



Project Manual
for
Bid/Contract No. PNC2120194B1,
Parks Construction and Improvements

3/4/2020

with all addenda revisions issued during bidding;
words in ~~strike-through~~ type are deletions from text; words in
bold underlined are additions to existing text

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SECTION 01 11 00 SUMMARY OF WORK

PART 1 - GENERAL

1.1 PROJECT INFORMATION

- A. Broward County manages almost 6,500 acres, encompassing nearly 50 regional parks and nature centers, neighborhood parks, and natural areas. This is a continuing construction service contract for construction improvements to various Broward County parks and similar locations. New park improvements may include construction work such as site development, parking lot and roadway improvements, water and sewer utilities, small buildings, playgrounds, sport courts and site lighting. **Projects are primarily for new construction; this contract is not intended for maintenance, renovation or repairs other than for the line items included in the Contract.**
- B. The Contractor is advised that the amount, magnitude, scope, and pace of projects shall be determined based on the needs, capacity and requirements of the County, and therefore the Contractor cannot expect that the Contract will necessarily provide a consistent, predictable rate of work and corresponding revenue stream. There are no minimum project amounts and Contractor is not guaranteed to receive a set amount of work.
- C. **Vendors are hereby notified that the County reserves the right to order quantities of less than one (for instance, if the unit of measure is ton, the County can order a percentage of a ton). In addition, the quantities listed in the solicitation are approximations only.**
- D. The Contractor agrees to cooperate and work with the County in providing project proposals and scheduling the work requested in accordance with the Contract.
- E. Refer to the References section of the Project Manual for the definitions including “provide”.

1.2 WORK RESTRICTIONS

- A. Work hours shall comply with the Project Schedule requirements. Each Park has its own established hours of operation which the Contractor shall abide by. No work is allowed on weekends without prior written permission from the County.

1.3 EXISTING CONDITIONS

- A. The Contractor is required to perform the needed work for its construction effort in a way that does not disturb the function or interrupt ongoing operations of the Park. All work must be coordinated and scheduled with approval from County staff. The areas not covered by the work must be protected. Any areas damaged or disturbed by the construction effort in any way must be repaired and brought to the condition it was found just prior to the construction. All repairs must be done by the Contractor as part of this contract and to the complete satisfaction of the County.
- B. **Burrowing owls may be present at some project locations.** Burrowing owls are protected by the State of Florida Endangered Species Act, Chapter 379.2291 and Rules Relating to Endangered or Threatened Species, FAC Chapter 68A-27. Contractor shall ensure that the burrowing owls and nest(s) are not disturbed and will not be harassed during any projects completed under this contract. The Florida Fish and Wildlife Conservation Commission provides Florida Burrowing Owl Guidelines which can be downloaded from the following link: <https://www.flrules.org/Gateway/reference.asp?No=Ref-10405>

1.4 LIMITS OF CONSTRUCTION

- A. The work set forth in the Contract Documents will be performed within the limits established in the site plan and any construction drawings. Contractor shall not work outside of the limits without requesting County authorization in writing and receiving written County approval.

1.5 MINIMUM STAFFING REQUIREMENTS

- A. Contractor shall provide the following services in addition to the construction such as but not limited to:
1. Project management and supervision (see the Project Management section in Division 1); these services cannot be subcontracted
 2. Estimating services
 3. Billing
 4. Background screening
 5. Locating and subcontracting with CBE firms and monthly completion of applicable forms
 6. Tracking of Prevailing Wage rate compliance

1.6 CONTRACTOR'S COORDINATION OF WORK

- A. All instructions and communications by the County shall be by and through the County Project Manager or his/her designee.
- B. The Contractor shall be responsible for the planning and scheduling, and coordination of all Work performed under the contract, so that materials will arrive on schedule and installation will proceed without delay.
- C. Coordinate scheduling, construction documents, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence and installation of interdependent construction elements.
- D. Verify that the utility requirement characteristics of operating equipment are compatible with available utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements and installation of Work, which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable. Utilize spaces efficiently to maximize for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate Sections in preparation for Substantial Completion.
- H. After County occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with the Contract Documents, to minimize disruption of County's activities.
- I. Coordinate Utility installation with each utility provider. Contractor shall include costs for service design and connections to each utility company in its bid prices.

1.7 UTILITIES

- A. It shall be the Contractor's responsibility to verify all existing utility locations. The Consultant and the County take no responsibility or liability for any existing utility conditions.
- B. The Contractor shall notify and coordinate with each utility company in enough time, prior to the start of construction, to arrange for positive underground location, relocation or support of its utility, where that utility may be in conflict with, or endangered by, the proposed construction. All costs of permanent utility relocations that are shown on the plans or are shown on the utility company's plans, are reimbursable as a pass-thru.
- C. Contractor must hand dig and confirm location of existing lines marked by utility locate company.
- D. Any existing underground utility lines damaged by the Contractor while construction must be promptly repaired or replaced at the Contractor's expense and at no additional cost to the County. At the sole discretion of the County, such repairs shall be performed by the Contractor's forces or by a subcontractor of the Contractor. Any delays ensuing from

this damage will be considered inexcusable and the County will have the right, at the County's sole discretion, to hire another contractor and to back charge the Contractor if the work is not done in a timely manner.

- E. The Contractor shall schedule the work in such a manner that Contractor is not delayed by the utility companies relocating or supporting their utilities. No compensation shall be made for such loss of time.
- F. The Contractor shall make any excavation necessary for location of structures and utilities prior to construction in order to ensure that the proposed work can be positioned as planned.
- G. All overhead, surface or underground structures and utilities encountered in trenching, whether or not shown on the plans, are to be carefully protected from injury and displacement. All damage to such structures is to be completely repaired within a reasonable time to limit any effects to the Park and neighbors. Needless delay will not be tolerated. If not completed by a specified deadline referenced in the NTP, the County reserves the right to remedy such damage by ordering outside parties to make such repairs at the expense of the Contractor.
- H. All such repairs made by the Contractor are to be made to the satisfaction of the utility owner; all damaged water or gas pipes must be replaced or prevented from leaking.
- I. All repairs are to be inspected and approved in writing by the utility owner prior to backfilling.
- J. No less than 48 hours prior to excavating, Contractor shall call the State's Sunshine State One Call (811) so that a locator can be dispatched to the work location.

1.8 COOPERATION BETWEEN CONTRACTORS

- A. The County reserves the right to contract for and perform other or additional construction on or near the Work covered by this Contract.
- B. When separate contracts are let within or near the limits of the Project, the Contractor shall conduct its Work so as not to interfere with or hinder the progress of completion of the construction performed by other Contractors. Contractors working on the same Project shall cooperate with each other as directed by the County.
- C. The Contractor shall arrange its Work and shall place or dispose of the materials being used as not to interfere with the operations of the other Contractors within or near the limits of the Project. The Contractor shall join its Work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

1.9 PROJECT PERFORMANCE

- A. The Contractor shall proceed expeditiously with adequate forces and shall achieve the agreed upon milestones included in the project proposal.
- B. The Contractor recognizes that unforeseen conditions occur and that as a normal course of construction there may be rain or inclement weather days, difficulties in obtaining materials and labor, requests for information from the Contractor to the County or Consultant, submittals, shortages and inefficiencies in operations. These will not be considered excusable delays.
- C. Further instructions about Quality Control and Quality Assurance are included in the Project Manual.

1.10 DISCREPANCIES, INTERPRETATION AND OMISSIONS

- A. Contractor shall bring any apparent discrepancies to the attention of the County and Consultant (if applicable) for resolution prior to commencing with the Work. Contractor shall use a Request for Information (RFI) form to communicate discrepancies and receive direction.
- B. Should conflict occur between the Code requirements and the Contract Documents, the Contractor is deemed to have based its bid pricing upon the more expensive method of performing the Work.
- C. Additional information can be found in the reference standards section.

1.11 ADDITIONAL REQUIREMENTS AFTER CONTRACT AWARD

- A. County will not impose any additional requirements such as additional background screenings/clearance requirements required by the Port and Aviation departments, Buy America, federal requirements and federal supplements unless the Contract is formally amended.

1.12 PREVAILING WAGE RATES

- A. Although not all projects will ~~not~~ be \$250,000 or greater, all unit pricing includes costs required to comply with the attached Prevailing Wage Rates tables.

1.13 BACKGROUND/SECURITY REQUIREMENTS

- A. This contract requires background checks when work is being completed at a County park; refer to the section on security requirements for the Parks and Recreation Division.

1.14 SUBCONTRACTING REQUIREMENTS

- A. Contractor shall notify the County Project Manager of all Broward County certified County Business Enterprise (CBE) subcontractors, subconsultants and/or suppliers proposed for each project by submitting properly executed Letter(s) of Intent, or as amended.
- B. Contractor and all of its subcontractors, installers, applicators, fabricators, subconsultants and suppliers shall be experienced in accordance with the References section of the Project Manual and shall possess valid insurance as required by law and per the Contract Documents.
- C. Contractor shall have a continuing obligation to notify the County of any change to its subcontracting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 14 33 WORK IN RIGHTS-OF-WAY

PART 1 - GENERAL

DESCRIPTION

- A. The work of this section includes but is not limited to Maintenance of Traffic (MOT) in public right of ways and on construction site.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition, including Supplements (FDOT Standard Specifications)
 - 2. State of Florida Manual of Traffic Control and Safe Practices for Street and Highway Construction
 - 3. Broward County requirements including the following MOT permit application: <http://www.broward.org/Traffic/Documents/MOT%20Application%20Form%202016-10-05%20to%20Present.pdf>
 - 4. Broward County Minimum Standards Applicable to Rights of Way under Broward County Jurisdiction, Broward County under Broward County Jurisdiction, Exhibit 25A, available at www.municode.com (Broward County Minimum Standards).
- B. Qualification: The Contractor or its MOT subcontractor shall be experienced in performing MOT services.

1.4 JOB CONDITIONS

- A. Control of Traffic:
 - 1. Do not allow traffic on repaved areas until authorized by the Consultant or County Project Manager.
 - 2. Employ traffic control measures necessary to maintain and to protect traffic, to protect the work in progress, to protect adjacent property from excess dust resulting from the construction area and to maintain traffic through, around, or adjacent to the construction area. The work shall include the furnishing and maintaining of all traffic control devices, flaggers, construction of temporary structures when required, labor, equipment and materials to keep the traveled road smooth and the furnishing and application of dust palliatives.
- B. The above referenced standards shall be used where applicable for the various work. If within a particular section, another section, article or paragraph is referred to, it shall be part of the standard specifications also.
- C. The Contractor shall abide by all local and state laws, regulations and building codes which have jurisdiction in the area.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

- A. Maintenance of Traffic: It shall be the sole responsibility of the Contractor to install and maintain adequate traffic control devices, warning devices and barriers for the purpose of protecting the traveling public, all workers and the work area in general. Such traffic control shall be maintained for the duration of the project period, including any temporary suspensions of the work. MOT shall be in the accordance with the above referenced standards. **Where required by the agency having jurisdiction over the right-of-way (ROW), a MOT plan shall be approved by that agency and Broward County's Traffic Engineering Division, and a copy forwarded to the Consultant and County Project Manager prior to beginning the associated work.**

END OF SECTION

SECTION 01 21 00 ALLOWANCES AND GENERAL CONDITIONS

PART 1 - ALLOWANCES

1.1 GENERAL

- A. Only the Contract Administrator or designee within the Parks Planning and Design section may authorize use of allowances prior to Contractor incurring costs related to an allowance amount. **All allowances must first be approved in writing or email by the Contract Administrator prior to issuance of a purchase order.** Using agencies shall provide details and a cost breakdown for all allowances.
- B. No markup or additional fees, such as overhead, profit or background checks, are allowed on the payment of allowance items. Payment will be equal to the amount paid by Contractor.
- C. Submitted prices shall be fair, reasonable, comparable to local prices, meet industry standards, and are subject to audit.
- D. The Contract Administrator reserves the right to reject any allowances, including those requested of other County agencies.
- E. Contractor must charge the County the same invoice prices as it is charged by its suppliers, or of Contractor manufactures or assembles its own parts, Contractor shall charge the County a price no higher than it charges its most favored customer. Contractor shall not submit modified invoices from its supplier to show a higher price than what the Contractor actually paid the supplier. County reserves the right to contact the supplier directly to verify amounts paid by Contractor.
- F. A copy of the Contractor's invoice(s) or receipt(s) shall be submitted with the Contractor's payment request. Payment will be made by the County after commodities and/or services have been received, accepted and properly invoiced.
- G. Allowances are not a guarantee. Any overages will be deducted from the Contract by a reduction to the Purchase Order.

1.2 PROVIDE MISCELLANEOUS CONSTRUCTION MATERIALS AND SERVICES

- A. **This allowance is for miscellaneous construction materials to be furnished and installed by the Contractor; this is not a method to purchase commodities such as temporary generators and site furnishings such as waste receptacles and benches not related to new construction projects issued through this contract.** Refer to the Division 1 References section for the definition of "provide".
- B. The County reserves the option to purchase and furnish parts and materials if the County determines that the prices obtained by the Contractor are not fair and reasonable. The County Project Manager shall identify if any County contracts can be utilized for required parts, materials or services requested through the pass-thru allowance.
- C. The County Project Manager shall identify if any County contracts can be utilized for these required items or services. If not available and the materials or services are not a sole source, the Contractor shall obtain at least one detailed quote from a third party and provide this to the County Project Manager. The quote shall be itemized; the County will not accept lump sums. If a quote is approved and accepted by the County Project Manager, Contractor shall be reimbursed at cost. No additional fees will be paid to Contractor for obtaining and submitting quotes for this Contract.
- D. Services may include unforeseen conditions, defined as differing site conditions such as concealed physical conditions that could not be **reasonably discovered or anticipated** by the Contractor or County prior to construction.
- E. **Retainage applies to this allowance.**

1.3 NON-CCNA PROFESSIONAL SERVICES

- A. Professional services may be necessary when modifying one of the structures included in this contract, such as for the shade structures, restroom, etc. The Contractor may be requested to hire a professional consultant to complete professional design services and calculate wind loads if not already included in the line item price. However, the County reserves the right to obtain its own professional services.

- B. Professional services obtained by the Contractor, such as architectural, engineering, registered surveying and mapping, and landscape architecture, will be evaluated based on licensing, professional qualifications and relative experience in the specified scope of work. Professional services are limited per the Florida Competitive Consultant Negotiation Act (CCNA) restrictions set forth in Sections 287.017 and 287.055, Florida Statutes, as amended. Statutes dictate the maximum project size and project cost.
- C. All professional service quotes shall be itemized. The itemized quote shall include the applicable job titles (such as Registered Architect, CAD technician, Inspector, Survey Crew), number of hours per task (such as design development, permitting, etc.) and hourly rates necessary to complete the work. Also included are the costs for CAD files, signed and sealed drawings, studies and PDFs as requested by County. If the professional service provider is currently under contract with the County for similar services, the hourly rates shall be less than or equal to the contracted rates. Contractor is encouraged to obtain quotes from more than one consultant.
- D. Refer to other Division 1 sections such as References, Quality Control and Quality Assurance for minimum requirements of the professional services consultants and testing services.
- E. All deliverables and electronic files shall become the property of County upon acceptance.
- F. **Retainage applies to this allowance.**

1.4 PERMITS AND FEES FOR NON-BROWARD COUNTY AGENCIES, UTILITIES AND TESTING

- A. Contractor is responsible for submitting and securing permits and for maintaining the permit in an active status. Any permit that expires shall be reactivated by the Contractor at no cost to the County.
- B. This allowance is for the reimbursement of the following:
 - 1. Testing services such as for materials and subsoil investigations which may be required for professional services or permits
 - 2. Reimbursement of all non-Broward County Board of County Commissioners issued permit
 - 3. Inspection and impact fees
 - 4. Special Inspector fees if incurred by Contractor
 - 5. Certificates of occupancy or completion
 - 6. Impact fees
 - 7. Fees required of the various utility providers such as Florida Power & Light (FPL), Comcast and AT&T
 - 8. Fees required of water districts
- C. Refer to the allowances section of the **Special Instructions for Vendors** for further information.
- D. County shall not be responsible for payment of re-inspection fees, permit expediting services or expired permits.
- E. Any overages will be deducted from the project by a reduction to the purchase order.
- F. Retainage shall not be applied to this allowance.

PART 2 - PERMITS AND FEES FOR BROWARD COUNTY AGENCIES

2.1 GENERAL

- A. All permit and inspection fees, certificates of occupancy, certificates of completion, and fees required of the departments of Broward County Board of County Commissioners, such as those of the Building Code Services Division and Water Management Division, and locations within the Broward Municipal Services District (BMSD) and some parks such as Quiet Waters and Markham, may be paid directly between County departments and payment is not the responsibility of the Contractor. Refer to the public bid disclosure section of the **Special Instructions for Vendors**. These costs are not an Allowance.

- B. Contractor's proposal should **exclude** the costs above for Broward County agencies as the Contractor will not be responsible for these costs.
- C. County shall not be responsible for payment of re-inspection fees, permit expediting services or expired permits resulting from the Contractor's actions.
- D. Contractor is responsible for submitting and securing permits. Contractor is responsible for submitting and securing permits and for maintaining the permit in an active status. Any permit that expires shall be reactivated by the Contractor at no cost to the County.
- E. Contractor shall notify the County Project Manager once the fees have been tabulated and shall provide a copy of the permit and fee invoices for direct payment between the County departments. Payment between the departments typically takes up to seven business days.
- F. Upon payment verification, County Project Manager will contact the Contractor to pick up the permits and proceed with the Work.

PART 3 - GENERAL CONDITIONS

3.1 GENERAL

- A. **General conditions include costs incurred by the Contractor which are not included in any line item costs** such as:
 - 1. Mobilization
 - 2. Maintenance of traffic
 - 3. Travel time and costs for all line items and allowances
 - 4. Permitting and inspection time with the building department and other authorities having jurisdiction (AHJs)
 - 5. Research, estimating and scheduling time
 - 6. Project proposal preparation
 - 7. Premiums for Contractor's payments and performance guarantees, Builder's Risk, Installation Floater, Professional Liability (Errors & Omissions) and Pollution/Environmental Liability
 - 8. Security/background screening
 - 9. Attendance and participation in meetings
 - 10. Contractor's Safety Program, OSHA, first aid and confined space requirements
 - 11. Quality control program
 - 12. Daily project and site superintendence
 - 13. Temporary site, tree, water, animal and plant protection and barriers
 - 14. Temporary utilities such as power and a generator
 - 15. Erosion and pollution controls
 - 16. Storage and work areas
 - 17. Sanitation, waste and recycling
 - 18. Photographic documentation
 - 19. Means and methods of construction which are not a permanent improvement to the site
- B. **General Conditions will remain fixed at the same percentage(s) for the life of the Contract; there will be no price adjustments.**
- C. **Calculation and application of General Conditions will apply to all line items and the Provide Miscellaneous Construction Materials and Services allowance items only.**
- D. Additional information may be included in the **Special Instructions to Vendors.**

END OF SECTION

SECTION 01 22 00 PROTOTYPE STRUCTURES PRICING

PART 1 - GENERAL

1.1 SCOPE

- A. The lump sum pricing for the prototype structures (restroom buildings and picnic shelters designed by Broward County and included as Drawings within the contract) includes all work and components included in the Drawings such as foundation, footings, soil (termite) treatment, connection to utilities, structure, lightning protection, utilities within and on the structure, finishes, accessories as well as all labor, daily project superintendence and equipment necessary for the construction of a turnkey structure. Signed and sealed roof truss shop drawings provided by the manufacturer are also included in the lump sum price. County reserves the right to make *minor* changes to the Prototypes without additional compensation to the Contractor, such as for inclusion of different light fixtures or an additional electrical outlet.
- B. The lump sum pricing excludes surveying, landscaping, site improvements, structural fill, surveying, testing services, special inspector services, installing new utilities such as power and water at the site of the prototype structure, and sidewalks connecting to the new prototype structure.
- C. Prior to commencing the work, Contractor shall be responsible for applying for and obtaining all necessary permits from all authorities having jurisdiction.

1.2 RELATED DOCUMENTS

- A. Refer to Drawings for layout and components.
- B. Refer to other sections of the Project Manual for minimum specifications, quality assurance, and approved products to be incorporated into the prototype structure as well as additional references and definitions.

1.3 QUALITY ASSURANCE

- A. Contractor shall provide prototype structures of very good or best quality.

