than SSPC SP 6 or an accepted equivalent.

B. The product for the shop primer coating and field touch-up of the primer for all ferrous metal items other than galvanized, weathering and stainless steel except where indicated otherwise shall be as specified in SECTION 09900.

C. The primer shall be compatible with the applicable coating system specified in SECTION 09900 Protective Coatings, and it shall be applied in accordance with SSPC PA 1 except as specifically indicted otherwise by the MANUFACTURER's instructions and accepted by the DISTRICT.

D. If all coats of a coating system accepted by the DISTRICT are to be applied in the fabricator's shop, field touch-up Work shall be provided in accordance with the coating MANUFACTURER's recommendations. The touch-up product shall be listed by the MANUFACTURER as being compatible with the system, and the performance and color shall match the system.

2.07 GROUT:

A. Provide grout where indicated on the Drawings.

B. Non-shrink grout beneath base and bearing plates shall be one of the following:

1. Five Star Grout by Five Star Products, Incorporated
2. MasterFlow 928 by BASF Group
3. NC Grout by Euclid Chemical Company
4. Unitex Multi-purpose Grout by Dayton Superior Corporation
5. SikaGrout 328 by Sika Corporation
6. DISTRICT approved equal

2.08 FABRICATION:

A. Metal items shall be fabricated and assembled in the shop except where field welding is indicated on the Drawings. Assembled pieces shall be taken apart for the removal of burrs and shavings produced by the reaming operation. Parts not connected in the shop shall be secured by bolts or tack welds to prevent damage in shipment and handling, and the parts shall be tagged to facilitate identification and proper final assembly in the field.

B. Milled surfaces shall comply with the AISC specifications and the Drawings.

C. Allowance shall be made for draw in all tension bracing.

D. Drainage holes must be provided to eliminate all standing and entrapped water as shown on the Drawings.

PART 3 - EXECUTION

3.01 GENERAL:

A. The CONTRACTOR shall be responsible for the fabricator and erector providing notice for quality assurance inspections and for access being provided to all places where the Work is being performed. Notification shall be provided prior to the commencement of Work no less than the amount of time specified in AISC 303 Section 8.5, but not less than 24 hours.

B. Workmanship and finish of all metalwork specified under this SECTION shall be of the highest grade and equal to the best practice of modern shops for the respective Work.

C. Exposed surfaces shall have smooth finish and sharp, well-defined lines.

D. Provide all necessary rabbets, lugs, and brackets so that the Work can be assembled in a neat, substantial manner. Conceal fastenings where practical. Drill metalwork and countersink holes as required for attaching hardware or other materials.

E. Fabricate metals as specified. Weld connections, except where bolting is directed.

F. Avoid dissimilar metal contact. Where dissimilar metals are in contact, protect surfaces with a coating in accordance with MPI 79 to prevent corrosion. Clean metal shavings deposited from construction activities from all surfaces at the end of each work day.

3.02 ERECTION AND INSTALLATION:

A. Splices and field connections shall be made as shown or noted on the Drawings. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the assembly and fitting of parts shall be reported immediately to the DISTRICT for directions as to the method of correction. Corrections shall be made at no additional cost to the DISTRICT.

B. Leveling plates shall not be used under base plates.

C. Column bases and bearing plates shall be attached as shown on the Drawings. Plates shall be supported and aligned on steel wedges, shims, or leveling nuts and washers. After the supported members have been plumbed, positioned and the anchor nuts tightened, the entire bearing area under the plate shall be dry-packed solidly with non-shrink grout. Wedges and shims shall be cut off flush with the edge of column base and bearing plates, and they shall be left in place.

D. After preliminary layout and assembly, the members forming parts of a completed frame or structure shall be aligned and adjusted before being bolted or welded. Tolerance shall conform to AISC. Fastening of splices of compression members shall be done after the abutting surfaces have been brought completely into contact. Bearing surfaces and surfaces that will be in permanent contact shall be cleaned before the members are assembled. As erection progresses, the Work shall be fastened to take care of all dead load, wind and erection stresses. Splices will be permitted only where indicated on the Drawings. Erection bolts used in welded construction shall be tightened and left in place. Welding for redrilling will not be permitted.

E. Drift pins may be used only to bring together the separate parts, and shall not be used in such manner as to distort or damage the metal.

F. The use of a gas-cutting torch in the field for correcting fabrication errors is prohibited unless the DISTRICT has specifically approved such procedures for each case individually in writing.

G. Erect all metal to conform to AISC specifications, and local, state and federal codes as applicable.

H. Install in accordance with the Shop Drawings, the Drawings, and these specifications. Perform field welding and erection Work by skilled mechanics. Install fabricated metalwork plumb or level as applicable. The complete installations shall, in all cases, be rigid, substantial, and neat in appearance. Erect structural steel in accordance with the applicable portions of AISC Code of Standard Practice, except as modified. Install commercially manufactured products in accordance with the MANUFACTURER’s recommendations as approved.

3.03 PAINTING:

A. Provide surface preparations and coatings in accordance with SECTION 09900.

B. All steel surfaces shall be cleaned of loose mill scale, loose rust, accessible weld slag or flux deposit, dirt, and foreign matter. Solvent shall remove oil and grease deposits. No paint shall be applied when the steel temperature is below the dew point of the atmosphere. Paint shall be mixed, and no pigment shall remain on the bottom of the can.

C. Prior to assembly, prime surfaces which will be concealed or inaccessible after assembly.

D. After cleaning and connections are approved by the quality assurance or quality control inspector as applicable, all steel surfaces except those to be encased in concrete, surfaces to be fireproofed, galvanized, or surfaces to be welded shall be given a shop coat of primer. The primer shall be applied at a rate to provide a minimum dry film of two (2) mils or as recommended by the primer MANUFACTURER. The primer shall be applied without holidays or paint runs.

E. After erection, all field connections shall be cleaned. All connections, including welds and bolts, and all abraded surfaces on the shop primer shall be painted to give one complete primer coat. Primer for field touch-up shall be the same product used for the shop coat. All touch-up coats shall match the adjacent coating system.