1.4 WARRANTY

- A. Provide a minimum one-year warranty of the prototype structure from the date of time of substantial completion. Warranties for products used within or on the structure itself may require different warranties as detailed in other sections of the Project Manual. Warranty includes the removal and replacement of any failed or non-compliant components, parts and materials and the supply, delivery and installation of replacement components, parts and materials at no additional cost to the County.

PART 2 - PRODUCTS

2.1 LIGHTING REQUIREMENTS

- A. Vandal-resistant
- B. Vapor proof or waterproof at all restrooms and at exterior locations
- C. For locations requiring lighting that is turtle-friendly or meets dark sky requirements, provide products that have been approved for such use by the Florida Fish and Wildlife Conservation Commission (FWC) or equivalent certifying agency.
- D. Provide products from the following pre-approved manufacturers: Cooper Lighting, Eaton, Kenall, Larson, Lithonia, Luminaire, Luminus-Nautilux, Pinnacle and Stonco Lighting.

2.2 VENTILATION/EXHAUST REQUIREMENTS

- A. Product shall be designed for commercial AND wet/humid applications
- B. When available, provide Energystar or similar rating
- C. UL listed
- D. Corrosion-resistant finish

- E. Provide products from the following pre-approved manufacturers: Broan, Dayton, Greenheck, PennBarry Zephyr and Panasonic.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

- A. Inspect all components upon delivery and prior to installation to ensure that components are not damaged and that all components are received. Failure to do so is not cause for an extension to the project time or compensation unless approved in writing by the County Project Manager through a change order.
- B. Store materials in accordance with Division 1 requirements.

3.2 INSTALLATION

- A. Notify the County Project Manager concerning any unforeseen surface or subsurface feature, such as a utility, encountered during excavation or site clearing. Proceed only after unsatisfactory conditions have been corrected.
- B. All construction and installations shall be laid out by the Contractor and Installer in accordance with the survey and approved drawings.
- C. Any variations from the drawings and survey must be approved, in writing, by the Consultant or County Project Manager.

END OF SECTION

SECTION 01 25 13 PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. General requirements applicable to approved equal/substitutions of products, materials, equipment, systems and method of construction. Additional instructions are included in the Common Product Requirements and Reference Standards and Definitions sections.

1.02 ADDITIONAL DEFINITIONS

- A. Approved equals (a/k/a Substitutions): Products, materials, equipment, systems and method of construction other than the basis of design; this includes County pre-approved or accepted products and manufacturers as listed in the Contract Documents. Refer to the Division 1 References, Product Options and Common Product Requirements sections for more information.

1.03 GENERAL REQUIREMENTS

- A. Based upon the Owner's contract with the Consultant, the County Project Manager may assist in the review and approval of substitutions and product selection. Therefore, in this section of the Project Manual, the Consultant and County Project Manager may be used interchangeably.
- B. Substitutions are not allowed for products or manufacturers in which the Drawings and/or specifications state "no substitutions" or similar phrase.
- C. Refer to the Reference Standards and Definitions for additional instructions and limitations of approved equals and substitutions.
- D. **As each project is unique, a previously substituted product from another contract or project does not constitute an approval under the Contract. Refer to each section for minimum requirements of products offered.**
- E. County reserves the right to deny a substitution based on past performance of the product.
- F. **No extensions of time will be provided to Contractor for submittal, review or acceptance of substitutions.**
- G. No more than one substitute will be reviewed for each type of product.
- H. The following are not considered substitutions:
 - 1. Revisions to Contract Documents requested by the Owner or Consultant.
 - 2. Specified and/or approved products (where both the manufacturer and model name are listed) and construction methods included in Contract Documents. In most cases, the Contractor has been provided three products from which to choose.
 - 3. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.
 - 4. The Contractor's unilateral incorporation of non-specified products, materials and equipment into the Work.
 - 5. The Contractor's unilateral incorporation of products, materials and equipment into the Work which do not conform to the requirements of the Contract Documents and which are not approved by the County Project Manager and/or Consultant.

1.04 SUBMITTALS

- A. Substitution Request Submittal: Submit all substitution requests to the Consultant and County Project Manager (Reviewers) on Document (Form) 01630A. Substitution requests on other forms or submitted by other means will not be reviewed. This completed form with supporting documentation should be emailed to the Consultant and County Project Manager.
 - 1. Include the information and documentation required on the document and other information necessary for an evaluation by both the County Project Manager and the Consultant.
 - 2. Substitution requests deemed incomplete or incorrect by the Consultant or County Project Manager shall not be approved and will not be re-reviewed.
 - 3. The County Project Manager's approval or disapproval decision, which may be based upon recommendations of the Consultant or County staff, shall be final.

- B. **Requests for substitutions shall be considered within 10 calendar days from issuance of the first Notice to Proceed and prior to issuance of permit. Unless due to force majeure, substitution requests received after this deadline shall not be considered for approval.**
- C. **Contractor shall bear all costs for substitutions including but not limited to permit, planning and/or application revisions and re-submittals, liquidated damages, letters of authorization, stamped/signed and sealed drawings and inspections. The Consultant and its subconsultants reserve the right to be compensated by the Contractor for the review and design time for substitutions.**
- D. Identify the product, the fabrication and installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - 1. Product data, including Drawings and descriptions of product, fabrication and installation procedures.
 - 2. Confirm, in writing, that the substituted product is equal to, meets or exceeds **each** of the criteria listed in the applicable specification or drawing criteria.
 - 3. Samples, where applicable or requested.
 - 4. A detailed, point by point comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, appearance and design flourishes, performance, color and visual effect.
 - 5. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Contractor and separate County contractors that will become necessary to accommodate the proposed substitution. For instance, a substitution of a water closet flushometer may require changes in the design and needs of the electrical and plumbing systems.
 - 6. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - 7. Cost information, including a proposal of the net deduction in the Contract Sum and costs between the County and Consultant for submittal reviews.
 - 8. Describe any modifications that will be made to the product so that it will conform to the design intent and minimum requirements as detailed in the Contract Documents.
 - 9. Refer to the basic and minimum product requirements and product option specifications in Division 1 for more information.
 - 10. **Certification by the Contractor that the proposed substitution is equal to or better in every significant respect to that required by the Contract Documents, and that the substitution will perform sufficiently in the application indicated.** Include the Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
 - 11. **The burden of proof lies with the Contractor and not the County or Consultant. County and Consultant shall not be responsible for conducting any additional research other than the documentation provided by the Contractor.**

1.05 REVIEWER'S ACTION

- A. The Reviewer (Consultant or County Project Manager) may request additional information or documentation necessary for evaluation of the request. If not received in a timely manner and within the stated deadlines, the substitution may be rejected.
- B. The Consultant or County Project Manager will notify the Contractor of the acceptance or rejection of the proposed substitution.
- C. **If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use one of the specified and approved products rather the substitution**
- D. Acceptance:
 - 1. Acceptance will be in the form of Document (Form) 01250F for accepted substitutions which do not alter the Contract Sum or Time.

PART 2 - PRODUCTS

2.01 CONDITIONS

- A. The Contractor's substitution request (request) will be received and considered by the Consultant and County Project Manager when one or more of the following conditions are satisfied as determined by the Consultant or County Project Manager:
 - 1. The request is timely, fully documented and properly submitted in accordance with the conditions of this Section and the Contract Documents; and
 - 2. The request is not directly related to a product or manufacturer for which “no substitutions” or similar phrase is stated.
 - 3. The specified product or method of construction is no longer available during the course of the Work or cannot be provided within the Contract Time. The request shall not be considered if the product or method cannot be provided as a result of the Contractor’s failure to pursue the Work or place orders promptly or coordinate activities properly.
 - 4. The County Project Manager or Consultant has deemed the specified product or method is no longer suitable or appropriate for incorporation into the Work or does not meet current code requirements.
 - 5. One of the following substantial, significant advantages (value engineering) is offered to the County: significant cost reduction; significant time reduction; or other considerations of merit, after deducting offsetting responsibilities the County and Contractor may be required to bear. Contractor’s additional responsibilities include additional compensation to the Consultant (and its subconsultants) for re-design, permit re-submittal, revised letters of authorization, evaluation services, increase in cost of other construction or utilities by the County or separate County contractors, and similar considerations.
- B. Where a proposed substitution involves the work or services of other contractors or Owner’s personnel, the Contractor shall cooperate with all others involved to coordinate the Work, provide uniformity and consistency, and to assure compatibility of products.

2.02 COMPLIANCE WITH CONTRACT DOCUMENTS

- A. The Contractor's submittal and Consultant's or County Project Manager’s acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.
- B. Replacement of products, materials and equipment not specified or not complying with the Contract Documents is the sole responsibility of the Contractor.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 29 00 PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment. Refer to Division 1 for administrative requirements governing preparation and the Special Instruction to Vendors for general requirements of all County contracts.

1.2 APPLICATIONS FOR PAYMENT (IN ADDITION TO THE SPECIAL INSTRUCTIONS TO VENDORS)

- A. Each project requires its own Application for Payment. Do not lump or group multiple projects into one invoice.
- B. Each Application for Payment shall be consistent with previous applications and payments as certified by Consultant, County's Field Inspector and County Project Manager and paid for by County and shall be coordinated with the Project Proposal.
 - 1. Each application should be emailed to the applicable County Project Manager or designee.
 - 2. Each Application shall include the following attachments in electronic formats, as may be applicable:
 - a. Copy of the County and Contractor agreed upon Project Proposal
 - b. Release of liens from previous payment application or Consent of Surety, if applicable
 - c. Itemized invoice with applicable line items and allowances
 - d. Log of revised quantities of line items
 - e. Aerial and Site Photographs (when required)
 - f. Daily Construction Reports
 - g. Updated Project Schedule and Catch up work plan (if behind schedule)
 - h. Supporting evidence for any project delays
 - i. Goal participation reports
 - j. Updated Security Affidavit for the project
 - k. Supporting documents and additional requirements for any Allowances as set forth in Division 1
 - l. Retainage amount and items these apply to
 - m. For hourly line items such as for heavy equipment and labor, if requested, provide supporting documentation such as certified payroll stubs for the labor or an invoice from the equipment rental company to substantiate the hours being charged
- C. Payment for materials and equipment stored at the project site shall be equal to 90% of the invoiced amount of the materials and equipment. Additionally, retainage on 90% of the invoiced amount shall be paid as per this section. The invoiced amount shall be based on the value of all acceptable materials and equipment not yet incorporated in the Work but delivered and suitably stored at the project site and **scheduled for installation at the project site within 30 calendar days of the date of the Application for Payment as verified by the County Project Manager or Consultant. Copies of the supplier's invoices for the materials and equipment and anticipated installation start date shall be included with the Application for Payment.**
- D. Payment for all Allowances, General Conditions and line items will be based on the percentage of Work completed for the item, upon verification by the County Project Manager or Consultant.
- E. County Small Business Forms: With each Application for Payment, submit a Monthly Utilization Report (MUR) and apprenticeship forms as amended.
- F. Waivers of Liens: With each Application for Payment, submit waivers of liens from subcontractors, subconsultants, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit final or full waivers.
 - 3. County reserves the right to designate which entities involved in the Work must submit waivers.

4. Submit final Application for Payment with final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to County.
- G. Partial Payments shall only be made upon approval of the Contractor's Application for Payment showing work performed and completed as detailed above.
- H. At each partial progress payment, ten percent (10%) of all monies earned by the Contractor shall be retained (Retainage) by the County until the project has reached final completion and acceptance by County.
- I. Retainage will be applied to the Miscellaneous Construction and Services allowance.

1.3 FINAL COMPLETION OF PROJECT

- A. The release of retainage shall not become due until all Work is (100%) complete and the project has reached final completion and acceptance by the County.
- B. Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of project Closeout Procedures included in Division 1 such as safety audits required of playgrounds.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Affidavit of Payment of Debts and Claims, if applicable.
 4. Affidavit of Release of Liens, if applicable.
 5. Consent of Surety to Final Payment, if applicable.
 6. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Final Completion, if applicable.
 7. Final, liquidated damages settlement statement, if applicable.
 8. Final CBE Utilization Report for the project along with payment affidavits from each Broward County certified CBE subcontractor, subconsultant and supplier, if required by Contract.
 9. Final list of subcontractors, suppliers and subconsultants for the project.
 10. Any other requirements of the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 30 00 ADMINISTRATIVE REQUIREMENTS (HOW TO USE THE CONTRACT)

PART 1 – GENERAL

1.1 APPROVAL TO USE CONTRACT

- A. The Using Agency's County Project Manager shall provide the Contract Administrator with a detailed description of the proposed work and the name of the County Project Manager that will be and managing and supervising the construction project. The Contract Administrator will then determine whether or not the proposed work falls within the scope of the contract.
- B. If the project is to proceed, the County Project Manager shall estimate the project cost as detailed in the Special Instructions to Vendors. Once the low contractor has been established, the County Project Manager will then proceed with obtaining the project proposal as detailed below.
- C. Additional instructions are included in the Summary of Work section in Division 1.
- D. In this Section, the term "Contract Administrator" may also refer to a person designated to act on behalf of the Contract Administrator such as an employee of the Parks Planning and Design section.

1.2 COUNTY PROJECT MANAGEMENT

- A. County Project Manager shall familiarize her/himself with the Contract prior to commencing work under this Contract.
- B. All instructions and communications to the Contractor shall be by and through the County Project Manager or his/her designee. This person is the point of contact for the project and is responsible for all project proposal approvals, construction management, invoice approval and abiding by the requirements of the Contract.

1.3 PROJECT PROPOSAL REQUEST

- A. There is no minimum project amount. **The Contractor cannot decline projects as stated in the Special Instructions.**
- A. A project proposal from the Contractor is required for all work to be completed under this Contract. Unless otherwise stated in writing by the County Project Manager, Contractor shall provide a complete, comprehensive project proposal **within 30 calendar days** of County's request and receipt of all necessary information from the County. This may require both the Contractor and County Project Manager to conduct a site visit/scoping meeting. If the proposal is incomplete or not provided within the County's deadlines, the County reserves the right to assign the project to another contractor.
- B. The project proposal shall include **all** of the following information:
 - 1. Excel spreadsheet or similar (to be completed after award of contract and provided to all contractors)
 - a. County Project Manager's name, agency and contact information.
 - b. Contract number.
 - c. Name of project (such as TY Park Water Main Replacement or Easterlin Park West Restroom).
 - d. Anticipated milestones (calendar days or dates for completion of permitting, substantial and final completion)
 - e. Any important information that may affect the project such as park closures, site access, additional watering period beyond final completion, prevailing wage rate applicability, etc.
 - f. Itemized list of proposed allowances and costs per the allowance requirements.
 - g. Contractor's proposed on-site Superintendent or Project Manager responsible for the project.
 - h. Proposed CBE subcontractors and suppliers with subcontracting amounts.
- C. **The Contract Administrator reserves the right to review, approve and deny any project proposals.**
- D. **The Contract does not allow for negotiations or reinterpretations of line items or terms and conditions of the Contract Documents.**

1.4 APPROVAL OF PROJECT PROPOSAL

- A. **The County Project Manager and Contractor shall mutually agree to the project milestones, time for completion, scopes of work, applicability of liquidated damages, quantities, and any allowances prior to issuance of the purchase order.** Make any necessary changes to the Excel spreadsheet; both parties shall sign the spreadsheet to signify acceptance. Email the project proposal and all supporting documentation (breakdown of allowance, written justification for any additional labor, etc.) to the Contract Administrator for final approval.
- B. Upon approval of the Project Proposal by the Contractor, County Project Manager and Contract Administrator, a purchase order may be issued. **However, work shall not commence until the applicable Notice to Proceed has been issued by the County Project Manager.**
- C. Should the provided quantities differ from the quantities included in the approved project proposal, the purchase order will either be revised to reflect the provided quantities or an additional purchase order will be issued for the additional quantities.

1.5 REQUISITION INSTRUCTIONS FOR USING AGENCIES

- A. Using Agency will attach the signed Excel spreadsheet and all supporting documents for allowances.
- B. Do not abbreviate the location in the header of the requisition; use TY Park, Deerfield Island, etc.
- C. The requisition shall clearly state the scope of work, such as TY Park Water Main Replacement.
- D. In the header or description, include the name, agency and contact information for the County Project Manager responsible for managing the project.

1.6 NOTICES TO PROCEED

- A. An NTP shall be issued after the purchase order is issued and upon receipt of all required documents and schedules including additional insurance certificates as may be required by the Contract (such as professional liability and pollution) and which have been approved in writing by the Risk Management Division. Contractor will have the new project added either to the Contractor's blanket installation floater or builder's risk policy, as best determined by the Contractor's insurance provider. Proof may be requested of the County.
- B. NTP 1 will be issued to commence the permitting phase, and NTP 2 will be issued to commence the construction work.
- C. If issued by an agency other than that of the Contract Administrator, copy the Contract Administrator on all Notices to Proceed.
- D. Each NTP should include the following information:
 - 1. County Project Manager's name, agency and contact information (phone and email).
 - 2. Contract number.
 - 3. Name of project (such as TY Park Water Main Replacement).
 - 4. Purchase order number.
 - 5. PDF copy of the approved project proposal with line items and quantities.
 - 6. Date to commence the work or permitting.
 - 7. Mutually agreed upon times for completion and milestones (in calendar days or as a set date) including preconstruction work (permitting), substantial and final completion.
 - 8. Security/background screening affidavits which must be updated monthly.
 - 9. Statement that all work shall be completed in accordance with the Contract terms, conditions, pricing and agreed upon schedule.
 - 10. Anything additional such as keyed access to the site, permitting authority, days and hours the site is not available, staging, etc.
 - 11. If the invoices are to be sent to an address different than the one listed on the purchase order, please state to whom and where to send invoices.

12. List of subcontractors, subconsultants and suppliers, including those that are Broward County CBE certified.

1.7 LIQUIDATED DAMAGES

- A. Unless agreed to in writing by both the County Project Manager and Contractor prior to approval of the project proposal, liquidated damages shall apply and are as follows for each project:
 1. Refer to the approved and signed project proposal for the scheduling milestones which will be used for the liquidated damages.
 2. The Preconstruction Work initiated in NTP 1, such as permit attainment, shall be completed within 60 calendar days from the project initiation date specified in the NTP 1 unless otherwise noted.
 3. The mobilization and physical construction work shall commence within 30 calendar days of issuance of permits, unless otherwise instructed by the County Project Manager, and shall be completed within the agreed upon time from the date of issuance of NTP 2, and completed and ready for final payment within the mutually agreed upon time from the date certified by Consultant or County Project Manager.
 4. Upon failure of Contractor to complete the Preconstruction Work within the specified period of time, plus approved time extensions, Contractor shall pay to County the sum of \$56.00 for each calendar day after the time specified above, plus any approved time extensions, for the Preconstruction Work. After the Preconstruction Work should Contractor fail to complete the Contract and obtain Final Completion within the specified period of time, plus approved time extensions, Contractor shall pay to County the sum of \$165.00 for each calendar day after the time specified above, plus any approved time extensions, for completion and readiness for final payment. These amounts are not penalties but are liquidated damages to County for its inability to obtain full beneficial occupancy of the Project. Liquidated damages are hereby fixed and agreed upon between the parties, recognizing the impossibility of precisely ascertaining the amount of damages that will be sustained by County as a consequence of such delay, and both parties desiring to obviate any question of dispute concerning the amount of said damages and the cost and effect of the failure of Contractor to complete the Contract on time.

1.8 DELIVERIES AND ORDERS

- A. Contractor is solely responsible for ordering, purchasing, and scheduling the delivery of all items required for the completion of the work on a timely basis. All items must arrive at the jobsite when needed.
- B. County will not sign for or receive any deliveries for projects assigned under this Contract.
- C. Contractor shall be prepared to provide the County Project Manager with a letter from the applicable product manufacturer indicating the date on which the order was submitted to the manufacturer and when it will be delivered to the job site. **The Contractor shall be found at fault for any product order not received by the manufacturer on or before 30 calendar days after the issuance date of the NTP 2.**

1.9 PROCEDURE FOR PRICE ADJUSTMENTS AT CONTRACT RENEWAL

- A. Refer to the **Special Instructions to Vendors** for may include additional information.
- B. **Price adjustments are not applicable to the Contractor's general conditions.**

END OF SECTION

SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project and Requests for Information (RFI) from Contractor seeking interpretation or clarification of the Contract Documents.

1.2 COUNTY RESPONSIBILITIES

- A. The requesting agency is responsible for obtaining and reviewing all proposals, purchase orders, pass-thru requests and design services included in the Contract.
- B. Requesting Agency is responsible for coordinating, overseeing and managing its construction projects issued under this Contract. The Requesting Agency's County Project Manager shall be experienced in construction project management.
- C. Agencies cannot impose any additional requirements such as additional background screenings/clearance requirements such as those for Port Everglades or Aviation departments, Buy America and federal requirements and supplements.
- D. Detailed information is provided in the Administrative Requirements section of the Project Manual.