END OF SECTION

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SECTION 05521 HANDRAILS, RAILINGS, AND BOLLARDS

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The Work of this SECTION shall consist of furnishing all labor, material, and equipment necessary for the installation of handrails as shown on the Drawings and specified herein.

B. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals
2. SECTION 05100 Structural Steel and Miscellaneous Metals
3. SECTION 09900 Protective Coatings

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the publications of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. ASTM International (ASTM)
    a. A36 Standard Specification for Carbon Structural Steel
    b. A47 Standard Specification for Ferritic Malleable Iron Castings
    c. A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
    d. A108 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
    e. A116 Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric
    f. A283 Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
    g. A385 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
    h. A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
    i. A501 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
    j. D6386 Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
2. American Welding Society (AWS)
    a. D1.1 Structural Welding Code – Steel
    b. D11.2 Guide for Welding Iron Casting
3. Florida Fire Prevention Code

1.03 SUBMITTALS:

A. Submittals shall be in accordance with SECTION 01300.

B. Submit Shop Drawings, signed and sealed by a Professional Engineer registered and active in the State of Florida, for all handrails and railings showing materials, configurations, dimensions, accessories, anchorage, etc.

1.04 WARRANTY: The CONTRACTOR shall warrant the Work against defects for one (1) year from the date of Substantial Completion and as described in Article 13 of Section 00700 - General Terms and Conditions.

PART 2 - PRODUCTS

2.01 MATERIALS: Comply with the requirements of the indicated specification.

A. Steel Plates and Bars (except plates to be cold formed): American Society for Testing and Materials ASTM A36

B. Cold-Formed Steel Plates: ASTM A283, Grade C

C. Steel Tubing:

1. ASTM A500, cold-formed, welded or seamless

D. Cold-Finished Steel Bars: ASTM A108, grade as selected by fabricator

E. Steel Pipe: ASTM A53, Grade B; black finish unless galvanizing is indicated; standard weight (Schedule 40) unless otherwise shown or specified

F. Steel Finish: Shop prime paint, except where galvanized finish indicated

G. Malleable Iron Castings: ASTM A47, grade as required

2.02 FABRICATION:

A. General:

1. Form exposed Work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32-inch, unless otherwise shown.

2. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing the Work.

3. Hot dip galvanize all steel railings, including pipe, fittings and other ferrous metal components after fabrication, unless otherwise indicated on the Drawings. Fabricated railing units to be galvanized shall have vent and drain holes in accordance with ASTM A385.

B. Non-welded Connections: When acceptable to the DISTRICT, intermediate post-to-rail connections may be made using internal pipe sleeve locks and Allen screw fasteners. Locking devices that do not produce flush, smooth, rigid, hairline joints will not be acceptable. Weld other connections.

C. Welded Connections: Cope intersections of rails and posts, weld joints and grind smooth. Butt weld end-to-end joints of railings or use welding connectors, at fabricator's option.

1. At connections to steel supports, weld post directly to steel supports, unless otherwise indicated.

2. Other methods of welding may be used when acceptable to the DISTRICT.

3. Weld corners and seams continuously and in accordance with the recommendations of American Welding Society (AWS). Grind exposed welds smooth and flush, to match and blend with adjoining surfaces. Discoloration of finished surfaces will not be acceptable.

4. Form exposed connections with flush, smooth, hairline joints, using concealed fasteners wherever possible. Use exposed fasteners of the type shown, or if not shown, use Phillips Flathead (countersunk) screws or bolts.

5. Provide for anchorage of the type shown, coordinated with the supporting structure. Fabricate and space anchoring devices as shown and as required to provide adequate support.

D. Brackets, Flanges, and Anchors:

1. Furnish cast metal brackets, flanges, and exposed anchors of the same material and finish as supported rails, unless otherwise indicated.

2. Furnish all fastenings as required for anchorage of railings to concrete or masonry work.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing handrails and railing items to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts, lag bolts and other connectors as required. Use railing MANUFACTURER's standard method of installation when acceptable to the DISTRICT.

B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation. Set the Work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Fit exposed connections accurately together to form tight hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Grind joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of units that have been coated or finished after fabrication, and are intended for field connections. Adjust railings prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length. Space posts not more than four (4) feet on centers, unless otherwise shown on the Drawings. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:

1. Anchor posts in concrete by means of pipe sleeves set and anchored into the concrete. Provide sleeves of galvanized, steel pipe, not less than six (6) inches long and having an inside diameter not less than 1/2-inch greater than the outside diameter of the inserted pipe post. Provide steel plate closure secured to the bottom of the sleeve and of width and length not less than one (1) inch greater than the outside diameter of the sleeve. After the posts have been inserted into the sleeves, fill the annular space between post and sleeve solid with nonshrink, nonferrous grout. Cover anchorage joint with a round metal flange to match post.

C. Secure handrails to walls with wall brackets and end fittings. Provide brackets with not less than 1-1/2 inches clearance from inside face to handrail to the finish wall surface. Drill wall plate portion of the bracket to receive one (1) bolt, unless otherwise indicated for concealed anchorage. Locate brackets as indicated or, if not indicated, at not more than eight (8) feet on center. Provide flush-type wall return fittings with the same projection as that specified for wall brackets. Secure wall brackets and wall return fittings to building construction as follows:

1. For concrete and solid masonry anchorage, use stainless steel epoxy-set anchors.

2. For hollow masonry anchorage, use Hilti HIT-HY 20 for Masonry Anchoring System, manufactured by Hilti Corporation, Tulsa, OK.

3. For drywall anchorage, provide horizontal wood blocking connecting consecutive studs, use toggle bolts having square heads.

END OF SECTION

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SECTION 07921 JOINT SEALANTS

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: This SECTION includes sealants and related materials for application in the joint locations specified in PART 2.

B. Related Work Specified Elsewhere:

1. SECTION 01300 Submittals
2. SECTION 03700 Concrete Restoration

1.02 APPLICABLE STANDARD AND PUBLICATIONS:

A. Standards or Codes: The edition of the publications of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. ASTM International (ASTM):
   a. C920 Standard Specification for Elastomeric Joint Sealants
   b. C1193 Standard Guide for Use of Joint Sealants
   c. E814 Standard Test Methods for Fire Tests of Penetration Fire Stop Systems

1.03 SUBMITTALS:

A. Submit as specified in SECTION 01300.

B. Includes, but not limited to, the following for each type of sealant or associated material required.

1. Product data and specifications including instructions for joint preparation and sealer application.
2. Color charts.
3. Samples for initial selection purposes: Submit samples consisting of strips of actual product showing full range of colors available, for each type of sealant exposed to view.

C. Certificates: Review the joint design and specifications and verify that the joint system is appropriate for its location and that sealant materials comply with specifications.

1.04 QUALITY ASSURANCE:

A. MANUFACTURER of sealants shall have a minimum of five (5) years of successful experience in the production of types of sealants required.

B. Sealant installer shall be certified by the sealant MANUFACTURER as having the necessary experience and equipment to install the materials properly.

C. Obtain joint sealant materials from a single MANUFACTURER for each different product required.

D. Preconstruction Compatibility and Adhesion Testing: The CONTRACTOR shall submit samples of all materials that will contact or affect joint sealers to joint sealer MANUFACTURERs for compatibility and adhesion testing, as indicted below: The CONTRACTOR shall

1. Use test methods standard with MANUFACTURER's recommendations to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates.
2. Perform tests under normal environmental conditions that will exist during actual installation.
3. Investigate materials failing compatibility or adhesion tests and obtain joint sealer MANUFACTURER's written recommendations for corrective measures, including use of specially formulated primers.

1.05 DELIVERY, STORAGE AND HANDLING: The CONTRACTOR shall

A. Deliver all materials in original sealed containers or bundles with labels and inscriptions legible and intact, and informing about MANUFACTURER, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store all materials in areas suitable to prevent deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.06 PROJECT CONDITIONS:

A. Environmental Conditions: The CONTRACTOR shall not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer MANUFACTURER or below 40 degrees Fahrenheit (F). (4.4 degrees Celsius (C)).
2. When joint substrates are wet due to rain, frost, condensation, or other causes.

B. Joint Width Conditions: The CONTRACTOR shall not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer MANUFACTURER for application indicated.

C. Joint Substrate Conditions: The CONTRACTOR shall not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

D. The CONTRACTOR shall proceed with application only when forecasted weather conditions is favorable for proper cure and development of bond strength.

1.07 WARRANTY: The CONTRACTOR shall warrant the Work against defects for one (1) year from the date of Substantial Completion and as described in Article 13 of Section 00700 - General Terms and Conditions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. MANUFACTURERs listed under each type of material is to establish minimum quality and specific type. Equivalent products of MANUFACTURERs listed below will be acceptable subject to suitability for intended condition.

1. Sealants and Caulking:
   a. Tremco Manufacturing Company

2.02 GENERAL:

A. Before purchase of each specified sealant, investigate its compatibility with the joint surfaces, joint fillers, and other materials in the joint system. Select materials for compatibility with joint surfaces and other indicated exposures, and except as otherwise indicated select modulus of elasticity and hardness or grade recommended by MANUFACTURER for each application indicated.

B. The CONTRACTOR shall provide colors as selected by the DISTRICT from MANUFACTURER's standard colors.

2.03 ELASTOMERIC SEALANTS:

A. Sealants conforming to equivalent Federal Specifications will be acceptable.

1. One-Component Urethane Sealant: (Use NT)

a. Conform to ASTM C920, Type S, Grade NS, Class 25. Use classification as required by locations stated below.

b. MANUFACTURER: Tremco Dymonic 100

c. Use in the following locations:

i. Exterior and interior joints around perimeter of doors and louver frames.

ii. Thresholds

iii. Joints between gypsum board and precast concrete.

iv. Penetrations in exterior wall (both sides of wall) by piping, conduit and other service equipment. (Does not include generator exhaust opening).

v. Perimeter of stainless steel plate at pipe wall sleeves.

2.04 MISCELLANEOUS MATERIALS:

A. Joint Cleaner: Type as recommended by the sealant MANUFACTURER, for the joint surfaces to be cleaned, which are not harmful to substrates and adjacent surfaces, and which do not leave oily residues or have detrimental effect on sealant adhesion or in-service performance.

B. Joint Primer/Sealer: Type as recommended by the sealant MANUFACTURER, for the joint surfaces to be primed or sealed.

2.05 FORM/SILICONE FIRE STOP SYSTEM:

A. Fire Stop Foam:

1. Medium density, 2-part silicone elastomer with fire resistant properties to meet fire rating of wall, ceiling or floor as indicated.

2. Have ability to form in place and fill complex geometrics to provide a tight, compressive fit.

3. Have ability to be poked through and resealed easily when penetration is modified.

B. Fire Stop Sealant:

1. One-part silicone elastomeric sealant with fire resistant properties to meet fire rating of wall, ceiling or floor as indicated, and stop the passage of fire, smoke, fumes and water through the fire-rated penetration.

2. Little or no damming shall be required for small, simple penetrations.

C. Damming and Priming Materials:

1. Include particleboard plywood or other suitable forming materials to contain foam and/or sealant.

2. Provide prime coat for sealant if recommended by MANUFACTURER.

D. Use in the following locations where indicted:

1. All penetrations in partition wall between Generator and Equipment Rooms. Seal from both sides.

E. MANUFACTURER:

1. Dow Corning RTV Fire Stop Foam and Fire Stop Sealant.

2. General Electric TRV 7403 and Pensil 851.

PART 3 - EXECUTION

3.01 JOINT SURFACE PREPARATION:

A. Joint Cleaning: The CONTRACTOR shall

1. Clean joint surfaces immediately before application of sealant.

2. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust, paints (except for permanent protective coatings tested and approved for sealant adhesion and compatibility by sealant MANUFACTURER), oil, grease, waterproofing water repellents, water, surface dirt, and frost.

3. Clean concrete and similar porous joint surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above operations by vacuuming or blowing out joints with oil-free compressed air.