1.3 CONTRACTOR'S ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. For **each** Project location, Contractor shall provide a competent, English-speaking Superintendent and any necessary assistants, all satisfactory to Consultant and County Project Manager. The role of the Superintendent is to:
 - 1. Acts as the supervisor and main point of contact for the Project
 - 2. Enforce all safety protocols
 - 3. Attend all meetings and have the authority to make decisions on behalf of the Contractor
 - 4. Oversee all Work including those completed by subcontractors and trades
 - 5. Evaluate the construction and prepare a daily job report
 - 6. Be responsible for all coordination, quality control and quality assurance
 - 7. Scheduling and accepting of deliveries to the job site (neither the County nor Consultant shall accept any deliveries on behalf of the Contractor)
- B. The Superintendent shall not be replaced without prior consent of the County Project Manager and Consultant.

1.4 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with subcontractors and other County contractors or to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for County Project Manager and separate subcontractors if coordination of their Work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other County contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule (required prior to NTP 2) if applicable
 2. Preparation of the Schedule of Values (required prior to NTP 2) if applicable
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Pre-installation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
 9. Monthly criminal background screening Affidavit submittal per the Additional Security Requirements for Parks and Recreation portion of the Contract Documents.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of Consultant's architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate required installation sequences.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Consultant for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
 2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
 3. Number of Copies: Submit six opaque copies of each submittal. Consultant will retain three copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.
 4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
- B. Key Personnel List: To be provided prior to or at the Pre-Construction Conference.
1. Contractor may not subcontract supervisory responsibilities of its key personnel such as the Superintendent or Project Manager.
 2. County Project Manager and Consultant will review all supervisory personnel qualifications. Any individual not acceptable shall be replaced by someone satisfactory to the County Project Manager and Consultant.
 - a. The Consultant or County Project Manager may require replacement of supervisory individuals for poor performance and management, quality control problems, project delays, lack of oversight, etc. The Contractor shall comply with such request within 5 business days.

- b. Contractor shall provide independently certified background checks, if required, to comply with state and local regulations. Any individual who does not pass the mandated requirements shall be removed immediately and replaced with someone with a clean background. Refer to the Parks and Recreation Division background check requirements listed elsewhere in the Contract Documents.
3. Post copies of the key personnel list in common areas used by the Contractor such as the storage trailer, temporary field office, and by each temporary telephone. Keep this list current at all times.
4. Provide names, email addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1.6 MEANS AND METHODS OF CONSTRUCTION

- A. Unless otherwise expressly provided in the approved project proposal and Contract, the means and methods of construction shall be such as the Contractor may choose; subject, however, to the Contract Administrator's right to reject the means and methods of construction proposed by the Contractor which in the opinion of the County or Consultant:
 1. Will constitute or create a hazard to the Work, or to persons or property; or
 2. Will not produce finished Work in accordance with the terms of the Contract; or
 3. Will be detrimental to the overall progress of the Project.
- B. The Consultant or County Project Manager's approval of the Contractor's means and methods of construction, or its failure to exercise its right to reject such means or methods, shall not relieve the Contractor of its obligation to complete the Work as provided in this Contract; nor shall the exercise of such right to reject create a cause of action for damages.
- C. If the Contractor proposes to modify the means and methods of construction after the County issues a Notice to Proceed, the County must approve the modification, and the modification may require a change to the approved project proposal and change in quantities. There will be no charge to the County for the Contractor's requested modification.

1.7 PROJECT MEETINGS

- A. Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify County Project Manager and Consultant of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including County Project Manager and Consultant, within three days of the meeting.
- B. Pre-construction Conference: After issuance of the first Notice to Proceed and prior to the start of construction, the County will schedule and administer a pre-construction conference as detailed further in Division 1.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction. Contractor and its subcontractors performing the services, such as the Installer and Manufacturer's representative, shall be in attendance.
 1. Do not proceed with installation if the pre-installation conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at intervals as necessary. Coordinate dates of meetings with preparation of payment requests.
 1. Attendees: Consultant, County Project Manager and other County staff as necessary, Contractor, and other entities (subcontractor, supplier or subconsultant) concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

- a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time. Review schedule for next period.
- b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements
 - 2) Sequence of operations
 - 3) Status of submittals
 - 4) Deliveries
 - 5) Off-site fabrication
 - 6) Access
 - 7) Site utilization
 - 8) Temporary facilities and controls
 - 9) Hazards and risks
 - 10) Progress cleaning
 - 11) Quality and work standards
 - 12) Status of correction of deficient items
 - 13) Field observations
 - 14) RFIs
 - 15) Pending changes
 - 16) Status of changes in quantities of line items
 - 17) Documentation of information for payment requests
3. Minutes: Record and prepare the meeting minutes.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.8 REQUESTS FOR INFORMATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified. Complete Document 01310A.
 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following on Document (Form) 01310A:
 1. RFI number, numbered sequentially
 2. Specification Section number and title and related paragraphs, as appropriate
 3. Drawing number and detail references, as appropriate
 4. Field dimensions and conditions, as appropriate
 5. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 6. Contractor's signature
 7. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation. Supplementary drawings prepared by Contractor shall include dimensions, structural grid references, and details of affected materials, assemblies, and attachments.
 8. Identify each page of attachments with the RFI number and sequential page number.

- C. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
1. RFIs and attachments shall be electronic files in Microsoft Word Document or .PDF format.
- D. Consultant's Action: Consultant will review each RFI, determine action required, and return it. Allow seven business days for Consultant's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following business day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals or substitutions.
 - b. Requests for coordination information already indicated in the Contract Documents.
 - c. Requests for adjustments in the Contract Time or the Contract Sum.
 - d. Requests for interpretation of Consultant's actions on submittals.
 - e. RFIs which are incomplete or with numerous errors.
 2. Consultant's action may include a request for additional information, in which case Consultant's time for response will start again.
 3. Consultant's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1.
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Consultant in writing within 10 days of receipt of the RFI response.
- E. Upon receipt of Consultant's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Consultant within seven days if Contractor disagrees with response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly. Include the following:
1. Contract name and number.
 2. Name and address of Contractor.
 3. RFI description.
 4. Date the RFI was submitted.
 5. Date Consultant's response was received.
 6. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 19 PRE-CONSTRUCTION MEETING

PART 1 – GENERAL

1.1 DESCRIPTION

- A. County may schedule a pre-construction meeting to be attended by the Contractor's Superintendent, Contractor's Project Manager, Consultant, County Project Manager, County Inspector, and subconsultants of the Contractor. This meeting will be scheduled prior to the second Notice to Proceed. County Project Manager will distribute an agenda and preside over the meeting.
- B. The purpose of this meeting is to designate responsible personnel, establish working relationships, discuss schedules submitted by Contractor, and review administrative and procedural requirements for the Project. Matters requiring coordination will be discussed and procedures for handling such matters will be established.
- C. Contractor shall provide information required and contribute appropriate items for discussion. Contractor shall bring to the meeting the following, with sufficient number of copies for each attendee:
 - 1. Progress Schedule.
 - 2. Schedule of Submittals.
 - 3. Schedule of Values.
 - 4. List of emergency contact information including the Contractor's Owner, Superintendent and Project Manager.
 - 5. Name, contact information and qualifications for the Contractor's third party testing, inspecting and certifying agency, special inspector and/or professional engineer.
- D. Consultant shall provide the name and contact information for its designated Project Manager or Superintendent that will be responding to Requests for Information, shop drawing reviews, etc. and who is authorized to make decisions on behalf of the Contractor.

1.2 AGENDA

- A. Items to be discussed at the pre-construction meeting may include:
 - 1. Designation of key personnel and their duties for the Consultant, County and Contractor
 - 2. Agreed upon milestones and time for completion
 - 3. Communication chain of command between the Contractor, County and Consultant
 - 4. Notices to Proceed
 - 5. Authorities having jurisdiction
 - 6. Coordination of Work and other on-site projects
 - 7. Background screening requirements and affidavit submittals
 - 8. Payment requests and retainage
 - 9. Pass-thru allowance requirements, if applicable
 - 10. Progress meeting schedule
 - 11. Pre-installation meeting requirements and schedule
 - 12. Project and Contractor's Signage requirements and limitations
 - 13. Media inquiries
 - 14. Contractor's Safety Program, OSHA, first aid and confined space requirements, as applicable
 - 15. Plan to prevent, control and reduce erosion and water pollution, if applicable
 - 16. Site security requirements
 - 17. Insurance
 - 18. Prevailing Wages
 - 19. Utility provider and outages
 - 20. Office, work and storage areas
 - 21. Daily waste removal, recycling and hazardous materials
 - 22. Mobilization
 - 23. Site restrictions such as noise, traffic, work hours, site access, water, power, parking, etc.
 - 24. County program requirements such as workforce
 - 25. Deliveries; County will not accept deliveries on behalf of the Contractor

26. Record drawings/as-builts
 27. Shop drawing submittal requirements
 28. Sample submittal requirements
 29. Requests for Information (RFI) submittal requirements
 30. Site restoration
 31. Any other project-specific requirements
 32. Protection of adjacent work and property
 33. Substitution procedures if the deadline has not yet passed
- B. Contractor will record significant meeting discussions, agreements, and disagreements, including required corrective measures and actions.
- C. Contractor will distribute minutes of the meeting to the attendees.

PART 2 – NOT USED

PART 3 – NOT USED

END OF SECTION

SECTION 01 32 33 PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Some projects will require photographic documentation. These are the minimum requirements.

1.2 QUALITY ASSURANCE

- A. Photographer Qualifications: An individual or company routinely hired for and experienced in photography of construction projects and in accordance with the References section in the Project Manual.

1.3 SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building (if applicable) with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same label information as corresponding set of photographs.
- B. Construction Photographs: Submit three sets of prints or two CD/DVDs with each payment application.
- C. Acceptable Color Photography Media:
 - 1. 35 mm, medium speed (ISO 100-200) camera or
 - 2. 15 megapixel (minimum) digital camera
- D. Acceptable Size Formats:
 - 1. Minimum 3200 by 2400 pixels with same aspect ratio as the sensor, uncropped, date and time stamped and without watermarks or
 - 2. 8 by 10 inch smooth-surface matte prints on single-weight commercial-grade photographic paper, enclosed back to back in clear plastic sleeves that are punched for standard 3-ring binder.
- E. Identification:
 - 1. Digital Format: Provide on a CD/DVD, in a plastic jewel case:
 - a. For the JPEG file naming convention, use the following format: date the picture was taken (MMDDYYYY), Contract Number, and then by the picture number (###). Example: 02172018-PW1411C1-001 (February 17, 2018 Contract PW1411C1 Picture 001).
 - b. For the jewel case and on the front of the CD/DVD, provide the following information:
 - 1) Contract name and number.
 - 2) Name and contact information for the Photographer.
 - 3) Name of Contractor.
 - 4) Date photographs were taken.
 - 2. For non-digital photography, on the back of each print, provide an applied label or rubber-stamped impression with the following information:
 - a. Contract name and number.
 - b. Name and contact information for the Photographer.
 - c. Name of Contractor.
 - d. Date photograph was taken if not date stamped by the camera.
 - e. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - f. Unique sequential identifier.

1.4 COORDINATION

- A. Auxiliary Services: Cooperate with Photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities such as temporary lighting required to produce clear, well-lit photographs without obscuring shadows.

1.5 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from Photographer to Owner and Consultant for unlimited reproduction of photographic documentation.
- B. Photography shall not include any watermarks.

1.6 ADDITIONAL ITEMS

- A. Storage: Photographer shall retain these photographic negatives or digital photographs for at least three years after date of Substantial Completion. During this period, Photographer shall fill orders by Consultant or Owner for extra prints. Photographer shall price extra prints at prevailing local commercial prices and charge the entity requesting the prints.
- B. Extra Prints: If requested by Consultant or Owner, photographer shall prepare extra prints of photographs. Photographer shall distribute these prints directly to designated parties who will pay the costs for extra prints.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field and in focus to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Film Images:
 - 1. Field Office Prints: Retain one set of progress photography in the field office at Project site, available at all times for reference. Identify photography same as for those submitted to Consultant.
- C. Pre-construction Photography: Before starting construction and/or demolition, take color photographs of Project site and surrounding properties, including existing items to remain during construction and those that will be re-located, from different vantage points.
 - 1. Flag construction limits before taking construction photographs.
 - 2. Take at least eight photographs to show existing conditions adjacent to property before commencement of the Work.
 - 3. Take at least eight photographs of existing buildings or important features either on or adjoining property to accurately record physical conditions at start of construction.
 - 4. Take additional photographs to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take at least four aerial color photographs monthly, with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Final Completion Construction Photographs: Take at least eight color photographs after date of Substantial Completion for submission as Project Record Documents. Consultant or County Project Manager will direct Photographer for desired vantage points.
 - 1. Do not include date stamp.

F. Additional Photographs: Additional photography requested by the County may be paid for through the pass-thru allowance.

1. Consultant or Owner will provide Photographer three calendar days' notice when feasible.
2. In emergency situations such as prior to a storm, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Immediate follow-up when on-site events result in construction damage or losses.
 - b. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
 - c. Substantial Completion of a major phase or component of the Work.
 - d. Extra record photographs at time of final acceptance.

END OF SECTION

SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, proposed Products List, samples, substitution requests and other submittals.

1.2 ADDITIONAL DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that requires Consultant or County Project Manager's responsive action. These may be indicated in respective sections of the Project Manual as "action submittals".
- B. Informational Submittals: Written and graphic information and physical samples that do not require Consultant or County Project Manager's responsive action. Submittals may be rejected for not complying with requirements.
- C. Submittal Schedule: A written list of necessary submittals arranged in chronological order by dates required by the construction schedule. Include time required for review, ordering, manufacturing/fabricating and delivery when establishing dates. Include additional time required for corrections or revisions by Consultant to the submittal.

1.3 RELATED SECTIONS

- A. Division 1 sections of the Project Manual such as payment procedures, quality assurance and control, project management and coordination, product substitutions, construction progress reporting and closeout procedures.
- B. Other portions of the Contract Documents.

1.4 CONTRACTOR'S RESPONSIBILITIES

- A. Prepare and submit all submittals in accordance with the Contract Documents.
- B. Verify field measurements and conditions.
- C. Notify Consultant or County Project Manager of deviations and variations as further detailed below.
- D. Distribute submittals to necessary parties.
- E. Do not begin Work requiring submittal until return and approval of submittals has been received.
- F. Contractor's responsibility for errors and omissions in submittals is not relieved by the Consultant or County Project Manager's review.
- G. Save and maintain copies of all approved submittals; keep a copy at the project site during the course of the Work.
- H. Furnish copies of final approved submittals to County Project Manager, manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution list on transmittal forms.
- I. Retain at least one copy of approved submittals at the job site and one for the Project Record document.

1.5 SUBMITTAL FORMATS

- A. Submittals other than samples can be submitted as a paper hardcopy, electronic PDF or through web-based project software for which the County can access.
- B. Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form such as Document (Form) 01330A. If providing on an alternate form, please include all of the same information as the Document 01330A. Consultant or County Project Manager will return submittals, without review, received from sources other than Contractor.
- C. Place a label or sticker on each submittal for identification.
 - 1. Provide space to record Contractor's review and approval markings and action taken by Consultant or County Project Manager.
 - 2. Include the following information on label or sticker for processing and recording action taken:
 - a. Contract name and number.
 - b. Date.
 - c. Name of manufacturer and supplier.
 - d. Sequential submittal number or other unique identifier, including revision identifier.

- e. Number and title of appropriate Specification Section.
 - f. Drawing number and detail references, as appropriate.
 - g. Location(s) where product is to be installed, as appropriate.
 - h. Applicable standards such as ASTM or ANSI.
 - i. Other necessary identification.
- D. Deviations: On a separate sheet prepared by the Contractor, record relevant information, requests for data, revisions other than those requested by the County Project Manager or Consultant on previous submittals, and deviations or variations from requirements of the Contract Documents including minor variations and limitations. Include same identification information as the previous submittal.
 - E. Provide adequate space for the Consultant and/or County Project Manager's review stamps.

1.6 SUBMITTAL PROCEDURES

- A. Coordinate preparation and processing of submittals with performance of construction activities.
- B. Contractor shall coordinate the Submittal Schedule with its subcontractors, suppliers and subconsultants as needed.
- C. Consultant or County Project Manager's reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- D. Preliminary Work submittals are required within 10 calendars days from date of issuance of NTP 1 and include the following:
 - 1. Requests for Substitutions; although these are required with the Preconstruction Work submittals, the procedures are detailed in the Product Substitution Procedures
 - 2. Proposed Major Products Schedule or List with manufacturer name and model numbers and information for each product, if applicable
 - 3. Project/Construction Schedule with milestones and permit applications to match the project proposal
 - 4. Submittal Schedule including which are action and informational; coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination. Identify any options/selections required by the Owner or Consultant. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - 5. List of Samples to be provided, if applicable
 - 6. Shop drawings list and schedule including materials, methods or construction and attachment or anchorage, erection diagrams, connections, explanatory notes necessary for completion of Work.
 - 7. Certificates, qualifications, licensing, manufacturer's authorization and experience of proposed subcontractors, installers and applicators, if applicable
 - 8. Product Data, if applicable
 - 9. Any other items requested by County and/or Consultant
- E. Group submittals of related items together, such as all door hardware, HVAC systems and controls, fire alarm systems, electrical power systems, etc. as may be applicable to the project.
- F. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with Contractor's approval stamp before submitting to Consultant or County Project Manager. Include a statement certifying that submittal has been reviewed, approved and meets the requirements of the Contract Documents. Submittals not in conformance will be returned without review.

1.7 ACTION SUBMITTALS

A. GENERAL

- 1. Prepare and submit Action Submittals required by individual specification sections.
- 2. Number of Copies: Submit six copies of each submittal. Submit additional copies where copies are required for operation and maintenance manuals or building department. Consultant or County Project Manager will retain three copies; remainder will be returned. Mark up and retain one approved copy as a Project Record Drawing and keep another copy at the job site.

B. PRODUCT DATA

1. Collect information into a single submittal for each element of construction and type of product or equipment.
2. If information must be specially prepared for submittal because standard printed data is not suitable for use, submit as Shop Drawings, not as Product Data.
3. Mark each submittal to show which products and options are applicable. Delete information not applicable to the Work. Supplement standard information to provide additional information applicable to the Work.
4. Include Manufacturer's legible catalog sheets, brochure, diagrams, schedule, material safety data, performance, illustrations, wiring diagrams and controls, and other descriptive data as necessary for review.
5. Submit Product Data concurrent with Shop Drawings and Samples.
6. Identify any conflicts between the Manufacturer's instructions and Contract Documents.

C. SHOP DRAWINGS

1. Prepare Project-specific information, drawn accurately to scale.
2. Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Schedules.
 - f. Design calculations including wind load and anchorage calculations.
 - g. Compliance with specified standards.
 - h. Notation of coordination requirements.
 - i. Notation of dimensions established by field measurement.
 - j. Relationship to adjoining construction clearly indicated as well as to architectural, civil, structural, mechanical, electrical and other systems.
 - k. Seal and signature of professional engineer if specified.
 - l. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 - m. Installation sequencing.
 - n. For substitution requests, provide all requirements of the Product Substitution section of the Project Manual.
3. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
4. Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on standard sheet sizes of at least 8-1/2 by 11 inches, 11 x 17 inches or 24 by 36 inches.

D. SAMPLES

1. Submit physical samples to illustrate functional and aesthetic characteristics of the product. The sample should represent the color, finish, pattern, repetition and texture and will be used for a comparison between submittal and actual component as delivered and installed.
2. Transmit samples that contain multiple, related components such as accessories, in one submittal package.
3. Identification: Attach label or sticker on unexposed side of sample that includes the following:
 - a. Generic description of sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate specification section.
 - e. Location of proposed installation.
4. Maintain one set of approved samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor and should be removed from the job site.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Consultant or County Project Manager will return submittal with options selected.
6. Samples for Verification: Submit full-size units or samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Submit sets of samples unless otherwise noted in other sections of the Project Manual. Consultant or County Project Manager will retain one sample set; remainder will be returned. Mark up and retain one returned sample set as a Project Record Sample.
 - 1) Submit a single sample where assembly details, quality of work, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a sample, submit at least three sets of paired units that show approximate limits of variations.
 - 3) Additional requirements for samples may be included in other sections of the Project Manual.
7. Mock-ups and field samples may be required and addressed elsewhere in the Contract Documents.