4. Remove laitance and form release agents from concrete.

5. Clean metal and other nonporous surfaces of chemical cleaners or other means that are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

B. Joint Priming: The CONTRACTOR shall prime joint substrates as required by joint sealant MANUFACTURER. Confine primers to areas of joint sealer bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: The CONTRACTOR shall use where required to prevent contact of sealant with adjoining surfaces which would otherwise be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.02 APPLICATION: The CONTRACTOR shall

A. Conform to sealant MANUFACTURER's printed instructions except where more stringent requirements apply.

1. For elastomeric sealant installation, comply with ASTM C1193 for use of joint sealants as applicable to materials, applications and conditions indicated.

B. Install joint filler units at depth or position in joint to coordinate with other Work and sealants. Do not leave voids or gaps between ends of joint fillers. Do not stretch, twist, puncture or tear joint fillers. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry materials.

C. Install sealants by proven application techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

D. Install sealants to depths as recommended by sealant MANUFACTURER, within the following limitations:

1. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50 percent of joint width, but neither more than 1/2-inch deep nor less than 1/4-inch deep.

E. Unless indicated otherwise, provide a slightly concave surface conforming to ASTM C1193.

F. Do not allow sealants or compounds to overflow from confines of joint or spill onto adjoining surfaces. Clean the adjoining surfaces to eliminate evidence of spillage, without damage to adjoining surfaces or finishes.

G. Immediately after sealant installation and prior to time skimming or curing begins, tool non-sag sealants to form smooth uniform beads of configuration indicated, to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant MANUFACTURER. Remove excess sealant from surfaces adjacent to joint.

3.03 CURE AND PROTECTION:

A. Cure sealants in compliance with MANUFACTURER's printed instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Cure and protect sealants in a manner that will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants that are damaged or deteriorated during construction period. Repaired areas shall be indistinguishable from original Work.

3.04 FIELD QUALITY CONTROL:

A. After nominal cure of exterior joint sealants which are exposed to weather, test for water leaks as follows:

1. Flood joint exposure with water directed from a 3/4-inch garden hose and connected to water system with 25-psi minimum static water pressure.

2. Hold hose perpendicular to wall face, two (2) feet from joint, and move stream of water along joint at approximate rate of twenty (20) feet per minute.

B. Repair sealant installation at leaks or, if leakage is excessive, replace sealant installation as required. Do not perform repair or replacement work until joints are dry.

END OF SECTION

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SECTION 09900 PROTECTIVE COATINGS

PART 1 - GENERAL

1.01 SCOPE:

A. Summary of Work: The CONTRACTOR shall provide coating on exterior and interior surfaces throughout the Project and which are listed in PART 2, with systems specified on "coating system" sheets at the end of this SECTION.

B. Regulatory Requirements: In addition to requirements specified elsewhere for environmental protection, provide coating materials that conform to the restrictions of the local and regional jurisdiction. Notify the DISTRICT of any coating specified herein that fails to conform to the requirements for the location of the Project or location of application.

1. Lead Content: Use only coatings that are totally lead free.
2. Chromate Content: Use only coatings that do not contain zinc-chromate or strontium chromate.
3. Asbestos Content: Materials shall not contain asbestos.
4. Mercury Content: Materials shall not contain mercury or mercury compounds.
5. The specified maximum volatile organic compounds (VOC) content shall apply to the unthinned product except where indicated otherwise.

C. Related Work Specified Elsewhere:

1. SECTION 01010 Summary of Work
2. SECTION 01300 Submittals

1.02 APPLICABLE STANDARDS AND PUBLICATIONS:

A. Standards or Codes: The edition of the publications of the organizations listed below in effect at the time of the advertisement for bids form a part of this specification to the extent referenced. See the various paragraphs for the specified standard. In the case of a conflict between the requirements of this SECTION and those of the listed document, the requirements of this SECTION shall prevail.

1. American National Standards Institute (ANSI):
   a. A13.1 - Scheme for the Identification of Piping Systems
   b. Z535.1 - Safety Colors
2. ASTM International (American Society for Testing and Materials International):
   a. C267 - Standard Test Methods for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacings and Polymer Concretes
   b. D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
   c. D4258 - Standard Practice for Surface Cleaning Concrete for Coating
   d. D4259 - Standard Practice for Abrading Concrete
   e. D4260 - Standard Practice for Liquid and Gelled Acid Etching Concrete
   f. D4261 - Standard Practice for Surface Cleaning Concrete Masonry Units for Coating
   g. D5201 - Standard Practice for Calculating Formulation Physical Constants of Paints and Coatings
   h. E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
3. Society for Protective Coatings (SSPC) Coatings and Surface Preparation Specifications:
   a. Paint 20 - Zinc-Rich Coating (Type I, Inorganic and Type II, Organic)
   b. SP 1 - Solvent Cleaning: Removes oil, grease, soil, drawing and cutting compounds, and other soluble contaminants.
   c. SP 2 - Hand Tool Cleaning: Removes loose mill scale, loose rust, loose paint and other loose foreign matter.

d. SP 3 - Power Tool Cleaning: Removes loose material. Not intended to remove all scale or rust.

e. SP 5 - White Metal Blast Cleaning: Removes all mill scale, rust, corrosion and other soluble contaminants. Leaves surface gray-white uniform metallic color with no visible residuals.

f. SP 6 - Commercial Blast Cleaning: Two-thirds of each square inch free of all visible residues; remainder only light discoloration.

g. SP 7 - Brush-Off Blast Cleaning: Removes only loose material, remaining surface tight and abraded to give anchor pattern.

h. SP 10 - Near-White Wet Blast: Removes all mill scale, rust, corrosion, and other soluble contaminants. At least 95% of each square inch shall be free of all visible residues.

i. SP 11 - Bare Metal Power Tool Cleaning

j. SP 13 - Surface Preparation of Concrete

k. SP 15 - Commercial Grace Power Tool Cleaning. Similar results to SSPC-SP6

4. International Concrete Repair Institute (ICRI)

a. Guideline #03732 - Surface preparation should comply with ICRI technical guideline number 03732 (selecting and specifying concrete surface preparation for sealers, coatings and polymer overlays)

b. Concrete Surface Preparation - Concrete Surface Preparation Comparator Chips 1-10.

5. United States Army Corps of Engineers (USACE)

a. CRD-C 48 - Standard Test Method for Water Permeability of Concrete

b. CRD-C 163 - Test Method for Water Permeability of Concrete Using Triaxial Cell

1.03 DEFINITIONS:

A. Coating systems include surface preparation, prime coat (first coat), finish coats (second and third coats), inspection, cleaning, and touch-up of surfaces and equipment. Shop preparation, prime coat, and finish coats to be shop-applied may be specified elsewhere or referenced to this SECTION so that a complete system is specified and coordinated.

1. Where surface preparation and first (prime) coat are specified in other SECTIONs to be shop-applied, such as for structural steel, hollow metal doors or equipment, only the touch-up and finish coats are a part of field painting. Surface preparation is the required degree of preparation as instructed by coating MANUFACTURER prior to application of first (prime) coat regardless if done in shop or field.

2. If materials are provided without shop primer such as miscellaneous steel or sheet metal, then surface preparation, first, second, and third coats are a part of field painting.

3. Concealed surfaces are generally not required to have finish-coats unless otherwise specified, but prime coat should be applied and touched up prior to concealment.

4. Where equipment and materials are provided with shop-applied finished coating system, only touch-up is a part of field painting.

5. Refer to applicable SECTIONs to determine whether surface preparation and first coat, or complete coating system, is to be shop-applied.

6. The term "DFT" means minimum dry film thickness, with no tolerance for thinner films.

1.04 SUBMITTALS:

A. Submit as specified in SECTION 01300.

B. Submittals include, but are not limited to, the following:

1. Schedule of products and paint systems to be used. Schedule shall include the following information:

a. Surfaces for system to be applied

b. Surface preparation method and degree of cleanliness
c. Product MANUFACTURER, name, and number
d. Method of application
e. Dry film thickness per coat of coating to be applied

2. Applicator's Certification required under 1.05A
3. Applicator's plan for material coating for field cleaning and coating of non-removable features.
4. Product information
   a. MANUFACTURER's data sheet for each product proposed
   b. Technical and performance information that demonstrates compliance with the system performance and material requirements
   c. MANUFACTURER's instructions on surface preparation and application
   d. Compatibility of shop and field applied coatings (where applicable)
   e. Safety Data Sheet (SDS) filled out completely according to the Florida Right-to-Know Law, Chapter 442, Florida Statutes, clearly identifying each product used.
5. Certification signed by coating MANUFACTURERs stating that each coating is suitable for service intended as stated on each coating system sheet, and that the materials to be installed comply in all respects with the requirements of this SECTION.
6. The CONTRACTOR shall certify in writing to the DISTRICT that staff working as applicators have previously applied all the systems in this SECTION and have the ability and equipment to prepare the surfaces and apply the coatings as instructed by the coating MANUFACTURER.
7. Samples
   a. Painted Wood: Eight (8) inch square samples for each color and material on hardboard.
   b. Sample of each paint, finish, and other coating material on 8-1/2 inch by 11 inch sheet metal. Each sheet shall be completely coated over its entire surface with one coating material, type, or color.
   c. Two (2) sets of color samples that match each color selected by the DISTRICT from the MANUFACTURER's color charts. The color designation shall be shown on the back of the color sample.
   d. Two (2) 2 foot by 2 foot concrete panels shall be constructed at the Site in an area designated by the DISTRICT. On one panel, the CONTRACTOR shall apply the coating system required for water-retaining concrete interior surfaces and the system for concrete exterior surfaces on the other panel. The CONTRACTOR shall not begin coating the structure surfaces until the DISTRICT has accepted both panels. If the DISTRICT does not approve either panel, at its own expense the CONTRACTOR shall erect another, coat it, and request DISTRICT approval.

1.05 QUALITY ASSURANCE:

A. Applicator Qualifications:
   1. Coating WORK shall be performed by an SSPC certified CONTRACTOR having a minimum of Category QP 1 certification for WORK without hazardous paint removal, and Category QP 2 certification for WORK involving hazardous paint removal. The certified CONTRACTOR shall maintain in effect all required certifications for the duration of the Project. Any request for Project delay due to an expired certification will not be considered.
   2. The applicator shall be certified in application of specified products and systems on projects of similar size and scope, as demonstrated by previous successful installations, and shall be approved by the MANUFACTURER in writing. Certification shall be provided to the District prior to contract award.
   3. Successful completion of a minimum of five (5) major pump stations projects of similar size and complexity to specified WORK.

B. Manufacturer:

1. Provide products of MANUFACTURER with no less than ten years of experience in manufacturing the materials for the required WORK.

1.06 INSPECTION COORDINATION:

A. Pre-painting Conference shall be held by the CONTRACTOR:

1. Before field painting starts, representatives for the DISTRICT, CONTRACTOR, coating applicator, and coating MANUFACTURER's technical representative shall meet with the DISTRICT's personnel.

2. Agenda for the meeting will include details of surface preparations and coating systems to ensure understanding and agreement by all parties for compliance.

B. In the event a problem occurs with coating system, surface preparation, or application, coating applicator and coating MANUFACTURER’s technical representative shall promptly investigate the problem and submit results to the DISTRICT.

C. Whenever water tightness in a water-retaining structure is dependent upon WORK in other sections, the CONTRACTOR shall assume full responsibility for water tightness of the integrated assembly. Prior to starting WORK, CONTRACTOR shall meet with installers involved and with MANUFACTURERs of all materials involved to review Drawings and Specifications to insure that materials are being used properly and details are correct. A written report of this meeting shall be submitted to the DISTRICT. The report shall contain at least:

1. Meeting date and names and affiliations of those present and written statements from each installer and MANUFACTURER of their acceptance of Drawings, Specifications and conditions, and of proposed use of their materials as proper for purposes shown.

1.07 WARRANTY:

A. The MANUFACTURER shall warrant the EQUIPMENT, MATERIALS, and PRODUCTS specified in this SECTION against defective materials and workmanship with the MANUFACTURER’s extended warranty, for no less than five (5) years. The extended warranty period will start after the CONTRACTOR’s one (1) year warranty expires; and as described in Article 13 of Section 00700 - General Terms and Conditions. The MANUFACTURER shall provide a special MANUFACTURER’s extended warranty for the stipulated period, or a Warranty Bond, to extend the MANUFACTURER’s warranty period for the stipulated period.