E. PRODUCT SCHEDULE OR LIST

1. As required in individual specification sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information:
 - a. Type of product. Include unique identifier for each product.
 - b. Number and name of room, space or location.
 - c. Location within room or space.
 - d. Product data.

F. MISCELLANEOUS DATA

1. Inspection and Test Reports
2. Survey Data
3. Field reports
4. Closeout submittals in accordance with applicable section(s) of the Contract Documents
5. Updated certificates, qualifications, licensing, manufacturer's authorization and experience of subcontractors such as applicators and installers if they have been changed from those provided during the Preconstruction Work submittal.
6. Updated Subcontractors/Subconsultants/Suppliers Requirement Form, as amended
7. CBE usage and other Contract reporting requirements
8. Warranties, Guarantees, Bonds and Maintenance agreements if applicable
9. Other requirements of the Contract Documents

1.8 INFORMATIONAL SUBMITTALS

A. Prepare and submit Informational Submittals required by other specification sections.

1. Submit copies of each submittal. Consultant and County Project Manager will retain at least one copy.

2. Certificates and Certifications (if applicable): Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

1.9 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Consultant or County Project Manager.
- B. In addition to Shop Drawings, Product Data, and other required submittals, submit hardcopies or an electronically signed PDF of certificate or statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.10 CONSULTANT'S ACTION

- A. Consultant or County Project Manager will not review submittals that do not meet the requirements of this Section.
- B. Consultant's review will not include dimensions, quantities and fabrication processes. Review is for general conformance with the Contract Documents.
- C. Processing Time: Allow enough time for submittal review, including time for re-submittals and shop drawings as follows. Time for review shall commence on date of Consultant or County Project Manager's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work for processing, including re-submittals.
 1. First Review: Allow 21 calendar days for first review of each submittal. Allow additional time if coordination with subsequent submittals is required. Consultant or County Project Manager will advise Contractor when a submittal being processed will be delayed for coordination.
 2. Re-submittal Review: Allow 10 calendar days for review of each re-submittal. Note date and content of revision in label and clearly indicate extent of revision.
 3. Sequential Review: Where sequential review of submittals by Consultant or County Project Manager or other parties is indicated, allow 21 calendar days for the first review of each submittal.
- D. For Work, use only final submittals with mark indicating "Reviewed" or "Reviewed as Noted" made by Consultant or County Project Manager.
- E. For Action Submittals, Consultant or County Project Manager will review each submittal, make marks to indicate corrections or modifications required, and return it. Consultant or County Project Manager will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 1. Final Unrestricted Release/No exceptions taken or similar phrase: the work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents; acceptance of the work will depend upon that compliance.
 2. Final-But-Restricted Release/Make Corrections As Noted or similar phrase: the work covered by the submittal may proceed provided it complies with both the Consultant or County Project Manager's notations or corrections on the submittal and with the requirements of the Contract Documents; acceptance of the work will depend on that compliance.
 3. Returned for Re-Submittal: do not proceed with the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise the submittal or prepare a new submittal in accordance with the Consultant or County Project Manager's notations stating the reasons for returning the submittal; re-submit the submittal without delay. Do not permit submittals with the following marking to be used at the project site, or elsewhere where work is in progress. The stamp will include a statement such as "Rejected", "Revise and Re-submit" or "Submit Specified Item".
- F. Informational Submittals: Consultant or County Project Manager will review each submittal and will not return it or will return it if it does not comply with requirements. Consultant or County Project Manager will forward each submittal to appropriate party.

- G. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.
- H. Submittals not required by the Contract Documents may not be reviewed and may be discarded.
- I. The first submittal for each required item will be reviewed free of charge. Each subsequent or re-submittal review, or previously rejected or incomplete submittals, Contractor will be billed on an hourly basis equal to the rate the Owner pays to Consultant or County Project Manager for similar hourly services. Contractor shall be responsible for payment of rejected submittals. Non-payment may result in termination of review services.

END OF SECTION

SECTION 01 35 00 SPECIAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general administrative and procedural requirements for hurricane, flood and storm precautions as it may pertain to various types of projects.

1.2 HURRICANE, FLOOD, STORM AND OTHER PERILS PROTECTION

- A. In the event the National Weather Service issues a Hurricane or Flood watch:
 - 1. Contractor shall cease all regularly scheduled construction activities.
 - 2. Contractor shall take immediate action to secure the building and the site.
 - 3. Secure all loose materials, supplies, debris, equipment, etc.
 - 4. All openings in the applicable building exterior shall be boarded up with minimum 3/4 inch plywood, 2 x 4 lumber, and tap-cons.
 - 5. Any construction material or equipment that has been delivered to the site with the intent of being used for the project shall be secured within the building or within a sealed and covered metal shipping container placed above the 100-year flood elevation.
 - 6. Tie down construction trailer, storage shed, etc. with tie down cables secured to ground anchors.
 - 7. Contractor shall make arrangements to secure pumps, dehumidifying equipment, generator, and fuel prior to the storm in the event those items are needed for clean-up.
 - 8. Contractor shall prepare a project damage assessment report no later than 72 hours after storm conditions have ceased. A copy of the report shall be sent to the County, the Consultant and the Contractor's insurance company providing builder's risk/windstorm coverage.
 - 9. Contractor shall prepare an updated project schedule no later than seven days after the storm conditions have ceased. Highlight any delays to the project specifically caused by the storm event. Consideration shall be made for availability or shortage of labor, material supplies, equipment, and any delays in shipments.

1.3 HURRICANE/STORM PRECAUTIONS

- A. Preliminary preparation during Hurricane Season
 - 1. Discuss hurricane procedures at Progress meetings.
 - a. Designate the Superintendent as the Contractor's point of contact for hurricane preparedness activities.
 - b. Coordinate with County and cooperate with hurricane preparedness activities in both pre-storm and post-storm periods.
 - 2. Rosters of Available Personnel:
 - a. Ensure Superintendent or Project Manager maintains a roster of names and contact information of the following:
 - 1) Staff that can be reached in an emergency situation who can work around-the-clock, if necessary.
 - 2) Electricians, plumbers and other technicians necessary to secure the site before the storm and remobilize it afterwards.

- b. Ensure Superintendent or Project Manager maintains a roster and key contacts for all subcontractors, suppliers, and manufacturers.
 3. Ensure that Contractor's on-site office (if applicable) is equipped with a hurricane-tracking map or internet access. Watch and track all tropical storms and hurricanes on a daily basis.
 4. Temporary Facilities:
 - a. Ensure proper anchoring of all jobsite office trailers, tool trailers and other temporary storage facilities with hurricane anchor straps. Maintain anchorage throughout contract term.
 - b. Ensure that adequate plywood or aluminum storm shutters are available for all openings (windows and doors).
 - c. Plan for securing building contents or relocating them to a safe location during storm periods. Ensure protection for project records and project record documents.
 5. Maintain clean site and work areas.
 6. Verify that the builder's risk policy is in effect and covers wind damage or storm damage.
 7. Make arrangements for and secure cleanup materials and tarps or plastic sheeting for protection of indoor equipment if applicable.
- B. Preparation 72 hours prior to hurricane:
 1. Check to see that all preliminary preparations have been made.
 2. Photograph the project and completed Work. Back-up the photographs and ensure photographs are maintained in a safe location during and after the storm.
 3. Delay delivery of materials that cannot be adequately protected such as cabinets, light fixtures, appliances.
 4. Clean site of loose debris, tools and materials:
 - a. Broom clean entire project inside of building and outside.
 - b. Empty and secure all trash containers: remove trash from site.
 - c. Ensure that no part of County's or adjacent properties will suffer damage from windblown debris originating on the project site.
 5. Protection of the Work:
 - a. Pour any slabs, columns or beams that are available and ready to be poured.
 - b. Secure all loose objects, both inside and outside.
 - c. Band all loose materials on the site with metal straps. Secure banded materials to floors and columns.
 - d. Make projects as wind and watertight as possible by covering all openings with plywood or shutters as appropriate to the level of finish of the Work.
 - e. Power down energized buildings prior to leaving the site before the storm.
 - f. Lower all cranes and freewheel all tower cranes.
 6. Reinstall all hurricane shutters and similar protection removed during the Work, if applicable.
 7. Remove from or secure all scaffolds at the site. Do not leave outside.
 8. Temporary Facilities:
 - a. Bring all jobsite files, computers, electronic equipment, appliances, levels, small tools into the main office or temporarily relocate them to a safe and secure location.
 - b. Secure temporary buildings and shutter openings.
 - c. Power down energized buildings prior to leaving the site before the storm.

9. Ensure security and safety of the site prior to storm.
10. Ensure workers have personally prepared for the storm and are instructed to return as soon as possible after the storm is past.

C. Post-Storm Activities

1. Photograph the project site immediately upon return.
2. Coordinate and cooperate with County and Consultant to assess damage.
3. Ensure immediate safe re-mobilization of site and workforce.
4. Ensure minimized impact on project schedule.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 42 00 REFERENCES (INCLUDING DEFINITIONS, ABBREVIATIONS, ACRONYMS AND REFERENCED STANDARDS)

PART 1 - GENERAL

1.1 COMMONLY USED TERMS IN THESE CONTRACT DOCUMENTS

- A. The terms "Technical Specifications", "Project Manual", "Specifications", "Section", "Specs" and "Specifications and Requirements" are used interchangeably.
- B. All references to "Architect", "A/E", "Project Consultant", and "Engineer", including those that are in all caps font, are used interchangeably with the term "Consultant" as defined below.
- C. All references to "GC", "Builder" and "General Contractor", including those that are in all caps font, are used interchangeably with the term "Contractor" as defined below.
- D. The term "County Project Manager" is used interchangeably with the term "County's Project Manager".
- E. The terms "County" and "Owner", including those that are in all caps font, are used interchangeably.
- F. The terms "Plans" and "Drawings" are used interchangeably.
- G. All references to "days" in these Contract Documents shall mean calendar days unless noted otherwise.
- H. **The terms Additional Play Component Price Group and Playground Add-on Price Group are used interchangeably.**

1.2 DEFINITIONS

- A. Change Order: A written document ordering a change in the construction project price or time or a material change in the Work.
- B. Consultant: Architect or engineer who has contracted with County or who is an employee of County and provides professional services for a project.
- C. Contract Administrator: The ranking managerial employee of the agency which requested the Contract, or some other employee expressly designated as Contract Administrator in writing by said ranking managerial employee.
- D. Contract Documents: The official documents setting forth bidding and award information requirements and contractual obligations. This includes the General Conditions, Scope of Work, Invitation for Bid, Standard and Special Instructions for Vendors, Project Manual/Technical Specifications, Specifications and Requirements, Plans, Drawings, Exhibits, Attachments, General Requirements, Bid Forms, Bonds, Record of Award by Board, Notice of Award, Notice(s) to Proceed, Certificates, Purchase Orders, Work Authorizations, Change Orders, Closeout Forms, Field Orders, and any additional documents, or as defined in the applicable BCF 170.
- E. Contractor: The person, firm, or corporation with whom Broward County has contracted and who is responsible for the acceptable performance of the Work and for the payment of all legal debts pertaining to the Work. All references in the Contract Documents to third parties under contract or control of Contractor shall be deemed to be a reference to Contractor.
- F. County Project Manager: The person responsible for coordinating, overseeing and managing the construction project. This will be an employee from the requesting agency who is experienced with construction management. In projects without a Consultant, or if the Consultant is not providing shop drawing review and construction administration services, the County Project Manager may replace references to the Consultant.
- G. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" and similar phrase mean directed and requested by the Consultant or County Project Manager.
- H. Drawings and Plans: The official graphic representations of this Project which are a part of the Project Manual.
- I. Experienced or Qualified: Person or entity with experience relevant to, and routinely engaged in, the services to be provided under this Contract, comply with any special requirements indicated, and having complied with requirements of authorities having jurisdiction. The term may be used to describe the minimum Contract requirements of the Contractor and its subcontractors, installers, applicators, fabricators, subconsultants, suppliers, etc. The services and supplies provided shall be of the highest quality. If requested by County or Consultant, Contractor shall provide all information needed to verify the experience and qualifications of the person or entity that will providing a service, such as licensing, list of completed projects, FDOT prequalification, completed training, certificates, etc.
- J. Fabricator: Contractor, or a subcontractor of the Contractor, that constructs assemblies required for the Work from diverse, usually standardized manufactured parts or components either on the project site or in a shop setting. Fabricators are required to be experienced in the services they are to perform under this Contract and licensed in accordance with the authorities having jurisdiction.

- K. Final Completion: The date certified by the County or Consultant in the Final Certificate of Payment upon which all conditions and requirements of any permits and regulatory agencies have been satisfied; any documents required by the Contract Documents have been received by County or Consultant; any other documents required to be provided by Contractor have been received by County or Consultant; and the best of County or Consultant's knowledge, information and belief the Work defined has been fully completed in accordance with the terms and conditions of the Contract Documents.
- L. Furnish: To supply and deliver, unload, inspect for damage (same as supply).
- M. HCED: Broward County Highway Construction and Engineering Division.
- N. Install: Operations at the project site including the actual unloading, temporary storage, unpacking assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations. To unpack, assemble, erect, apply, place, finish, cure, protect, clean, and make ready for use.
- O. Installer: Contractor, or a subcontractor of the Contractor, that performs a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the services they are to perform under this Contract and licensed in accordance with the authorities having jurisdiction.
- P. Indicated: refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- Q. Manufacturer: Person or entity who produces materials or equipment for the Work, including that manufactured to a special design, but who does not perform labor (such as installation or testing) at the Project site.
- R. Notice to Proceed (NTP): Written notice to Contractor authorizing the commencement of the activities identified in the notice or described in the Contract Documents. Each project will require a project specific NTP and should include the date of work commencement, time for completion, project requirements and contact information for the applicable County's Project Manager and Consultant.
- S. Project: Each collective construction improvement(s) to be constructed by the Contractor through this Contract.
- T. Project Manual: Technical specifications for all Work to be completed under this Contract.
- U. Project Proposal (Proposal): A document including the scope of work, milestones, line item costs and quantities, allowances and other information relevant to the Project as further detailed in the Administrative Requirements (How to Use the Contract) section of the Project Manual.
- V. Project site: is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing work as part of a project.
- W. **Provide: Includes all daily construction site supervision, travel, labor, tools, equipment, materials and incidentals to furnish/supply and install, complete and ready for the intended use.**
- X. Regulations: Includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work regardless of whether they are lawfully imposed by governing authority or not.
- Y. Responsibility: Contractor is responsible for the work and products provided by its subcontractors, consultants, suppliers and manufacturers. Any issues or problems with any of the above shall be resolved by and through the Contractor.
- Z. Subcontractor: A person, firm or corporation having a direct contract with Contractor including one who furnishes material worked to a special design according to the Contract Documents but does not include one who merely furnishes Materials not so worked. This includes all fabricators and installers.
- AA. **Substantial Completion: The date as certified in writing by the Consultant or County Project Manager and as finally determined by the Contract Administrator in its sole discretion on which the Work or a portion thereof, is at a level of completion in substantial compliance with the Contract Documents such that all conditions of permits and regulatory agencies have been satisfied and the County or its designee can enjoy use or occupancy and can use or operate it in ALL respects for its intended purpose. A Certificate of Occupancy (CO) or a Temporary CO or other alternate County or municipal authorization for limited or conditional occupancy acceptable to the Contract Administrator must be issued for Substantial Completion to be achieved; however the issuance of a CO will not, by itself, constitute the achievement or date of Substantial Completion. Final Completion shall be obtained within 30 calendar days of Substantial Completion. Substantial Completion will not apply to all projects and will be determined by the County Project Manager in the project proposal. When Substantial Completion is not applicable to a project, the term may be used interchangeably with Final Completion.**
- BB. **Supplementary Conditions: shall include any documentation added to the Contract Documents** including, but not limited to, addenda, RFIs, reports, meeting minutes, change orders, etc.
- CC. Supplier: Person or entity who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor (installation) at the site.
- DD. Testing Agencies: Entity hired to perform specific inspections or tests, either at the Project site or elsewhere, and who will report on and, if required, to interpret results of those inspections or tests.

- EE. Work: the construction and services required by the Contract Documents, whether completed or partially completed, and includes all labor, materials, equipment and services provided or to be provided by Contractor to fulfill Contractor's obligations. The Work may constitute the whole or a part of the Project.
- FF. Additional and similar information can be found in other Division 1 sections of the Project Manual.

1.3 CODES AND STANDARDS

- A. **Except where earlier editions are specifically indicated, latest editions with current revisions and amendments of the following codes and standards are considered minimum requirements for materials, quality of work and safety where not covered elsewhere in the Project Manual.**
- B. Applicable Codes and Standards for this Contract:
 - 1. Florida Building Code (FBC) latest edition and revisions including Broward County amendments and high velocity wind zone requirements
 - 2. Florida Fire Prevention Code (FFPC), latest edition and revisions including Broward County amendments
 - 3. Chapter 68A-27 of the Florida Administrative Code (FAC) regarding Endangered or Threatened Species, as amended
 - 4. Florida Endangered Species Act, Chapter 379.2291, as amended
 - 5. Chapter 64E-9 of the Florida Administrative Code (FAC), Public Swimming Pools and Bathing Places
 - 6. National Electric Code (NEC), latest edition
 - 7. National Fire Protection Association (NFPA), latest standards
 - 8. Americans with Disabilities Act (ADA), latest edition
 - 9. 29 CFR / OSHA Standard 1910 and 1926 safety standards
 - 10. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, January 2020 edition, excluding Division 1 (hereby referred to as FDOT Standards); County has revised some of the units of measure
 - 11. Florida Department of Transportation (FDOT) Design Standards for Design, Construction, Maintenance, and Utility Operations on the State Highway System, 2017-2018 edition (hereby referred to as FDOT Design Standards); County has revised some of the units of measure and is currently available at <https://www.fdot.gov/design/standardplans/DS.shtm>
 - 12. All work performed within the County jurisdiction right-of-way shall conform to the latest edition of the Broward County Minimum Standards applicable to public rights-of-way, currently available at http://library.municode.com/HTML/13528/level3/CH25OPPOUWO_EXHIBIT_25.AMISTAPPURI-WUNBRCOJU_TIIN.html#TOPTITLE
 - 13. All water, sewer and lift station work shall conform to the latest Broward County Water and Wastewater (WWS) Minimum Design & Construction Standards currently available at <http://www.broward.org/WaterServices/Engineering/Pages/MinimumDesignandConstructionStandards.aspx>
 - 14. All work for this Contract shall conform to the above codes and to the requirements of any regulatory authority having jurisdiction such as the local municipality, water district, health department, etc.
- C. Contractor should provide copies of or access to the above (unless otherwise indicated) at the project site, available for reference by parties who have a reasonable need for such reference.

1.4 GOVERNING REGULATIONS/AUTHORITIES

- A. Coordinate inspections and regulatory requirements of the agencies specified above under provisions of Division 1.
- B. Pay fees and obtain permits as specified elsewhere in the Contract Documents.
- C. The organizations of the Contract Documents are not intended to be an indication of jurisdictional or trade union agreements.
- D. In the event of a conflict between the drawings, referenced standards, project manual, and codes the more stringent requirements shall apply provided they are not in conflict with applicable regulatory codes.
- E. Contractor and its subcontractors shall provide training and comply with the safety standards of 29 CFR / OSHA 1910 and 1926 Standards for asbestos, compressed gas, noise, confined spaces, fall protection, trenching/excavation and other such activities involved in the Work.

1.5 SPECIFICATION FORMATS AND CONVENTIONS

- A. These specifications within Project Manual are organized into Divisions and Sections using the Construction Specifications Institute's (CSI) MasterFormat 2016 or more current numbering system.
 1. Section Identification: The specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Project Manual.
- B. Content: The specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 3. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 4. **Approved and Accepted Manufacturers or Products, Approved Equal and Substitutions: To further define what is addressed in the General Conditions and other sections of the Project Manual, County and/or Consultant has made its best efforts to name at least three products or manufacturers from which the Contractor can choose to incorporate into the project. Although not specifically stated in each section of the Project Manual, substitutions may be accepted after award in accordance with procedures and requirements set forth in the Product Substitution Procedures and Product Options sections of the Project Manual.**
 5. Abbreviations: Actual word abbreviations of a self-explanatory nature may be included within the Project Manual. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specifications with notations on drawings and schedules. These abbreviations are frequently defined in the specification section at the first instance of use. Trade association names and titles of general standards are frequently abbreviated. Singular words will be interpreted as plural and plural word will be interpreted as singular where applicable and where full context of the Contract Documents so indicates. Refer instances of uncertainty to the Consultant for decision prior to proceeding.
 6. **Named Product and Basis of Design: In addition to the language included in the General Conditions, this is intended to establish a minimum standard in terms of form, fit, function, quality, dimensions, performance, physical properties and appearance, design, theme and other characteristics.**

1.6 INDUSTRY STANDARDS

- A. Applicability of Standards. Unless the Contract Documents include more stringent requirements, applicable construction industry standards shall have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference. Refer to Division 1 for codes and standards that the Contractor must have available at the Project site.
- B. Publication Dates. Contractor shall comply with the standards in effect as of the date of the Contract Documents. Updated Standards: At the request of the Consultant, Contractor, or authority having jurisdiction, submit a Change Order proposal where an applicable code or standard has been revised and reissued after the date of the Contract Documents and before performance of Work affected. The Consultant and Owner will decide whether to issue a Change Order to proceed with the updated standard.
- C. Conflicting or Overlapping Requirements. Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, Contractor shall comply with the most stringent requirement, and shall refer uncertainties and requirements that are different but apparently equal to the Consultant for a decision before proceeding.
 1. Minimum Quantity or Quality Levels. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements,

- indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Contractor shall refer uncertainties to the Consultant for a decision before proceeding. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
2. Trades: Use of titles such as "carpentry" are not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
- D. Copies of Standards. Each entity engaged in construction on the Project shall be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names. Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they shall mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision.

1.7 DRAWING SYMBOLS

- A. Except as otherwise indicated, graphic symbols used on the Drawings are those symbols recognized in the construction industry for the purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., eleventh edition or later.
- B. Mechanical and Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE and/or the National Electric Code. Where appropriate these symbols are supplemented by more specific symbols as recommended by other technical associations including ASME, ASPE, IEEE and other similar organizations.
- C. Refer instances of uncertainty to the Consultant or County's Project Manager for clarification prior to proceeding.

1.8 PERMITS, LICENSES, CERTIFICATES AND RECORDS

- A. For the County's records, Contractor shall submit to County Project Manager copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, as appropriate, established for compliance with standards and regulations bearing on performance of the Work. Additional information may be found elsewhere in the Project Manual.

1.9 COMMONLY USED ABBREVIATIONS AND ACRONYMS

- A. The following is a list of commonly used, industry standard acronyms and abbreviations which may be referenced in the Contract Documents.
 1. AABC: Associated Air Balance Council
 2. AAMA: American Architectural Manufacturers Association
 3. AASHTO: American Association of State Highway and Transportation Officials
 4. ABMA: American Boiler Manufacturers Association
 5. ABA: Architectural Barriers Act
 6. ACI: American Concrete Institute
 7. ACPA: American Concrete Pipe Association
 8. ADA: Americans with Disabilities Act Accessibility Guidelines
 9. A/E: Consultant who is an Architect or Engineer
 10. AF&PA: American Forest and Paper Association
 11. AGA: American Gas Association
 12. AGC: Associated General Contractors of America
 13. AHRI: Air-conditioning, Heating and Refrigeration Institute
 14. AI: Asphalt Institute

15. AIA: American Institute of Architects
16. AISC: American Institute of Steel Construction
17. AISI: American Iron and Steel Institute
18. AITC: American Institute of Timber Construction
19. ALSC: American Lumber Standard Committee
20. AMCA: Air Movement and Control Association
21. ANSI: American National Standards Institute
22. APA-APA: Engineered Wood Association
23. APA: Architectural Precast Association
24. ARI: Air-conditioning & Refrigeration Institute (See AHRI)
25. ASA: American Subcontractors Association
26. ASC: Associated Specialty Contractors
27. ASCE: American Society of Civil Engineers
28. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers
29. ASME: American Society of Mechanical Engineers
30. ASPE: American Society of Plumbing Engineers
31. ASSE: American Society of Safety Engineers
32. ASTM: American Society for Testing of Materials
33. ATIS: Alliance for Telecommunications Industry Standards
34. AWEA: American Wind Energy Association
35. AWG: American wire gauge
36. AWI: Architectural Woodwork Institute
37. AWWA: American Water Works Association
38. AWS: American Welding Society
39. AWWA: American Water Works Association
40. BCWCD: Broward County Water Control District
41. BHMA: Builders Hardware Manufacturers Association
42. BIA: Brick Industry Association
43. BCI: Building Code Inspector
44. BPQI: Building Performance Quality Institute
45. BTU: British thermal unit
46. CADD: Computer-aided design and drafting; the County currently uses AutoCAD
47. CCTV: Closed circuit television
48. CD/DVD: Compact disc or digital video disc
49. CFR: Code of Federal Regulations
50. CIMA: Cellulose Insulation Manufacturers Association
51. CISCA: Ceilings & Interior Systems Construction Association
52. CLFMI: Chain Link Fence Manufacturers Institute
53. CPSC: Consumer Product Safety Commission
54. CRRC: Cool Roof Rating Council
55. CRSI: Concrete Reinforcing Steel Institute
56. CSI: Construction Specifications Institute
57. CFC: Chlorofluorocarbon
58. CMU: Concrete masonry unit
59. CY and cy: Cubic yard
60. DDCV: Double Decker Check Valve
61. Degrees F: Degrees Fahrenheit
62. Dia: Diameter
63. DOE: Department of Energy
64. EPA: Environmental Protection Agency
65. EPDM: Ethylene propylene diene monomer
66. FAA: Federal Aviation Administration
67. FBC: Florida Building Code
68. FCC: Federal Communications Commission
69. FDEP: Florida Department of Environmental Protection
70. FDOT: Florida Department of Transportation
71. FEMA: Federal Emergency Management
72. FGMA: Flat Glass Marketing Association
73. FM: Factory Mutual

- 74. FRSA: Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.
- 75. FSC: Forest Stewardship Council
- 76. Ft²: Square feet
- 77. GA and ga: Gauge
- 78. GANA: Glass Association of North America
- 79. g/l: Grams per liter
- 80. g/m²: Gallons per meter squared
- 81. GPM: Gallons per minute
- 82. GSA: General Services Administration
- 83. HCFC: Hydrochlorofluorocarbon
- 84. HFC: Hydrofluorocarbon
- 85. HP: Horsepower
- 86. HPVA: Hardwood Plywood and Veneer Association
- 87. HDPE: High-density polyethylene
- 88. HVAC: Heating, ventilating and air-conditioning
- 89. HID: High-intensity discharge
- 90. ICBO: International Conference of Building Officials
- 91. ICC: International Code Council
- 92. IEEE: Institute of Electrical and Electronics Engineers
- 93. IPEMA: International Play Equipment Manufacturers Association
- 94. IBC: International Building Code
- 95. IFI: Industrial Fasteners Institute
- 96. IN.: Inch
- 97. ISFA: International Surface Fabricators Association
- 98. ISO: International Organization for Standardization
- 99. LB, Lb and lb: Pound
- 100. Lbf: Pound-force
- 101. Listed and Labeled: When used in conjunction with UL, see definition in NFPA 70.
- 102. LEED: Leadership in Energy and Environmental Design
- 103. LDPE: Low-density polyethylene
- 104. LPI: Lighting Protection Institute
- 105. MDPE: Medium-density polyethylene
- 106. MEP: Mechanical, Electrical and Plumbing
- 107. MFMA: Metal Framing Manufacturers Association
- 108. Mph: Miles per Hour
- 109. MOT: Maintenance of Traffic
- 110. MM: Millimeter
- 111. MPa: Megapascal
- 112. MPI: Master Painters Institute
- 113. MSDS: Material Safety Data Sheets
- 114. N/A: Not applicable
- 115. NAAMM: National Association of Architectural Metal Manufacturers
- 116. NAIMA: North American Insulation Manufacturers Association
- 117. NCCA: National Coil Coating Association
- 118. NCMA: National Concrete Masonry Association
- 119. NEBB: National Environmental Balancing Bureau
- 120. NEC: National Electrical Code
- 121. NECA: National Electrical Contractors Association
- 122. NEMA: National Electrical Manufacturers Association
- 123. NFIP: National Flood Insurance Program
- 124. NFPA: National Fire Protection Association
- 125. NIST: National Institute of Standards and Technology
- 126. NPDES: National Pollutant Discharge Elimination System
- 127. NPSI: National Playground Safety Institute
- 128. NRCMA: National Ready Mixed Concrete Association
- 129. NRPA: National Recreation and Park Association
- 130. NRTL: Nationally Recognized Testing Laboratory
- 131. NLGA: National Lumber Grades Authority
- 132. NOA: Notice of Acceptance

- 133. NRCA: National Roofing Contractors Association
- 134. NSF: National Sanitation Foundation
- 135. NSPE: National Society of Professional Engineers
- 136. NVLAP: National Voluntary Laboratory Accreditation Program
- 137. O.C. and O/C: On center
- 138. OD: Outside dimension
- 139. OESBD: Broward County Office of Economic and Small Business Development
- 140. OITC: Outdoor-indoor transmission class
- 141. OSHA: Occupational Safety and Health Administration
- 142. Oz: Ounce
- 143. Pa: Pascal
- 144. PBDE: Polybrominated diphenyl ethers
- 145. PCA: Portland Cement Association
- 146. PDF and .pdf: Portable Document Format
- 147. PCB: Polychlorinated Biphenyl
- 148. PCI: Precast/Prestressed Concrete Institute
- 149. PM: Particulate matter
- 150. PPE: Personal protective equipment
- 151. PPM: Parts per million
- 152. PSI: Pounds per square inch
- 153. PSF: Pounds per square foot
- 154. QA: Quality assurance
- 155. QC: Quality control
- 156. RCSC: Research Council on Structural Connections
- 157. RFI: Request for Information or Interpretation
- 158. RPZ: Backflow preventer vault
- 159. SAE Society of Automotive Engineers
- 160. SBR: Styrene-Butadiene Rubber
- 161. SDI: Steel Door Institute
- 162. SF: Square feet
- 163. Sq. Ft.: Square feet
- 164. SWPPP: Storm Water Pollution Prevention Plan
- 165. SFWMD: South Florida Water Management District
- 166. SPIB: Southern Pine Inspection Bureau
- 167. SMCCNA or SMACNA: Sheet Metal and Air Conditioning Contractors' National Association
- 168. SSPC: The Society for Protective Coatings
- 169. TAS: Testing Application Standard
- 170. TCA: Tilt-up Concrete Association
- 171. TCA: Tile Council of North America
- 172. TCNA: Tile Council of North America
- 173. THHN: Thermoplastic high-heat resistant nylon-coated wire
- 174. THWN: thermoplastic heat-resistant and water-resistant nylon-coated wire
- 175. TPI: Truss Plate Institute
- 176. TRI: Tile Roofing Institute
- 177. UL: Underwriters Laboratories
- 178. UON and UNO: Unless otherwise noted
- 179. USACE: United States Army Corps of Engineers
- 180. USDA: United States Department of Agriculture
- 181. VOC: Volatile organic compound
- 182. WCLIB: West Coast Lumber Inspection Bureau
- 183. WWP: Western Wood Products Association

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01 43 00 QUALITY ASSURANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Refer to the Definitions as included in the section regarding reference standards and definitions.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance.

1.3 QUALIFICATIONS OF FABRICATORS AND INSTALLERS

- A. Refer to the References specification of Division 1 for definitions and experience requirements.
- B. Provide the levels of more extensive experience that may be specified within the respective specification sections contained in this Project Manual.
- C. Fabricators and installers are required to comply with the Workforce Investment Program requirements, if the program is applicable.

1.4 MANUFACTURER'S QUALIFICATIONS

- A. Upon request, provide the following to the Consultant or County Project Manager:
 - 1. Location of the manufacturer including foreign or domestic status.
 - 2. Evidence of the time period in which the manufacturer has been producing the specified products, materials, components or assemblies without formulation, engineering, design or other production changes which would alter or modify their performance characteristics.
 - 3. Listings of the manufacturer's authorized franchised distributors, installers or applicators.
 - 4. Manufacturer's latest product performance criteria and test results.
 - 5. List of the manufacturer's technical services and their local availability.
 - 6. Other pertinent information to establish the capacity, capability and quality of the manufacturer as may be requested by the Consultant or County.
- B. County reserves the right to require replacement of any manufacturer to whom reasonable objection is made by County or Consultant.
- C. Refer to the Division 1 References specification for additional instructions.

1.5 MANUFACTURER'S FIELD SERVICES

- A. If manufacturer is not listed as an approved manufacturer in the Drawings or specifications, submit qualifications of manufacturers, suppliers, distributors or other entities' observers to Consultant and County at least 30 days in advance of required observations. The Observer is subject to approval by Consultant and County, and County reserves the right to replace any observer for whom reasonable objection is made.
- B. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of work, or other conditions as applicable, and to initiate instructions when necessary.
- C. Individuals will report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

- D. Submit report in duplicate within 15 days of observation to County for review.

1.6 SUPPLIER AND MANUFACTURER QUALIFICATIONS

- A. Suppliers are required to be experienced in the services they are engaged to perform and the products they are to supply.
- B. County reserves the right to require replacement of any Supplier to whom reasonable objection is made by County or the Consultant.
- C. Refer to the References specification for additional qualifications.

1.7 PROFESSIONAL ENGINEER QUALIFICATIONS

- A. A Professional Engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

1.8 TESTING AND INSPECTION AGENCY QUALIFICATIONS

- A. An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities. Prior to testing and inspecting, this agency shall disclose any conflict of interest to the Building Official, Consultant and County Project Manager
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7, as amended.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
 - 3. See Quality Control section.
- B. Testing and Inspection Agencies may be hired, paid for and utilized by the Contractor for the Contractor's use at no additional expense to County except as otherwise provided in the Contract Documents.
- C. Testing and inspections to be provided by the County are addressed in the Quality Control section.
- D. Such testing and inspection agencies shall meet the following minimum qualifications:
 - 1. Laboratory: Authorized to operate in State in which Project is located.
 - 2. Laboratory Staff: Maintain a full time registered Engineer and the necessary specialists on staff to review services.
 - 3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 45 00 QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality control. The following requirements may not apply to all projects.

1.2 CONTRACTOR'S QUALITY CONTROL

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

1.3 FIELD SAMPLES AND MOCK-UP REQUIREMENTS

- A. Field Samples and Mock-Ups:
 - 1. Erect at the Project site at location acceptable to the County Project Manager and Consultant.
 - 2. Construct each sample or mock-up complete, including all work of all trades required in finishing the Work.
- B. Provide field samples and mock-ups identical with final condition the proposed materials or products for the Work.
 - 1. Include "range" of samples (not less than 3) where unavoidable variations must be expected and describe or identify variations between units of each set.
 - 2. Provide full set of optional field samples where Consultant's selection is required. Prepare samples to match Consultant's sample where so indicated.
- C. Include identification on each field sample or mock-up, with full Project information as required in Division 1.
- D. Provide the number of field samples and mock-ups as specified in individual specification Sections.
- E. Color selections for interior materials will not occur until the Consultant has approved samples of all interior finish items. No extension of time or substitution of materials will be granted as a result of the Contractor's failure to provide the Consultant with timely color samples of interior finish materials.
- F. Reviewed field samples and mock-ups which may be used in the Work are indicated in individual specification Sections and must be in undamaged condition when incorporated into the Work.

1.4 INSPECTIONS AND SOURCE QUALITY CONTROL

- A. The Consultant, and other personnel authorized by County, shall at all times have access to the Work whenever it is in preparation or progress and wherever located.
- B. Provide safe facilities for such access so the Consultant and the County Project Manager may perform their functions under the Contract.
- C. Ensure that off-site work locations (including factories, shops, warehouses and other structures which might be used for the manufacture, fabrication, assembly and storage of any element which will be incorporated into the Work) conforms the quality standards specified herein.
- D. Ensure that all off-site work is performed to the standards specified in this Project Manual for the respective elements of the Work.

1.5 INSPECTION AND TESTING LABORATORY SERVICES

- A. Contractor will employ and pay for services of an independent firm to perform inspection and testing other than those listed below in the Schedule of Mandatory Inspections.
- B. The independent firm will perform inspections, tests, and other services specified in individual specification Sections and as required by County.
- C. Reports will be submitted by the independent firm to County, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - 1. Notify County independent firm 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by County. Payment for re-testing will be paid for by the Contractor.

1.6 INSPECTIONS

- A. Municipal, Broward County and other authorities having jurisdiction
 - 1. The Contractor is responsible for obtaining all permits required by respective jurisdictional authorities for Work.
 - 2. Coordinate with respective jurisdictional agencies to verify their requirements and procedures for requesting and conducting inspections of the Work.
- B. Inspection Procedures:
 - 1. On-Site Inspections:
 - a. Requests for Inspection: For on-site inspections (for work with-in County's property line), notify County a minimum of one business day prior to the time of the requested inspection. Inspections requested which fall on weekends or holidays observed by County will be scheduled for the next business day except for exceptional circumstances approved by County in advance. Provide a simultaneous notification to the County Project Manager or Consultant that the Request for Inspection has been made. Coordinate and make arrangements for an Independent Testing Laboratory or other testing agency if one is required to be present at or participate in the inspection.
 - b. Cooperate with and facilitate the inspection by providing incidental labor and facilities:
 - 1) To provide access to Work to be inspected.
 - 2) To obtain and handle samples at the site or at source of Products to be inspected or tested.
 - 3) To facilitate tests and inspections.
 - 4) To provide storage and curing of test samples.
 - 5) Maintaining complete set of submittals on site as specified elsewhere and having them available for the inspector's use.
 - 2. Off-Site Inspections:
 - a. Requests for Inspection: Request inspection from the respective jurisdictional agency according to that agency's standard request procedures. Notify the inspector and the County Project Manager and Consultant a minimum of one business day prior to the time of the requested inspection. Coordinate and make arrangements for an Independent Testing Laboratory or other testing agency if one is required to be present at or participate in the inspection.
 - b. Inspections will be conducted by the inspector representing the respective jurisdictional agency in the presence of the inspector, County Project Manager and the Consultant.

- c. Cooperate with and facilitate the jurisdictional agency's inspection by providing incidental labor and facilities:
 - 1) To provide access to Work to be inspected.
 - 2) To obtain and handle samples at the site or at source of Products to be inspected or tested.
 - 3) To facilitate tests and inspections.
 - 4) To provide storage and curing of test samples.
 - d. Provide Inspection Report as specified below.
 - 3. Non-Conforming Work
 - a. Re-execute or correct Work identified during inspections as deficient.
 - b. Upon completion of re-executed or corrected Work, request re-inspection following procedures specified above.
- C. Inspection Reports:
 - 1. After each inspection promptly submit three copies of inspection report to Consultant and County Project Manager.
 - 2. Include the following:
 - a. Date issued.
 - b. Contract name and number.
 - c. Name and affiliation of inspector (Broward County, City, etc.).
 - d. Date and time of inspection.
 - e. Weather conditions and temperature at the time of inspection.
 - f. Identification of product and relative specification sections.
 - g. Location in the Project.
 - h. Type of inspection.
 - i. Results of tests,
 - j. Conformance with Contract Documents.
 - 3. When requested, provide interpretation of inspection results.
- D. Limits of Inspector's Authority:
 - 1. Inspectors may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Inspectors may not accept any portion of the Work.
 - 3. Inspectors may not assume any duties of Contractor or the Consultant.
 - 4. Inspectors may not authorize any deviation from the Contract Documents or approve any substitute Products or equipment.
- E. Schedule of Mandatory Inspections to be coordinated with the applicable building department and any other agencies having jurisdiction.
 - 1. This schedule indicates mandatory inspections required for each project, as applicable:
 - a. Soil compaction: Special inspections and related testing for all lifts of entire building/structural pad.
 - b. Foundations (including footings, pile caps and grade beams): Inspections prior to pouring concrete and after excavations, placement of fill and compaction, form erection, and placement of reinforcing steel placement prior to pouring of the concrete.
 - c. Slabs on Grade: Inspection prior to pouring concrete and after excavations, placement of fill and compaction, form erection, steel reinforcing bar placement, wire mesh placement, and vapor barrier installation.
 - d. Concrete Columns: Inspection prior to erection of forms and pouring of concrete and after placement of reinforcing steel.