B. The CONTRACTOR shall warrant the WORK against defects for one (1) year from the date of Substantial Completion and as described in Article 13 of Section 00700 - General Terms and Conditions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER:

A. Proprietary names and product numbers are specified in most systems for material identification from these MANUFACTURERs.

1. PPG (Pittsburg Plate Glass Co.)
2. Carboline Company, Inc.
3. BASF Building Systems
4. ICI Devoe Coating Company
5. The Euclid Chemical Company
6. Tnemec Company, Inc.
7. Xypex Chemical, Ltd.
8. Kryton International
9. Sika Corporation
10. Wasser Corporation
11. Polyval Coatings, Inc.
12. Benjamin Moore & Company

13. Sherwin-Williams
14. International Fire Resistant Systems, Inc.
15. Penetron
16. Belzona Inc.
17. Alocit & Enviropeel USA.
18. Insl-x

2.02 GENERAL:

A. CONTRACTOR shall confirm all materials furnished for each coating system must be compatible with the substrate.

B. Single Manufacturer: All materials in each coating system shall be by the same coating MANUFACTURER to assure compatibility of coatings.

C. Compatibility: When shop-painted surfaces are to be field coated, the CONTRACTOR shall ascertain whether finish materials will be compatible with shop coating. Coatings of uncertain composition shall be removed completely before applying new coatings.

D. Colors:

1. Color of finish coatings shall match accepted color samples.
2. When second and finish coats of a system are of same type, CONTRACTOR shall tint or use an easy distinguishable alternate color on second coat to enable visual coverage inspection of the third coat. When first and second coats only are specified and are of same or different types, tint or use an easy distinguishable alternate color on first coat to enable visual coverage inspection of the second coat.

E. Include on label of material containers:

1. MANUFACTURER’s name, product name, and number
2. Type of paint and generic name
3. Color name and number
4. Storage and temperature limits
5. Mixing and application instructions, including requirements for precautions which must be taken
6. Drying, recoat, or curing time

2.03 COATING SYSTEMS: Specified on the "Coating System" sheets at the end of this SECTION.

2.04 SURFACES TO BE COATED:

Generic Description	Specific Surfaces	System
Steel, Severe Exposure, Non-Immersion, Exterior or Interior, where only marginal cleaning can be performed	1. Hollow metal doors and frames 2. Roll Up Doors 3. Window Frames	S-2
Concrete and concrete masonry units (CMU), mild exposure, non-immersion, interior and exterior	1. Concrete Control Structure 2. Concrete Masonry Unit Structure	C-1

2.05 SURFACES NOT TO BE COATED:

A. Factory finished equipment, except for touch-up or noted otherwise

B. Metal surfaces of stainless steel, bronze, aluminum, and fiberglass

C. Concrete, unless listed on specific surfaces above

D. Machined surfaces

E. Grease fittings

F. Glass

G. Equipment nameplates

H. Platform gratings, stair treads, door thresholds, and other walking surfaces unless listed on specific surfaces above

I. Interior Building Surfaces

J. Concrete Floors unless listed above

2.06 GALVANIZING REPAIR:

A. Field welded, cut, abraded or blemished areas of all galvanized steel components shall receive a zinc-based coating in accordance with ASTM A780. Repair procedures shall be in strict accordance with the MANUFACTURER's instructions. All damaged galvanized coatings shall be repaired using a zinc-tin-copper solder where possible as specified in SECTION 05100. Where a zinc-tin-copper solder cannot be used and with written DISTRICT approval, provide a cold-applied repair product.

B. The non-heated galvanizing touch-up repair product, where applicable, shall be ZRC 221 Galvanizing Compound by ZRC Worldwide or a DISTRICT approved equivalent product. The product performance shall be documented by the MANUFACTURER prior to DISTRICT acceptance. Field resistivity testing is not an acceptable substitute for laboratory testing. The surface preparation and coating procedure shall be as specified by the manufacturer and as indicated in System S-8 in this Section. The product requirements include the following:

1. The minimum zinc dust concentration shall be 92% in the dried film.
2. The zinc dust shall be Type III in accordance with ASTM D520.
3. The binder shall be non-encapsulating.
4. The maximum electrical resistivity shall be 73 MΩ per unit square with a three mils thick non-aged dry film.
5. The maximum volatile organic compounds content shall be 1.8 lbs/gal (221 g/L).

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING:

A. Manufacturer Recommendations: Unless this specification requires otherwise, CONTRACTOR shall strictly follow the MANUFACTURER's printed recommendations and instructions for storing and handling coating system materials.

B. Delivery of Materials:

1. Deliver in sealed containers with labels and information legible and intact. Containers shall also have correct labels with required information.
2. CONTRACTOR shall allow sufficient time for testing, if required.

C. Storage of Materials: CONTRACTOR shall store under conditions recommended by the Safety Data Sheets:

1. All protective coating materials shall be used within the MANUFACTURER's recommended shelf life.
2. Store only acceptable materials on Project Site.
3. Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures. Provide separate area and suitable containers for storage of coatings and related coating equipment.
4. Dispose of used or leftover containers, thinners, rags, brushes, and rollers in accordance with applicable regulations.

3.02 PREPARATION FOR COATING:

A. General: All surfaces to receive protective coatings shall be clean prior to application of coatings. The CONTRACTOR shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application. Surfaces to be coated shall be dry and free of visible dust.

B. Preparation of zinc (Hot-Dip Galvanized) coated iron and steel product and hardware surfaces shall be in accordance with ASTM D6386. This procedure can be used to prepare new and weathered zinc-coated surfaces on after-fabrication steel products for painting, and this can improve the bond of paint to the zinc surface.

C. Protection of surfaces not to be coated: Surfaces that are not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations.

D. Hardware, lighting fixtures, switch plates, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not to be painted shall be removed, masked, or otherwise protected. Drop cloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.

E. Care shall be exercised not to damage adjacent work during blast cleaning operations. Spray painting shall be conducted under carefully controlled conditions. The CONTRACTOR shall be fully responsible for and shall promptly repair any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.