- e. Concrete Masonry Units: Inspection after each successive pour after placement of reinforcement and prior to pouring of the grout.
- f. Concrete Beams and Tie Beams: Inspection prior to pouring concrete and after erection of forms, placement of reinforcing steel, bracing, and shoring.
- g. Structural Steel: Inspection after erection of steel framing members, permanent and temporary bracing, steel floor joists, steel roof joists or trusses, and anchors/welds.
- h. Roof Trusses: Inspection after erection of truss members, permanent and temporary bracing, roof sheathing and bottom chord furring members and anchors/welds.
- i. Roof Deck or Sheathing: Inspection after placement and attachment of panels or planking and prior to application of base or anchor sheets of roofing system.
- j. Roofing Dry-In: Prior to application of membrane plies or other elements of finish roofing system.
- k. Roofing: At completion of roofing installation with all flashing systems and roof accessories, roofing aggregate, roof coatings, walkways and other related items are installed.
- l. Above Ceilings: Inspection after framing, support system and/or ceiling grid and prior to the application of ceiling finish materials or acoustic lay-in panel.
- m. Framing: Inspection prior to application of gypsum wall board, tile backer boards, metal lath, or other interior finish systems and after:
 - 1) Installation of all structural elements including furring, firestops, nailers, anchors, and bracing, and
 - 2) Completion of inspections for rough-in electrical, plumbing and HVAC systems. Refer to mandatory inspections for each of these respective systems.
- n. Insulation:
 - 1) Interiors: Inspection prior to installation of wallboard or other wall/partition systems.
 - 2) Exteriors: Inspection prior to application of finish systems.
- o. Lathing: Inspection prior to application of plaster, stucco or other coatings, and after installation of lath and all accessory items (plaster stops, expansion and corner beads, etc).
- p. Plaster Base: Inspection prior to application of plaster basecoat and after installation of plaster base (including gypsum board, wire lath, and masonry type bases) and all associated accessories including corner beads, expansion joints, strip reinforcing, and nailers for molding, trim and other items.
- q. Wallboard Systems:
 - 1) Screw inspection prior to application of joint reinforcement and joint compounds.
 - 2) Installation inspection after application of joint reinforcement and joint compounds, completion of sanding and preparation for finish material application or painting.
- r. Curtain Wall: Inspection at each floor level prior to concealing curtain wall attachments to structural substrate.
- s. Store Front: Inspection prior to concealing storefront attachments to structural substrate.
- t. Windows and Glass Doors: Inspection prior to concealing window and door attachments to structural substrate.
- u. Overhead Coiling Doors: Upon completion of installation of frame.
- v. Glass Block: Upon completion of installation of frame.
- w. Hardware: Upon completion of installation hardware.
- x. HVAC Systems:
 - 1) HVAC Systems curbs and stands
 - 2) Underground: To be made after trenches or ditches are excavated, piping installed, and before any backfill is put in place.
 - 3) Piping
 - 4) Chiller
 - 5) Insulation
 - 6) Duct Work
 - 7) Controls

y. Electrical:

- 1) Lighting Protection
- 2) Communications and audio/visual equipment attachments
- 3) Underground: To be made after trenches or ditches are excavated, piping installed, and before any backfill is put in place.
- 4) Temporary service
- 5) Duct bank
- 6) Slab
- 7) Rough
- 8) Trim

z. Plumbing:

- 1) Temporary services
- 2) Underground: To be made after trenches or ditches are excavated, piping installed, and before any backfill is put in place.
- 3) Rough: Inspection at completion of ground work and at completion of rough plumbing.
- 4) Trim: Inspection at completion of fixture installation.
- 5) Fire Sprinkler: Testing and inspection at completion of fire sprinkler plumbing.
- 6) Plumbing system disinfection

aa. Substantial Completion Inspection

bb. Final Completion Inspection

2. Additional inspections may be required by County or authority having jurisdiction. The Contractor will be notified in advance of any additional inspections required.
3. The following inspections are required by County but are not required by the building department:
 - a. Tile Installation: Upon completion of installation of tile.
 - b. Hardware: Upon completion of installation hardware.
 - c. Polished and/or stained concrete.

F. Schedule of Mandatory Inspections

1. The following tests, inspections, and certifications shall be performed by objective, unbiased third-party independent testing agencies, special inspectors, or professional engineers hired by and paid for by the County to provide quality control services. These testing agencies shall neither represent the Contractor nor the County. See Quality Assurance section.
2. Copies of the results shall be provided to the Contractor, County Project Manager, County Inspector and/or Consultant. This will be discussed at the Pre-Construction Conference.
3. County reserves the right to verify the results of Contractor provided inspections, tests and certifications using its own independent testing agencies.
4. County reserves the right to choose the locations or request a random location for tests and inspections such as:
 - a. Concrete cylinder tests.
 - b. Soil density tests.
 - c. Structural welding certification.
 - d. Roof insulation certification.
 - e. Lighting photometric plan.
 - f. Lightning protection system UL certification after re-installation.
 - g. Test and Balance reports for HVAC units after installation.
 - h. Existing roofing membrane moisture survey for all roof areas to be re-roofed.
 - i. Roof fastener pullout testing.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
- B. Comply with Contract requirements regarding specialized activities such as carpentry, concrete, landscaping, etc.
- C. Protect construction exposed by or for quality control service activities and protect repaired construction.
- D. Repair and protection are the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.
- E. Additional services including but not limited to professional services which are necessary and or required due to repairs or inspections is the responsibility of the Contractor.

END OF SECTION

SECTION 01 51 00 TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary utilities. See also Temporary Facilities and Controls, if applicable.

1.2 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Submit a schedule indicating implementation and termination of each temporary utility within 15 days of the receipt of the second Notice to Proceed. At the earliest feasible time, after Substantial Completion and when acceptable to the Consultant and County Project Manager and Owner, change over from use of temporary service to use of the permanent service.

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:
 - 1. Health and safety regulations such as OSHA and CFR 29
 - 2. Utility company requirements
 - 3. Police, Fire Department and Rescue requirements
 - 4. Environmental protection regulations
 - 5. Others as noted in the References sections and on the Drawings
- B. Comply with:
 - 1. Comply with NFPA Code 241, as amended
 - 2. ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition" as amended
 - 3. NECA Electrical Design Library "Temporary Electrical Facilities" as amended
- C. Refer to the latest edition of the "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC, ASA and ASC, for industry recommendations.
- D. Electrical Service:
 - 1. Comply with NEMA, NECA and UL standards and regulations for temporary electric service.
 - 2. Install service in compliance with National Electric Code (NFPA 70).
- E. Inspections: Arrange for inspection and testing with authorities having jurisdiction.
- F. Obtain required certifications and permits.

1.4 CONDITIONS OF USE

- A. Keep temporary services and facilities clean and neat in appearance.
- B. Operate in a safe and efficient manner.
- C. Take necessary fire prevention measures.
- D. Do not overload facilities or permit them to interfere with progress.
- E. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide new materials; if acceptable to the Consultant and County Project Manager, undamaged previously used materials in serviceable condition may be used.
- B. Provide materials suitable for the use intended.
- C. Water: Provide potable water approved by local health authorities.

2.2 EQUIPMENT

- A. Provide new equipment; if acceptable to the Consultant and County Project Manager.
 - 1. Undamaged, previously used equipment in serviceable condition may be used.
 - 2. Provide equipment suitable for use intended.
- B. Water Hoses:
 - 1. Provide 3/4 inch heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long (or longer as needed), with pressure rating greater than the maximum pressure of the water distribution system
 - 2. Provide adjustable shutoff nozzles at hose discharge.
- C. Electrical Outlets:
 - 1. Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets.
 - 2. Provide receptacle outlets equipped with ground fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- D. Electrical Power Cords:
 - 1. Provide grounded extension cords; use "hard service" cords where exposed to abrasion and traffic.
 - 2. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
- E. Lamps and Light Fixtures:
 - 1. Provide general service lamps of wattage required for adequate illumination.
 - 2. Provide guard cages or tempered glass enclosures, where exposed to breakage.
 - 3. Provide exterior or waterproof lamps and light fixtures where exposed to moisture.
- F. Heating and Cooling Units: Provide temporary heating units, as required to maintain proper environmental conditions for the work. Provide units that have been tested and labeled by UL or another recognized trade association related to the type of fuel being consumed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use experienced personnel for installation of temporary utilities and conform to the workforce composition and supervision requirements specified elsewhere in the Contract Documents.
- B. Locate temporary utilities where they will serve the Project adequately and result in minimum interference with performance of the Work or existing.
- C. Provide each temporary utility ready for use when needed to avoid delay.
- D. Maintain and modify as required.
- E. Do not remove until temporary utilities are no longer needed or are replaced by authorized use of completed permanent utility.

3.2 TEMPORARY UTILITY INSTALLATION

A. General Requirements:

1. Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.
2. Arrange with the utility company and Owner for a time when service can be interrupted, where necessary, to make connections for temporary services. The Consultant and County Project Manager will coordinate service interruptions scheduling with the occupants of existing facilities.
3. Provide suitable capacity at each stage of construction. Prior to temporary utility availability, provide trucked in services.
4. Coordinate with Consultant and Owner to obtain easements to bring temporary utilities to the site, where the Owner's easements cannot be used for that purpose.
5. Usage Charges: Cost or usage charges for temporary facilities are not chargeable to the Owner or Consultant as these costs are included in the General Conditions.

B. Water Service:

1. Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
2. Sterilization: Sterilize temporary water piping prior to use.

C. Temporary Electrical Power Service:

1. Provide weatherproof, grounded electrical power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground fault interrupters and main distribution switchgear.
2. Temporary Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage.

D. Temporary Lighting:

1. Whenever an overhead floor or roof deck has been installed, provide temporary lighting with local switching.
2. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations and traffic conditions.
 - a. Provide and maintain incandescent or other lighting for construction operations to achieve a minimum lighting level of 2 watts/square feet.
 - b. Provide and maintain 1 watt/square foot lighting to exterior staging and storage areas after dark for security purposes.
 - c. Provide and maintain 0.25 watt/square foot of high-intensity discharge (H.I.D.) lighting to interior work areas after dark for security purposes.
3. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
4. Maintain lighting and provide routine repairs.
5. Permanent building lighting shall not be utilized during construction.
6. Install exterior yard and sign lights so that signs are visible and lit during night hours.

E. Temporary Telephones:

1. For a temporary facility such as a construction trailer, provide telephone and highspeed internet service to the Project site for the duration of the construction activities. If regular telephone lines cannot be provided or regular temporary telephone service must be curtailed or interrupted for longer than two days, provide temporary cellular service.

F. Sewers and Drainage:

1. Provide temporary sewer connections to legally remove effluent.
2. Connect temporary sewers to the municipal system as directed by the sewer department officials.
3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
4. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.
5. Do not allow pollution or contamination of the site, adjacent properties or waterways.

3.3 OPERATION, TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary utilities. Limit availability of temporary utilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain temporary utilities in good operating condition until removal. Protect from damage by heat, humidity, and similar elements including brief periods of unexpected cold conditions.
1. Maintain operation of temporary, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
 2. Protection: Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal:
1. Unless the Consultant or County Project Manager requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion.
 2. Complete and restore permanent construction that may have been delayed because of interference with the temporary facility.
 3. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.

END OF SECTION

SECTION 01 56 39 TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the protection and trimming of existing trees that interfere with, or are affected by, execution of the Work, whether temporary or permanent construction.

1.2 ADDITIONAL DEFINITIONS

- A. Tree Protection Zone: Area surrounding individual trees or groups of trees to remain during construction and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.3 SUBMITTALS

- A. Tree Pruning Schedule: Written schedule from Arborist detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
- B. Qualification Data: For tree service firm and Arborist.
- C. Maintenance Recommendations: From Arborist, for care and protection of trees affected by construction during and after completing the Work.

1.4 QUALITY ASSURANCE

- A. Tree Service Firm (Arborist) Qualifications: An experienced tree Arborist firm that has successfully and legally completed tree protection and trimming work similar to that required for this Project and that will provide its experienced, qualified Arborist to Project site during execution of tree protection and trimming. The Tree Service Firm shall possess a Broward County Class "A" Tree Trimmer license as required by Broward County.
- B. Tree Pruning Standard: Comply with ANSI A300 (Part 1), "Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices (Pruning)."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than two inches in diameter; and free of weeds, roots, and toxic and other non-soil materials.
 - 1. Obtain topsoil only from well-drained sites where topsoil is 4 inches deep or more; do not obtain from bogs or marshes.
- B. Fence around tree protection zone: Refer to the applicable section or drawing regarding chain link fencing.
- C. If required, provide Organic Mulch: Shredded hardwood, ground or shredded bark, wood and bark chips, free of deleterious materials.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Temporary Fencing: Install temporary fencing around tree protection zones to protect remaining trees and vegetation from construction damage. Maintain temporary fence and remove when construction is complete.
 - 1. Install chain-link fence according to ASTM F567, manufacturer's written instructions and other applicable requirements of the Contract Documents.

- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Mulch areas inside tree protection zones and within drip line of trees to remain and other areas indicated.
 - 1. Apply three inches average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.
- D. Do not store construction materials, debris, or excavated material inside tree protection zones. Do not permit vehicles or foot traffic within tree protection zones; prevent soil compaction over root systems.
- E. Maintain tree protection zones free of weeds and trash.
- F. Do not allow fires within tree protection zones.
- G. No trees shall be removed until approved by the Consultant or County Project Manager.
- H. If trees are determined to remain, a tree preservation fence shall be installed in accordance with the detail(s) in the Drawings.

3.2 EXCAVATION

- A. Install shoring or other protective support systems to minimize sloping or benching of excavations.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks and comb soil to expose roots.
 - 1. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately three inches back from new construction.
 - 2. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
- D. Where utility trenches are required within tree protection zones, tunnel under or around roots by drilling, auger boring, pipe jacking, or digging by hand.
 - 1. Root Pruning: Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with sharp pruning instruments; do not break or chop.

3.3 REGRADING

- A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade beyond tree protection zones. Maintain existing grades within tree protection zones.
 - 1. Root Pruning: Prune tree roots exposed during grade lowering. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots with sharp pruning instruments; do not break or chop.
- B. Minor Fill: Where existing grade is six inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.4 TREE PRUNING WHEN APPLICABLE

- A. Prune trees to remain that are affected by temporary and permanent construction.
- B. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by Arborist.
- C. Pruning Standards: Prune trees according to ANSI A300 (Part 1) as follows:
 - 1. Type of Pruning: Cleaning, Thinning, and Raising.
 - 2. Specialty Pruning: Restoration, Vista, Palm, and Utility.
- D. Cut branches with sharp pruning instruments; do not break or chop.
- E. Chip removed tree branches and dispose of off-site.

3.5 TREE REPAIR AND REPLACEMENT WHEN APPLICABLE

- A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to Arborist's written instructions.
- B. Remove and replace trees indicated to remain that die or are damaged during construction operations that Consultant, County Project Manager or Inspector determines are incapable of restoring to normal growth pattern.
 - 1. Provide new trees of same size and species as those being replaced; plant and maintain as specified.
- C. Aerate surface soil, compacted during construction, 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill two inch diameter holes a minimum of 12 inches deep at 24 inches on center (O.C.) Backfill holes with an equal mix of augered soil and sand.
- D. Provide hand watering or irrigation system for replacement trees for a minimum of six months.
- E. Warrant replacement trees for a minimum of one year. If the replacement tree dies, the warranty will restart from the planting or the replacement for minimum for one year for the second replacement tree.
- F. Tree specifications are included in Division 32 of the Project Manual or in the Drawings.

END OF SECTION

SECTION 01 57 00 TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes requirements for prevention, control and abatement of erosion situation and water pollution resulting from the construction of the Project until Final Completion and Acceptance.
- B. All applicable provisions of local codes concerning grading, filling, excavation, and soil removal shall be complied with.

1.2 SUBMITTALS, PLANS, AND PERMITS

- A. The Contractor shall apply for and obtain a National Pollutant Discharge Elimination System (NPDES) Permit or approval by the U.S. Environmental Protection Agency (EPA) pursuant to 40 CFR Part 122.26 as amended.
- B. The Contractor shall prepare the Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will include this erosion control plan and all additional measures that will be employed to dispose of, control, or prevent the discharge of solid, hazardous, and sanitary wastes to waters of the U.S. Include procedures to control off-site tracking of soil by vehicles and construction equipment and a procedure for cleanup and reporting of non-storm water discharges, such as contaminated groundwater or accidental spills. The Consultant will review the Contractor's SWPPP, including required signed certification statements, before soil disturbing activities begin.
- C. Failure to sign any required documents or certification statements will be considered a default of the Contract. Any earth disturbing activities performed without the required signed documents or certification statements may be considered a violation of the Clean Water Act by the EPA.
- D. Prepare the erosion control plan in accordance with the sequence of operations and present in the NPDES Storm Water Pollution Prevention Plan required format provided by State of Florida Department of Environmental Protection. The erosion control plan shall describe, but not be limited to, the following items or activities:
 - 1. For each phase of construction operations or activities, supply the following information:
 - a. Locations of all erosion control devices
 - b. Types of all erosion control devices
 - c. Estimated time erosion control devices will be in operation
 - d. Monitoring schedules for maintenance of erosion control devices
 - e. Methods of maintaining erosion control devices
 - f. Containment or removal methods for pollutants or hazardous wastes
 - 2. The business name, contact information and telephone number of the person responsible for monitoring and maintaining the erosion control devices.
 - 3. Submit for approval the erosion control plans meeting standards listed below:
 - a. Projects permitted by the South Florida Water Management District require the following:
 - 1) Obtain approval by the South Florida Water Management District (SFWMD) of the erosion control plan.
 - 2) Do not begin construction activities until the erosion control plan receives written approval from SFWMD and the Consultant.
 - b. Projects authorized by permitting agencies other than the SFWMD or projects for which no permits are required require the following: The Consultant will review and approve the Contractor's erosion control plan. Do not begin construction activities until the erosion control plan receives written approval from the Consultant. Comply with the approved erosion control plan.

1.3 ECOLOGICAL REQUIREMENTS

- A. Take sufficient precautions to prevent pollution of streams, canals, lakes, reservoirs and other water impoundments with fuels, oils, bitumen, calcium chloride or other harmful materials. Also, conduct and schedule operations so as to

avoid interference with movement of migratory fish. No residue from dust collectors or washers shall be dumped into any live stream.

- B. Construction operations in rivers, streams, lakes, tidal waters, reservoirs, canals and other water impoundments shall be restricted to those areas where it is necessary to perform filling or excavation to accomplish the Work shown in the plans and to those areas which must be entered to construct temporary or permanent structures. As soon as conditions permit, rivers, stream, and impoundments shall be properly cleared of all obstructions placed therein or caused by construction operations.
- C. Except as necessary for construction, and approved by the Consultant or Owner, excavated material shall not be deposited in rivers, streams, canals or impoundments, or in a position close enough thereto to be washed away by high water or runoff.
- D. Do not disturb lands or waters outside the limits of construction except as may be found necessary and authorized by the Consultant or Owner.

1.4 SCHEDULING/COORDINATION

- A. Clearing and grubbing shall be scheduled and performed that grading operations can follow immediately thereafter; grading operations shall be so scheduled and performed that permanent erosion control features can follow immediately thereafter if conditions on the project permit.
- B. Schedule operations such that the area of unprotected erodible earth exposed at any one time is not larger than the minimum area necessary for efficient construction operations; and the duration of exposed, uncompleted construction to the elements shall be as short as practicable.

1.5 PROTECTION OF STORM DRAINS

- A. Storm drain facilities, both open and closed conduit, serving the construction area shall be protected from pollutants and contaminants.
- B. If the Consultant or County's Project Manager determines that siltation of drainage facilities has resulted due to the project, the Consultant or County's Project Manager will advise the Contractor to remove and properly dispose of the deposited materials without an increase to the Contract Sum.
- C. Should the Contractor fail to or elect not to remove the deposits, the COUNTY will provide maintenance cleaning as necessary and charge all costs of such service against the amount of money due or to become due the Contractor.

1.6 PREVENTION, CONTROL AND ABATEMENT REQUIREMENTS

- A. Provide, install, construct and maintain all coverings, mulching, sodding, sandbagging, berms, slope drains, hay and straw bales, sedimentation structures or other devices necessary to meet City, County, State and Federal regulatory agency codes, rules and laws, and as indicated on the Drawings.
- B. The locations and methods of operation in all detention areas, borrow pits, material supply pits and disposal areas furnished by the Contractor shall meet the approval of the Consultant as being such that erosion during and after completion of the Work will not likely result in detrimental siltation of water pollution.
- C. The Consultant or Owner may limit the surface areas of unprotected erodible earth exposed by clearing and grubbing, excavation or filling operations and may direct the Contractor to provide immediate erosion or pollution control measures to prevent siltation or contamination of any river, stream, lake, tidal waters, reservoir, canal or other impoundment or to prevent damage to the Project or property outside the project right of way.