F. Protection of painted surfaces: Cleaning and coating shall be coordinated so that dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.

3.03 SURFACE PREPARATION:

A. General

1. Prepare surfaces for each coating system conforming to SSPC or ASTM surface preparation specifications listed.
    a. If grease or oils are present, SSPC-SP1 must precede any other method specified.
    b. Remove surface irregularities such as weld spatter, burrs, or sharp edges, prior to specified surface preparation.
2. Depth of profile shall be as specified for each system, but in no instance shall it exceed one-third of the total dry-film thickness of complete system.
3. Prepare only those areas which will receive the first coat of the system on the same day.

B. Metals

1. The minimum abrasive blasting surface preparation shall be as indicated in the coating system sheets included at the end of this Section. Where there is a conflict between these specifications and the coating MANUFACTURER's printed recommendations for the intended service, the higher degree of cleaning shall apply.

2. All sharp edges shall be rounded or chamfered, and all burrs, surface defects, and weld splatter shall be ground smooth prior to blast cleaning.
3. The type and size of abrasive shall be selected to produce a surface profile that meets the system sheet requirements for the particular coating and service conditions. Abrasives for submerged and severe service coating systems shall be clean, hard, sharp cutting crushed slag. Automated blasting systems shall not be used for surfaces that will be in submerged service. Metal shot or grit shall not be used for surfaces that will be in submerged service, even if subsequent abrasive blasting is planned to be one with hard, sharp cutting crushed slag.
4. Abrasive shall not be reused unless an automated blasting system is used for surfaces that will be in non-submerged service. For automated blasting systems, clean oil-free abrasives shall be maintained. The abrasive mix shall include at least 50 percent grit.
5. The CONTRACTOR shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.
6. Compressed air for air blast cleaning shall be supplied at adequate pressure from well maintained compressors equipped with oil and moisture separators that remove at least 95 percent of the contaminants.
7. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming, or another method prior to painting.
8. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth.
9. Damaged or defective coating shall be removed by the blast cleaning to meet the clean surface requirements before recoating.
10. If the required abrasive blast cleaning will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be submerged in service, then SSPC SP2 or SSPC SP3 may be used. Refer to SSPC SP11 for submerged surfaces.
11. Shop applied coatings of unknown composition shall be completely removed before the indicated coatings are applied. Valves, castings, ductile iron pipe, and fabricated pipe or equipment shall be examined for the presence of shop-applied temporary coatings. Temporary coatings shall be completely removed by solvent cleaning per SSPC SP1 before the abrasive blast cleaning work is started.
12. Shop primed equipment shall be solvent cleaned in the field before finish coats are applied.

C. Concrete and Concrete Masonry Units

1. Surface preparation shall not begin until at least 30 days after the concrete or masonry has been placed.
2. All oil, grease, and form release and curing compounds shall be removed by detergent cleaning per SSPC SP1 before abrasive blast cleaning.
3. Concrete, concrete block masonry surfaces and deteriorated concrete surfaces to be coated shall be abrasive blast cleaned to remove existing coatings, laitance, deteriorated concrete, and to roughen the surface equivalent to the surface of the No. 80 grit flint sandpaper, if required by the coating application instructions.
4. If acid etching is required by the coating application instructions, the treatment shall be made after abrasive blasting. After etching, CONTRACTOR shall rinse surfaces with water and test the pH. The pH shall be between neutral and eight (8).
5. Surfaces shall be clean and as recommended by the coating MANUFACTURER before coating is started.
6. Unless required for proper adhesion, surfaces shall be dry prior to coating. The presence of moisture shall be determined with a moisture detection device such as Delmhorst Model DB, or equal.

3.04 APPLICATION:

A. CONTRACTOR shall apply coatings in compliance with coating MANUFACTURER's procedural guide. Materials shall be thoroughly stirred, strained, and kept at uniform consistency during application. Coatings from different MANUFACTURERs shall not be mixed together.

B. Use MANUFACTURER's specified properly designed brushes, rollers, and spray equipment for all applications.

C. On unprimed surfaces apply first coat of the system the same day as surface preparation, or before the specified degree of cleanliness has deteriorated.

D. Cleaned surfaces and all coats shall be inspected prior to each succeeding coat. The CONTRACTOR shall schedule such inspection with the DISTRICT in advance.

E. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be coated in the same working day. No cleaned blasted surface shall be left overnight without coating, the surface shall be clean blasted again before coating the next day.

F. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe painting for these areas.

G. Dry-film thickness of each system shall be at least as thick as the minimum specified. Maximum dry-film thickness shall not exceed the minimum more than 20% or coating MANUFACTURER's requirements, whichever is less. Where a dry-film thickness range is specified, the thickness shall not be shall not be outside the range. Adhesion test for testing adhesion of old coatings is required in accordance with ASTM D 3359, Measuring Adhesion by Tape Test Method A.

H. Shop and field painting shall not be applied within three (3) inches of unprepared surface areas to be welded or bolted, except primers are acceptable where specifically specified at these locations.

I. Environmental Conditions:

1. Atmospheric temperature must be 50 degrees Fahrenheit or higher during application, unless approved in writing by coating MANUFACTURER. Do not apply coatings when inclement weather or freezing temperature may occur during the curing time interval.
2. Wind velocities for exterior applications shall be at a minimum to prevent overspray or fallout and not greater than coating MANUFACTURER's limits.
3. Relative humidity must be less than 85% and the temperature of the surface to be painted must be at least five (5) degrees above the dew point.
4. Provide adequate ventilation in all areas of application to ensure that at no time does the content of air exceed the Threshold Limit Value given on the MANUFACTURER's Safety Data Sheets for the specific coatings being applied.

J. Recoat Time: In the event a coating, such as an epoxy, has exceeded its recoat time limit, prepare the previously applied coating in accordance with MANUFACTURER's procedural guide.

K. Protection:

1. Cover or otherwise protect surfaces not to be painted. Remove protective materials when appropriate.
2. Mask, remove, or otherwise protect finish hardware, machined surfaces, grilles, lighting fixtures, and prefinished units as necessary.
3. Provide cover or shields to prevent surface preparation media and coatings from entering orifices in electrical or mechanical equipment. Where ventilation systems must be kept in operation at time of surface preparation, take precautions to shield intakes and exhausts to prevent the materials from entering system or being dispersed.
4. Provide signs to indicate fresh paint areas.
5. Provide daily cleanup of both storage and working areas and removal of all paint refuse, trash, rags, and thinners. Dispose of leftover containers, thinners, rags, brushes, and rollers that cannot be reused in accordance with applicable regulations.

6. Do not remove or paint over equipment data plates, code stamps on piping, or UL fire-rating labels.

3.05 INSPECTION:

A. CONTRACTOR shall provide and use a wet-film gauge to check each application approximately every fifteen (15) minutes in order to immediately correct film thickness under or over that specified.

B. On ferrous surfaces, measurements shall be made with one of the thickness gauges listed below. The gauge shall be calibrated on metal practically identical in composition and surface preparation to that being coated and be of substantially the same thickness, except that for measurements on metal thicker than 1/4-inch, the instrument may be calibrated on metal with a minimum thickness of 1/4-inch. When calibrating any of the gauges for making film measurements of over three (3) mils, the calibrating thickness standards (shims) shall be of non-metallic composition. Where only one thickness criterion is specified, the calibrating shim thickness shall closely approximate the specified thickness, but where both thicknesses are specified, the shim's thickness shall closely approximate an average of the two. Calibrating instructions, thickness standards and, in the case of the Mikrotest gauge, a calibrating tool, should be obtained from the MANUFACTURER or supplier of the gauge. Authorized thickness gauges are:

1. General Electric, Type B, General Electric Company
2. Mikrotest, Elektrophysik - Koln
3. Elcometer, Elcometer Instruments, Ltd.
4. Inspector Gage, Elcometer Instruments, Ltd.
5. Minitector, Elcometer Instruments, Ltd.

C. Use holiday or pinhole detector on systems over metal substrates to detect and correct voids when indicated on system sheet.

D. Furnish a sling psychrometer and perform periodic checks on both relative humidity and temperature limits.

E. Check temperature of the substrate at regular intervals to be certain surface is five (5) degrees Fahrenheit or more above the dew point.

3.06 CLEANING AND REPAIRS:

A. Remove spilled, dripped, or splattered paint from surfaces.

B. Touch up and restore damaged finishes to original condition. This includes surface preparation and application of coatings specified.

South Florida Water Management District 3301 Gun Club Road West Palm Beach, Florida 33406	**PROTECTIVE COATING SYSTEM** **System S-2**

SERVICE:	Steel, Severe Exposure, Non-Immersion, Exterior or Interior, where only marginal cleaning can be performed
Surface Preparation:	SSPC-SP6 or SSPC-SP10 as specified by the manufacturer. Clean and dry.
First Coat:	SSPC Paint 20 zinc-rich primer with a minimum of 82% zinc dust by weight in the dry film. Apply nonweldable primers at 3.0 to 3.5 mils dry film thickness as specified by the manufacturer. Apply weldable primers where specified at locations to be welded in accordance with the manufacturer's instructions.
Second Coat:	High build polyamide or cycloaliphatic amine epoxy with minimum 65% solids by volume. Apply at 5.0 mils minimum dry film thickness.
Third Coat (Exterior):	High solids aliphatic or acrylic polyurethane gloss enamel with minimum 65% solids by volume. Apply at 2.0 mils minimum dry film thickness.
System Total:	Minimum 10.0 mils dry film thickness, Exterior. Minimum 8.0 mils dry film thickness, Interior.
Volatile Organic Content:	Maximum 2.8 lbs/gal (340 g/l) with or without thinner added.

COATING MANUFACTURER	**PRODUCT DESIGNATION**		
	FIRST COAT	**SECOND COAT**	**THIRD COAT**
Carboline	Carbozinc 11 HS	Carboguard 890	Carbothane 133 VOC
Devoe Coatings	Cathacoat 304V	Devran 224V	Devthane 379H
Tnemec	Tneme-Zinc H90-97	Chembuild 135	Endura-Shield II 1074
PPG	Dimetcote 9 H	Amercoat 385	Amercoat 450H
Sherwin-Williams	Zinc Clad II Plus	Macropoxy 646 FC	Acrolon 218 HS

South Florida Water Management District 3301 Gun Club Road West Palm Beach, Florida 33406	**PROTECTIVE COATING SYSTEM** **System C-1**

SERVICE:	Concrete walls (interior), CMU walls (interior & exterior), and precast walls with a finned or textured concrete surface (exterior), Mild Exposure, Non-Immersion,
Surface Preparation:	Concrete: ASTM D 4258, clean and dry, free from grease, oil, and any other contamination. Remove protrusions. Fill pits in concrete with patching compound as recommended by coating MANUFACTURER. CMU: ASTM D 4261, clean and dry, free from grease, oil, and any other contamination. Remove protrusions.
First Coat:	Acrylic Latex block filler with minimum 44% solids by volume. Apply at approximately 800 square feet per gallon on concrete and as required to fill pores on CMU.
Second Coat:	Water reducible acrylic coating with minimum 34% solids by volume, gloss finish. Apply at 2.0 mils dry film thickness.
Third Coat:	Same as second coat.
System Total:	Minimum 4.0 mils dry film thickness in addition to filler.
Volatile Organic Content:	Maximum 2.8 lbs/gal (340 g/l).

COATING MANUFACTURER	**PRODUCT DESIGNATION**		
	FIRST COAT	**SECOND COAT**	**THIRD COAT**
PPG	PermaCrete 4-100	PittTech 90-374	Same as second coat
Carboline	Sanitile 100	Carbocrylic 3359	Same as second coat
Devoe Coatings	Bloxfil 4000	Devflex 4208QD	Same as second coat
Tnemec	Masonry Filler 54	Enduratone 1026	Same as second coat
Sika Corporation	Sikagard 62	Sikagard 62	Same as second coat
Sherwin-Williams	CementPlex 875	Pro Industrial DTM Acrylic	Same as second coat

END OF SECTION