1.7 PROJECT CONDITIONS

- A. Temporary Erosion Control Facilities: Contractor and its installer of temporary erosion control facilities shall assume responsibility for operation, maintenance, and proper function of each facility during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. The Consultant will not require testing of materials used in construction of temporary erosion control features other than as provided for geo-textile fabric in FDOT Section 985-3, as amended, unless such material is to be incorporated into the completed project. When no testing is required, the Consultant will base acceptance on visual inspection.

- B. The Contractor may use new or used materials for the construction of temporary silt fence, staked turbidity barriers, and floating turbidity barrier not to be incorporated into the completed project, subject to the approval of the Consultant or County's Project Manager.
- C. Environmental Protection: Provide Best Management Practices (BMPs) environmental protection equipment to prevent air, soil, and water pollution in and around the project site. BMPs shall comply with contract specifications, FDEP regulations and FDOT standards. Contractor shall be solely liable and responsible for any fines issued by the regulatory agencies due to non-compliance or inadequate compliance. BMPs shall be maintained for the construction duration.

PART 3 - EXECUTION

3.1 PRE-CONSTRUCTION CONFERENCE

- A. At the pre-construction conference, provide a special plan to prevent, control, and reduce erosion and water pollution, meeting the requirements or special conditions of all permits authorizing project construction. If no permits are required or the approved permits do not contain special conditions or specifically address erosion and water pollution, the project erosion control plan will be governed by this section.

3.2 CONSTRUCTION REQUIREMENTS

- A. Limitation of Exposure of Erodible Earth:
 - 1. The Consultant or County's Project Manager may limit the surface areas of unprotected erodible earth exposed by the construction operation and may direct the Contractor to provide erosion or pollution control measures to prevent contamination of any river, stream, lake, tidal waters, reservoir, canal, or other water impoundments or to prevent detrimental effects on property outside the project right-of-way or damage to the project. Limit the area in which excavation and filling operations are being performed so that it does not exceed the capacity to keep the finish grading, grassing, sodding, and other such permanent erosion control measures current in accordance with the accepted schedule.
- B. Do not allow the surface area of erodible earth that clearing and grubbing operations or excavation and filling operations expose to exceed 750,000 sq. ft. without specific prior approval by the Consultant. This limitation applies separately to clearing and grubbing operations and excavation and filling operations.
- C. Incorporation of Erosion Control Features:
 - 1. Incorporate permanent erosion control features into the project at the earliest practical time. Use approved temporary erosion control features to correct conditions that develop during construction which were not foreseen at the time of design, to control erosion prior to the time it is practical to construct permanent control features, or to provide immediate temporary control of erosion that develops during normal construction operations, which are not associated with permanent erosion control features on the project.
- D. Scheduling of Successive Operations:
 - 1. Schedule operations such that the area of unprotected erodible earth exposed at any one time is not larger than the minimum area necessary for efficient construction operations, and the duration of exposure of uncompleted construction to the elements is as short as practicable.
 - 2. Schedule and perform clearing and grubbing so that grading operations can follow immediately thereafter. Schedule and perform grading operations so that permanent erosion control features can follow immediately thereafter if conditions on the project permit.
- E. Details for Temporary Erosion Control Features:
 - 1. General: Use temporary erosion and water pollution control features that consist of, but are not limited to, temporary grassing, temporary sodding, temporary mulching, sandbagging, slope drains, sediment basins, sediment checks, berms, baled hay or straw, floating turbidity barrier, staked turbidity barrier and silt fence. For design details for some of these items, refer to the Water Quality Section of the FDOT Design Standards.

2. Temporary Grassing: The Contractor may designate certain areas of grassing constructed in accordance with the SWPPP as temporary erosion control features. Keep the grass in a moist condition in order to ensure growth. The Contractor will pay for all required watering and mowing.
3. Temporary Sod: Furnish and place sod in accordance within areas designated by the SWPPP to temporarily control erosion. Keep the sod in a moist condition in order to ensure growth. The Contractor will pay for all required watering and mowing.
4. Temporary Mulching: Furnish and apply a 2 to 4 inch thick blanket of straw or hay mulch to designated areas, then mix or force the mulch into the top 2 inches of the soil in order to temporarily control erosion. Use only undecayed straw or hay which can readily be cut into the soil and which otherwise complies with FDOT 981-3. The Contractor may substitute other measures for temporary erosion control, such as hydro mulching, chemical adhesive soil stabilizers, etc., for mulching with straw or hay, if approved by the Consultant. When beginning permanent grassing operations, plow under temporary mulch materials in conjunction with preparation of the ground.
5. Sandbagging: Furnish and place sandbags in configurations to control erosion and siltation.
6. Slope Drains: Construct slope drains in accordance with the details shown in the plans, the FDOT Design Standards, or as may be approved as suitable to adequately perform the intended function.
7. Sediment Basins: Construct sediment basins in accordance with the details shown in the plans, the FDOT Design Standards, or as may be approved as suitable to adequately perform the intended function. Clean out sediment basins as necessary in accordance with the plans or as directed.
8. Berms: Construct temporary earth berms to divert the flow of water from an erodible surface.
9. Baled Hay or Straw:
 - a. Provide bales having minimum dimensions of 14 by 18 by 36 inches [350 by 450 by 900 mm], at the time of placement. Construct baled hay or straw dams to protect against downstream accumulations of silt. Construct the baled hay or straw dams in accordance with the details shown in the plans or the FDOT Design Standards. Meet the FDOT provisions or all baled hay or straw.
 - b. Place the dam to effectively control silt dispersion under conditions present on this project. The Contractor may use alternate solutions and usage of materials if approved.
10. Temporary Silt Fences:
 - a. General: Furnish, install, maintain, and remove temporary silt fences, in accordance with the manufacturer's directions, these Specifications, the details as shown on the plans, and the FDOT Design Standards.
 - b. Materials and Installation: Use a geotextile fabric made from woven or nonwoven fabric, meeting the physical requirements of FDOT Section 985 according to those applications for erosion control.
 - c. Choose the type and size of posts, wire mesh reinforcement (if required), and method of installation. Do not use products which have a separate layer of plastic mesh or netting. Provide a durable and effective temporary silt fence that controls sediment comparable to the FDOT Design Standards, Index No. 102, as amended.
 - d. Install all sediment control devices in a timely manner to ensure the control of sediment and the protection of lakes, streams, gulf or ocean waters, or any wetlands associated therewith and to any adjacent property outside the right-of-way as required.
 - e. At sites where exposure to such sensitive areas is prevalent, complete the installation of any sediment control device prior to the commencement of any earthwork.
 - f. After installation of sediment control devices, repair portions of any devices damaged at no expense to the Owner.
 - g. Erect temporary silt fence at upland locations across ditch lines and at temporary locations shown on the plans or approved by the Consultant where continuous construction activities change the natural contour and drainage runoff. Do not attach temporary silt fence to existing trees unless approved by the Consultant.
 - h. Inspect all temporary silt fences immediately after each rainfall and at least daily during prolonged rainfall. Immediately correct any deficiencies. In addition, make a daily review of the location of silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, install additional silt fences as directed by the Consultant.
 - i. Remove sediment deposits when the deposit reaches approximately half of the volume capacity of the temporary silt fence or as directed by the Consultant. Dress any sediment deposits remaining in place after the temporary silt fence is no longer required to conform with the finished grade.

11. Floating Turbidity Barriers and Staked Turbidity Barriers:

- a. Install, maintain, and remove turbidity barriers to contain turbidity that may occur as the result of dredging, filling, or other construction activities which may cause turbidity to occur in the waters of the State. The Contractor may need to deploy turbidity barriers around isolated areas of concern such as seagrass beds, coral communities, etc. both within as well as outside the project limits. The Consultant or County's Project Manager will identify such areas. Place the barriers prior to the commencement of any work that could impact the area of concern. Install the barriers in accordance with the details shown in the plans or as approved by the Consultant or County's Project Manager. Ensure that the type barrier used and the deployment and maintenance of the barrier will minimize dispersion of turbid waters from the construction site.
- b. Operate turbidity barriers in such a manner to avoid or minimize the degradation of the water quality of the surrounding waters.
- c. Rock Bags: Furnish and place rock bags to control erosion and siltation. Place the bags as shown in the plans, the FDOT Design Standards or as directed by the Consultant or County's Project Manager. Use a fabric material with openings that are clearly visible to minimize clogging yet small enough to prevent rock loss. Use material of sufficient strength to allow removing and relocating bags without breakage. The bag size when filled with rocks shall be approximately 12 by 12 by 4 inch. Use No. 4 or No. 5 coarse aggregate rock unless otherwise noted.
- d. Watering: Provide temporary water during earthwork operation to minimize airborne sediment pollution.

3.3 MAINTENANCE OF EROSION CONTROL FEATURES.

- A. Provide routine maintenance of permanent and temporary erosion control features, at no expense to the Owner, until the project is complete and accepted. If reconstruction of such erosion control features is necessary due to the Contractor's negligence or carelessness or, in the case of temporary erosion control features, failure by the Contractor to install permanent erosion control features as scheduled, the Contractor shall replace such erosion control features at no expense to the Owner.
- B. Inspect all erosion control features at least once every seven calendar days and within 24 hours of the end of a storm of 0.25 inches [6 millimeters] or greater. Maintain all erosion control features as required in the SWPPP and as specified in State and/or Federal environmental regulatory permits. Use an inspection form to report all inspection findings and to document all corrective actions taken as a result of the inspection. Sign each inspection report and submit with final closeout document package.
- C. Mow of areas within the limits of the project. Mow these areas within every twenty-one days or more frequently. Do not mow slopes that are steeper than three horizontal to one vertical.

3.4 PROTECTION DURING SUSPENSION OF CONTRACT TIME

- A. If it is necessary to suspend the construction operations for any appreciable length of time, shape the top of the earthwork in such a manner to permit runoff of rainwater, and construct earth berms along the top edges of embankments to intercept runoff water. Provide temporary slope drains to carry runoff from cuts and embankments that are in the vicinity of rivers, streams, canals, lakes, and impoundments. Locate slope drains at intervals of approximately 500 feet [150 meters] and stabilize them by paving or by covering with waterproof materials. Should such preventive measures fail, immediately take such other action as necessary to effectively prevent erosion and siltation. The Consultant may direct the Contractor to perform, during such suspensions of operations, any other erosion control work deemed necessary.

3.5 REMOVAL OF TEMPORARY EROSION CONTROL FEATURES

- A. In general, remove or incorporate into the soil any temporary erosion control features existing at the time of construction of the permanent erosion control features in an area of the project in such a manner that no detrimental effect will result. The Consultant may direct that temporary features be left in place.

3.6 BASIS OF PAYMENT

- A. Prices and payments will be full compensation for all work specified in this Section, including construction and routine maintenance of temporary erosion control features and for mowing. Any and all costs resulting from compliance with the requirements of this Section, including permitting, construction, routine maintenance, and removal of temporary erosion control features, watering and mowing, shall be included within the general conditions of the Contract.
- B. Separate payment will not be made for the cost of erosion control features, including constructing temporary earth berms along the edges of the roadways to prevent erosion during grading and subsequent operations. The Contractor shall include these costs in the Contract prices for grading items.
- C. In case of repeated failure on the part of the Contractor to control erosion, pollution, or siltation, the Owner reserves the right to employ outside assistance or to use the Owner's own forces to provide the necessary corrective measures. Any such costs incurred, including design costs and fines, will be charged to the Contractor and appropriate deductions made from the monthly progress estimate.

END OF SECTION

SECTION 01 61 00 COMMON (BASIC) PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 NOT USED

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project, toxic substances, manufacturers' standard warranties on products. Substitutions are addressed elsewhere in the Contract Documents.

1.03 ADDITIONAL DEFINITIONS

- A. Products: Items purchased or manufactured for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Product and Basis of Design: As defined in the Division 1 References section. Additional information can also be found in the Product Options and Product Substitution Procedures sections.
 - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
 - 3. Approved and Pre-approved Product: Product that is demonstrated and approved by the County and Consultant through a substitution submittal and approval process, or where indicated as a pre-approved or accepted product in the Drawings or in the Project Manual to have the qualities equal to or better than the basis of design.
 - 4. Substitutions/Approved Equals: Refer to Product Substitution Procedures and References sections of the Project Manual.
- B. Materials: Products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
- C. Equipment: Product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.04 GENERAL PRODUCT REQUIREMENTS

- A. Do not use products removed from existing premises, other facilities or other construction sites, except as specifically permitted by the Contract Documents.
- B. Provide interchangeable components of the same manufacturer for similar components.
- C. Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new and unused at the time of installation.
 - 1. Provide manufactured and fabricated products that are produced and assembled in accord with the best design, engineering and shop practices.
 - 2. Provide products that are suitable for the service conditions.
 - 3. Adhere to specified product, equipment and component capacities, sizes, installations and dimensions.
 - 4. Provide identical products when multiples of the same products are required.
 - 5. Do not use material or equipment for any purpose other than that designated or specified.
- D. Provide products complete with all accessories, hardware, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
- E. Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- F. Continued Availability: Where, because of the nature of its application, the County 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, readily available products for which the manufacturer has published assurances that the products and its parts are likely to be available to the County at a later date.

- G. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products, which will be exposed to view in occupied spaces, or on the exterior.
- H. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
- I. Equipment Nameplates:
 - 1. Provide a permanent nameplate on each item of service connected or power operated equipment.
 - 2. Locate on an easily accessible surface, which is inconspicuous in occupied spaces.
 - 3. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed (if applicable)
 - e. Ratings and adherence to national standards (if applicable)

1.05 TOXIC SUBSTANCES

- A. Before any toxic substance may be used, the Contractor shall notify the Consultant and County, in writing, at least three business days prior to using the substance. The notification shall contain:
 - 1. Name of substance to be used.
 - 2. Where substance is to be used.
 - 3. When substance is to be used.
- B. Other Prohibited Materials: In addition to the restrictions placed by the State, use of the following materials is strictly prohibited on Broward County projects:
 - 1. Asbestos bearing materials.
 - 2. Cellulose or urea formaldehyde foam insulation products.
 - 3. Lead in plumbing pipe solders or other plumbing components.
- C. Handling of toxic or hazardous materials:
 - 1. Do not store any chemical or otherwise hazardous product in any size container outside of a building. Provide proper secondary containment barriers for all stored chemicals or hazardous materials.
 - 2. Do not discharge any volume of any material or chemical directly onto the ground, into any water source, or into any storm drain. If legally allowed, discharge materials or chemicals into sanitary sewer system in accordance with local, Broward County, and State of Florida requirements.
 - 3. Do not store buckets, drums, large containers of chemicals or other hazardous materials on site. Dispose of on any such containers off site in accordance with local, Broward County, and State of Florida requirements.
 - 4. The Contractor shall remove all chemical products from the site at the completion of its use.
 - 5. Extra stock materials shall be properly stored on site and conveyed by the Contractor upon notice by the County to a storage area designated by the County.
 - 6. Material Safety Data Sheets (MSDS) or equivalent shall be maintained by the Contractor on site at all times for all chemicals/products.
- D. Contractor's Responsibility:
 - 1. The Contractor is responsible for materials and chemicals used during the prosecution of the Work.
 - 2. If the Contractor spills or leaves hazardous materials on or near the site or any other location used in connection with prosecuting the Work which cause an environmental problem or cause a notice of compliance issued by any authoritative Federal, State and Local governmental agency; shall be responsible for:
 - a. Any and all cleanup costs.
 - b. Any and all enforcement fines, penalties and any other associated cost and/or actions deemed necessary as to resolve the problem, to the satisfaction of the respective jurisdictional agency and the County.

1.06 PRODUCT WARRANTIES

- A. Warranties may be specified in the Project Manual and on the Drawings. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to County.
 - 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for County as may be applicable such as for additional coatings.
- B. Special Warranties: When applicable, prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Refer to other Divisions for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements of Closeout Procedures of the Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

END OF SECTION

SECTION 01 62 00 PRODUCT OPTIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes administrative and procedural requirements for selection of products for use in Project, quality assurance and selection. Additional instructions can be found in other Division 1 sections of the Project Manual.

1.02 PRODUCT QUALITY ASSURANCE

- A. Compatibility of products is a basic requirement of product selection. When the Contractor is given the option/choice of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also choices.
 - 1. Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other contractors or the Owner's own forces.
 - 2. If a dispute arises between County's contractors over concurrently selectable, but incompatible products, the Consultant or County Project Manager will determine which products shall be retained and which are incompatible and must be replaced.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION

- A. Product selection is governed by the Contract Documents and governing regulations, not by previous project experience. Procedures governing product selection include the following:
 - 1. The compliance requirements for individual products as indicated in Contract Documents, are multiple in nature and may include generic, descriptive, proprietary, performance and prescriptive.
 - 2. Contractor's choice in selecting products are limited by requirements of the Contract Documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous projects.
- B. Three or more named products or manufacturers: Provide one of the named products at Contractor's selection but excluding any that do not comply with requirements
- C. Standards, Codes and Regulations: Where only compliance with an imposed standard, code or regulation is required and no products have been pre-approved, selection from among products which comply with requirements including those standards, codes and regulations, is Contractor's option.
- D. Performance Requirements: Provide products which comply with specific performances indicate, and that are recommended by manufacturer for the application indicated.
 - 1. The manufacturer's recommendations may be contained in published product literature or by the manufacturer's individual certification of performance.
 - 2. General overall performance of a product is implied where the product is specified for specific performances.
- E. Descriptive Specification Requirements: Provide products which have been produced in accordance with descriptive requirements of the Contract Documents using specified ingredients and components, and complying with specified requirements for mixing, fabricating, curing, finishing, testing and similar operations in manufacturing process.
- F. Visual Matching: Where matching an established sample is required, the final judgment of whether a product proposed by the Contractor matches the sample will be determined by the Consultant or County Project Manager.
- G. Visual Selection: When "as selected from the manufacturer's standard colors" or similar phrase is used, the Consultant or County Project Manager shall be responsible for selecting the color, pattern and texture from the product line.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 66 00 PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.01 NOT USED

1.02 SUMMARY

- A. This Section includes the product transportation, delivery, storage, protection and handling.

1.03 PRODUCT TRANSPORTATION AND DELIVERY

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. **County will not accept deliveries on behalf of Contractor.**
- C. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
- D. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
- E. Deliver products to the site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
- F. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- G. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- H. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- I. Keep and maintain shipping receipts, damage reports, and other shipping/delivery documentation as project records.

1.04 PRODUCT STORAGE, PROTECTION AND HANDLING

- A. Store product in a manner that will facilitate inspection and measurement of quantity or counting of quantities.
- B. Periodically inspect storage areas to assure products are undamaged and are maintained under specified conditions.
- C. Store products to allow for inspection and measurement of quantity or counting of units.
- D. Store cementitious products and materials on elevated platforms.
- E. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
- F. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.
- G. Protect sensitive materials from weather and climate.
- H. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
- I. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
- J. Protect stored products from damage and liquids from freezing.
- K. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.
- L. Exterior Storage:
 - 1. Store fabricated products above ground on blocking or skids to prevent soiling, staining and water absorption.
 - 2. Cover products subject to deterioration with impervious sheet covering.
 - a. Provide ventilation to avoid condensation.
 - b. Ensure adequate drainage: Do not allow standing water on top of impervious sheeting.
 - 3. Loose granular materials (including sands and other aggregates):
 - a. Store on well drained solid surfaces only.
 - b. Cover with impervious sheet covering or provide other weatherproof enclosure.
 - 4. Prevent mixing with ground, run-off, sprayed or spilled contaminants.
- M. Provide equipment and personnel to store and handle products by methods to prevent soiling, disfigurement, or damage.

N. Replace materials improperly transported, stored or handled at no additional cost to the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 70 00 EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, field engineering and surveying, general installation of products, and protection of installed construction and protection. **This section, and portions of it, may not apply to all projects issued under this Contract.**

1.2 SUBMITTALS

- A. Certificates: Submit certificate signed by the Land Surveyor certifying that location and elevation of improvements comply with requirements.
- B. Certified Surveys: Submit three copies signed by land surveyor for surface water license certifications.
- C. Final Property Survey: Submit three copies showing the Work performed and record survey data.
- D. Electronic Final Property Survey: Submit three CD/DVDs with electronic copies of the final survey. Surveys shall be .DWG format, for use with AutoCAD or other County approved comparable software.

1.3 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A Professional Land Surveyor who is legally qualified and licensed to practice in jurisdiction where Project is located and who is experienced in providing land surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Upon immediate discovery of the need for clarification of the Contract Documents, submit a Request for Information (RFI) to Consultant. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Consultant promptly.
- B. General: Engage a professional and licensed Surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Consultant when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Consultant.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Consultant. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Consultant before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

- B. Benchmarks: Establish and maintain a minimum of four permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- C. Certified Survey: Upon completion of foundation walls, major site improvements, and other work requiring field engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and site work.
- D. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by the Surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Final survey shall be prepared by the same surveying firm who prepared the property survey for the Owner prior to construction. Contractor shall be responsible for hiring and paying for the surveying firm.
 - 2. Original site survey shall be updated to show all improvements made by the Contractor.
 - 3. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 - 4. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of eight feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance.
- D. Conduct construction operations so that no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels unless personal protection equipment is utilized at the site.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Consultant.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 01 71 23 FIELD ENGINEERING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide and pay for field surveying services required for the project.

1.2 QUALIFICATIONS OF SURVEYOR

- A. Provide a qualified and experienced land surveyor, registered in the State of Florida as a Professional Surveyor and Mapper and acceptable to Contractor and Owner.

1.3 SUBMITTALS

- A. Submit name and address of Surveyor to County with the list of subcontractors.
- B. Any and all as-builts shall be prepared utilizing CADD software compatible with AutoCAD 2012 or later version and submitted as an electronic file (.dwg and .pdf)) in addition to paper copies.
- C. Submit Surveyor certified as-builts at the completion of each of the following stages and obtain Consultant's approval of the as-builts before proceeding to the next phase of work as shown below.
 - 1. Final grading of sub-grade.
 - 2. Final grading of rock base.
 - 3. Finished asphalt grades.
 - 4. Final site grades presented in such a way that construction with the contract documents can be confirmed. Final site grades to be referenced to the property lines on a 50 feet grid. Swales shall be cross sectioned at 20 feet intervals. The swale cross section shall be referenced to the property line, shall show the top of bank on both sides, bottom of swale on both sides and their elevations.
 - 5. Building finish floor elevations and location.

1.4 SURVEY REQUIREMENTS

- A. Establish and maintain line and levels for the earthwork, underground utility, paving operations, building slabs, and any other horizontal or vertical control necessary to construct the project.
- B. Provide final as-builts in .dwg and .pdf formats to the Consultant, County, and all applicable permitting agencies.
 - 1. Submit partial surveys to the Consultant and County Project Manager prior to continuing to the next phase of work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 73 00 EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes cutting and patching and selective demolition.

1.2 SUBMITTALS

- A. Cutting and Patching Proposal:

1. Submit a proposal for the Consultant's and County's approval well in advance of the time cutting and patching will be performed and request approval to proceed where:
 - a. Individual specification sections require approval of procedures for cutting and patching before proceeding.
 - b. Cutting and patching will affect:
 - 1) Structural integrity of any element of Project.
 - 2) Integrity of weather exposed or moisture resistant element.
 - 3) Efficiency, maintenance, or safety of any operational element.
 - 4) Visual qualities of sight exposed elements.
 - 5) Work of County or separate County contractor.
2. Include the following information, as applicable, in the proposal:
 - a. Identification of Project.
 - b. Location and description of affected Work.
 - c. Necessity for cutting or alteration: Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
 - d. Description of proposed Work and Products to be used: List products to be used and firms or entities that will perform Work.
 - e. Alternatives to cutting and patching.
 - f. Effect on the Work, the work of the County or separate County contractors:
 - 1) Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 - 2) List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 - g. Written permission of affected separate contractor.
 - h. Date and time when cutting and patching will be executed.
3. Approval by the Consultant and County to proceed with cutting and patching does not waive the Consultant's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

- B. Selective Demolition:

1. Include coordination for shut-off, capping, continuation of utility services as required, together with details dust noise control protection.
2. Coordinate with County's continuing occupation of portions of existing building and with County's partial occupancy of completed new addition, alteration, and renovation.

- C. Project Record Documents: Accurately record actual locations of capped utilities, subsurface obstructions, and unanticipated structural, mechanical and electrical elements uncovered during demolition and submit as required of Division 1.

1.3 QUALITY ASSURANCE

A. Operational and Safety Limitations:

1. Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
2. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems such as:
 - a. Primary operational systems and equipment.
 - b. Air or smoke barriers.
 - c. Fire protection systems.
 - d. Noise and vibration control elements and systems.
 - e. Control systems.
 - f. Communication systems.
 - g. Electrical wiring systems.
 - h. Special construction specified.

B. Visual Requirements:

1. Remove and replace Work cut and patched in a visually unsatisfactory manner.
2. If possible, retain the original installer or fabricator to cut and patch the following categories of exposed Work, or if it is not possible to engage the original installer or fabricator, engage another experienced firm.

1.4 APPLICATION AND INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of eight feet in spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Materials and work quality: Conform to the requirements of the Contract Documents with respect to the parts or kinds of work included.

D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work and products true to line and level. Allow for expansion and building movement.

E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Consultant for final decision.

F. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

G. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

H. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

I. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels, when possible.

J. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

K. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Consultant for final decision.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- L. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- M. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

1.5 ERECTION

- A. Erect structural and other building elements within the dimensional tolerances and other requirements as specified in the respective specification sections.

1.6 PROTECTION OF ADJACENT PROPERTY

- A. Cleaning and Protection:
1. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
 2. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 INSPECTION

- A. Take corrective action before proceeding if unsafe or unsatisfactory conditions are encountered.
- B. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades.
- C. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately upon discovery of the need for clarification of the Contract Documents, submit a request for information to Consultant. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests using Document (Form) 01310A.
- D. Temporary Support: Provide temporary support of Work to be cut.
- E. Protection:
1. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- F. Avoid interference with use of adjoining properties or interruption of free passage to adjoining properties.

- G. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 CUTTING AND PATCHING

A. General:

- 1. Employ experienced workers to perform cutting and patching; refer to the References section for definition.

B. Cutting:

- 1. Where possible, review proposed procedures with the original installer; comply with the original installer's recommendations.
 - a. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping.
 - b. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces.
 - c. Temporarily cover openings when not in use.
 - d. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - e. Cut through concrete and masonry using a cutting machine such as carborundum saw or diamond core drill.
 - f. Comply with requirements of applicable specification section where cutting and patching requires excavating and backfilling.

C. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned:

- 1. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after bypassing and cutting.

D. Patching:

- 1. Patch with durable seams that are as invisible as possible. Comply with tolerances specified for the same or similar Work in other specification sections.
- 2. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.

E. Cleaning:

- 1. Thoroughly clean areas where cutting and patching is performed or used as access.
- 2. Remove completely paint, mortar, oils, putty and items of similar nature.
- 3. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied.
- 4. Restore damaged pipe covering to its original condition.

3.4 DEMOLITION

- A. Pending receipt of directive from County, rearrange selective demolition schedule as necessary to continue overall job progress without delay.
- B. Disposal of Demolished Materials: Refer to Division 1 section regarding construction waste.
- C. Clean Up and Repair of Selectively Demolished areas:
 - 1. Upon completion of selective demolition work, remove tools, equipment, demolished materials from site. Remove temporary protections and clean affected interior areas.
 - 2. Repair demolition performed in excess of that required.
 - 3. Return damaged structures, surfaces to remain to condition existing prior to or better than commencement of selective demolition work.

3.5 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces

END OF SECTION

SECTION 01 74 00 CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the construction waste. These costs are included in the Contractor's general conditions.

1.2 ADDITIONAL DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- C. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- D. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- E. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 PERFORMANCE REQUIREMENTS

- A. Salvage/Recycle Requirements: The project requirement is to salvage and recycle as much non-hazardous construction waste as possible including the following materials:

- 1. Construction Waste:
 - a. Site-clearing waste
 - b. Masonry
 - c. Concrete and asphalt
 - d. Lumber
 - e. Wood sheet materials
 - f. Wood trim
 - g. Metals
 - h. Roofing
 - i. Insulation
 - j. Flooring materials
 - k. Gypsum and fiber boards
 - l. Piping
 - m. Electrical conduit.
 - n. Uncontaminated Packaging such as:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
 - 1. Recycling company shall be locally and/or state regulated with recycling diversion rates certified by the applicable regulating agency.

1.5 WASTE MANAGEMENT PLAN

- A. Contractor should develop a waste management plan (plan) consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan
- B. Waste Identification: Indicate anticipated types and quantities of site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract. Do not use the facilities' waste receptacles.
- B. The Superintendent or other person designated by the Contractor shall serve as Waste Management Coordinator, responsible for implementing, monitoring, and reporting status of waste management work plan. The Waste Management Coordinator shall be present at Project site full time for duration of Project.
- C. Contractor shall train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
- D. Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Division 1 for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work, if applicable:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
- C. Salvaged Items for County's Use, if applicable:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to County.
 - 4. Transport items to County's storage area off-site.
 - 5. Protect items from damage during transport and storage.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE

- A. Recycle paper and beverage containers used by on-site workers.
- B. Separate clean, recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off County's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

- A. Break up and transport asphalt concrete paving to asphalt-recycling facility, which is not suitable for being used as fill.
- B. Remove concrete reinforcement and other metals from concrete and sort with other metals. Pulverize concrete to maximum 4-inch size, for potential use in sub-base.
- C. Metals: Separate metals by type.
 1. Structural Steel: Stack members according to size, type of member, and length.
 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- D. Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- E. Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag materials.
 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum and Fiber Board: Stack large clean pieces on wood pallets and store in a dry location.
 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.6 DISPOSAL OF WASTE

- A. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill/final disposal site or incinerator acceptable to authorities having jurisdiction.
 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Do not burn waste materials.
- C. Transport waste materials off County's property and legally dispose of them.

END OF SECTION

SECTION 01 74 19 PROGRESS CLEANING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Contractor shall enforce **daily** cleaning during progress of Work and enforce final cleanup prior to Final Completion.
 - 1. Hazards Control:
 - a. Store volatile wastes in covered metal containers outside the building (if applicable) and away from the public.
 - b. Prevent accumulation of waste and debris that creates hazardous conditions or that may affect the surrounding environment such as wildlife and bodies of water.
 - c. Provide adequate ventilation during use of volatile or noxious substances.
- B. Conduct cleaning and disposal operations to comply with local ordinances, anti-pollution laws and standard practices:
 - 1. Do not burn or bury debris or waste materials on Project Site.
 - 2. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Refer to the Construction Waste Management specification for any additional requirements.
 - 4. **Do not leave waste and trash within walls, columns, pipes, etc.**

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Use cleaning materials recommended by manufacturer or surface to be cleaned which will not create hazards to health or property and which will not damage surfaces.
- B. Use non-toxic cleaning products and procedures.

PART 3 - EXECUTION

3.1 DAILY CLEANING DURING CONSTRUCTION

- A. **Enforce daily cleaning to keep building, grounds, jobsite and public property free of accumulation of waste materials, debris, and windblown debris resulting from construction operations. This includes any waste generated by workers such as cigarette butts, bottles, wrappers, seeds, etc.**
- B. Have protective covering applied on newly installed Work where reasonable required to ensure freedom from damage or deterioration at time of Substantial Completion. Enforce cleaning and maintenance on other newly installed Work as frequently as necessary through remainder of construction period.
- C. Have operable components adjusted and lubricated to ensure operability without damaging effects.
- D. Furnish on-site dumpster(s) for collection of waste materials and debris.
- E. **At the end of each workday, remove waste material and debris from project site or dispose of in Contractor's on-site dumpster.**
- F. **Do not drop or throw** materials from heights without a chute.
- G. Continue enforcing cleaning daily until site is accepted for Final Completion.

3.2 DUST CONTROL

- A. Wet down materials as needed to prevent blowing dust on a regular basis.
- B. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

END OF SECTION

SECTION 01 75 00 STARTING AND ADJUSTING

PART 1 - GENERAL

1.1 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems. Notify County at least two business days prior to start-up of each item.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- E. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions, which may cause damage.
- F. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- G. Verify wiring and support components for equipment are complete and tested.
- H. Execute start-up under supervision of responsible Contractor's personnel and County in accordance with manufacturers' instructions and commissioning plan.
- I. When specified in individual specification sections, require manufacturer to provide an authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- J. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in other Division 1 sections.

1.2 SUBMITTALS

- A. Submit a written report in accordance with Division 1 confirming that the equipment or system has been properly installed, inspected, and is functioning correctly.

1.3 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to County's maintenance staff approximately three calendar days prior to the date of Substantial Completion.
- B. Demonstrate Project equipment and provide instruction by a qualified and experienced representative who is knowledgeable about the Product.
- C. For equipment or systems requiring changes for seasonal operations, perform demonstration for other seasons within six months of Substantial Completion.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with County staff in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.

END OF SECTION

SECTION 01 76 00 PROTECTING INSTALLED CONSTRUCTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Cleaning and Protection:

1. During handling and installation, clean and protect construction in progress and adjoining materials in place.
2. Apply protective covering where required to ensure protection from damage or deterioration until Owner occupancy.
3. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period under provisions of Division 1.
4. Adjust and lubricate operable components to ensure operability without damaging effects.

B. Limiting Exposures:

1. Take precautions and supervise construction activities to ensure that no part of the construction in progress or completed is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
2. Where applicable, such exposures include, but are not limited to, the following construction related elements:
 - a. Excessive static or dynamic loading.
 - b. Excessive internal or external pressures.
 - c. Excessively high or low temperatures.
 - d. Thermal shock.
 - e. Excessively high humidity.
 - f. Air contamination or pollution.
 - g. Water.
 - h. Solvents.
 - i. Chemicals.
 - j. Light.
 - k. Radiation.
 - l. Puncture.
 - m. Abrasion.
 - n. Heavy traffic.
 - o. Soiling, staining and corrosion.
 - p. Bacteria.
 - q. Rodent and insect infestation.
 - r. Combustion.
 - s. Electrical current.
 - t. High speed operation.
 - u. Improper lubrication.
 - v. Unusual wear or other misuse.
 - w. Contact between incompatible materials.
 - x. Destructive testing.
 - y. Misalignment.
 - z. Excessive weathering.
 - aa. Unprotected storage.
 - bb. Improper shipping or handling.
 - cc. Theft.
 - dd. Vandalism.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in respective specification sections.
- B. Protect all stored products with plastic or equivalent wrapping.
- C. Protect all ductwork with plastic wrap on the ground and installed.
- D. Provide temporary and removable protection for installed products.
- E. Control traffic in immediate area of installed Work to minimize damage.
- F. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- G. Protect finished floors, stairs and other finished surfaces with durable sheet materials to protect from traffic, dirt, wear, damage, or movement of heavy objects.
- H. Prohibit traffic and storage on waterproofed or roofed surfaces. If traffic or activity on such surfaces is necessary, obtain recommendation from waterproofing or roofing manufacturer and provide protection accordingly.
- I. Do not allow wheeled or tracked vehicles on surfaces or areas not designed for their support or which will be otherwise damaged.

END OF SECTION

SECTION 01 77 00 CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Other sections of the Project Manual, Contract Documents and Documents (Forms) 01770.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout.
- B. Some projects will not require substantial completion, just final completion. This does not reduce the effort and requirements of the Contractor. If only a final completion is required, Contractor shall still abide by the substantial and final completion procedures.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. In the request, list items below that are incomplete.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise County of pending insurance changeover requirements.
 - 3. Submit specific warranties, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting County unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - a. Any project where a Broward County Surface Water or a South Broward Drainage District permit has been issued, a construction certification by the Civil Engineer of Record and approval by associated agencies will be required before the building department will issue a certificate of occupancy.
 - b. Contractor shall be responsible for meeting all construction and paperwork requirements to obtain such approval within the timeframe stipulated in the contract. Failure on the part of the Contractor to secure timely approval will result in assessment of liquidation damages owed to the County for any resulting delays.
 - 5. Prepare and submit the Project Record Documents, operation and maintenance manuals, Final Completion construction photographs (if applicable), copies of as-builts, property surveys (if applicable), and similar final record information.
 - 6. Provide Contractor's list of deficiencies (if applicable).
 - 7. Deliver tools, spare parts, extra materials, and similar items to location designated by County. Label with manufacturer's name, model number where applicable and location of where material was installed.
 - 8. Make final changeover of permanent locks and deliver keys to County. Advise County's personnel of changeover in security provisions.
 - 9. Complete startup testing of systems per Starting and Adjusting section of the Project Manual.
 - 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 11. Advise County of changeover in electric, water, padlocks and other utilities.
 - 12. Submit changeover information related to County's occupancy, use, operation, and maintenance.
 - 13. Complete final cleaning requirements, including touchup painting.
 - 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
 - 15. Any other requirements of the Contract Documents.
- B. Inspection: Submit a written request for inspection for Substantial Completion. Upon receipt of request, Consultant or County Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Consultant or County Project Manager will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Consultant or County Project Manager, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.
- C. Surface Water License Final Certification (if applicable): Special attention is called to the As-Built requirements of the Drainage License Certification. South Broward Water Control District and South Florida Water Management District (SFWMD) require that all proposed grade designations be verified and as-built with a surveyed measurement. All utilities new must be documented.
1. Provide an As-Built Survey signed and sealed by the Professional Surveyor of Record (original surveyor) indicating the actual elevations of all of the spots where proposed elevations are shown on the plans.
 2. As-built surveys shall be submitted to the Civil Engineer of Record for review and certification prior to submittal to the permitting agencies. Contractor is responsible for timely submittal of the as-built surveys to the civil engineer and to the permitting agencies. Any delays to project completion caused by incomplete or delayed as-built will be the responsibility of the Contractor. No additional time or extension to the project schedule will be granted for as-builts, and the Contractor will be responsible for liquidated damages caused by its delays.
 3. Electronic As-builts: All updated as-built information shall be drafted into electronic format by the Professional Surveyor of Record (original surveyor). The Consultant or County Project Manager will provide the base sheet electronic files for the project in .dwg format. All as-built information shall be transferred to the drawings and the electronic files delivered back to the Consultant and County in .dwg or other compatible format.
 - a. The electronic as-builts shall be clearly marked "As-Builts" and the modified information shall be clearly indicated.
 - b. The characteristics of the electronic files (file naming, layer structure, font configuration, etc.) shall be organized and neat and shall be approved by the County.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Division 1.
 2. Submit certified copy of Consultant's Substantial Completion inspection list of items to be completed or corrected (Document 01770D) endorsed and dated by the Consultant or County Project Manager. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest control final inspection report and warranties, if applicable.
 5. Instruct County's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training requirements.
- B. Inspection: Submit Documents 01770G, and 01770F final inspection for acceptance. On receipt of request, Consultant or County Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Consultant or County Project Manager will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. If more than one final completion inspection is required, the Contractor will be responsible for paying the Consultant for all additional inspections and punch list preparation required by the Consultant to verify compliance. Final payment application will not be processed until all items have been completed, closeout documentation completed, and re-inspection fees paid.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use the attached Documents (Forms) 01770.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.6 MAINTENANCE MATERIALS

- A. Submit maintenance materials, equipment and accessories of the types and in the quantities specified within the respective specification sections.
- B. Provide maintenance materials, equipment and accessories in original manufacturer's packaging with manufacturer's original, clearly legible labeling.
- C. Coordinate delivery date and final storage location of maintenance materials, equipment and accessories to the County through the Consultant or County Project Manager prior to requesting Substantial Completion Inspection.
- D. Do not utilize maintenance materials or equipment for cleaning, maintenance or other Contractor operations.
- E. Test and inspect maintenance materials, equipment and accessories to ensure operability, fitness for purpose and new condition prior to submitting to the County.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Consultant or County Project Manager for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by County during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual in accordance with the Warranties section of Division 1.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. Provide final cleaning of the Work at time indicated, consisting of cleaning each surface and unit of Work to a clean, neat and sanitary condition expected of a high-class building or amenity.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions and recommendations for cleaning procedures and products.
- C. After final cleaning, the County shall not need to provide any additional cleaning in order to immediately open the Project to use by the public and tenants.
- D. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project. **The cleanliness of the building or the new amenity should be so that the tenant can move in without the need for any additional cleaning.** The following are the minimum cleaning requirements for most projects and not all may be applicable:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of debris, waste material, litter, worker generated waste and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

- c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
- d. Remove tools, construction equipment, machinery, and surplus material from Project site.
- e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, closets, equipment vaults, maintenance hatches, attics, vents and similar spaces.
- g. Sweep concrete floors broom clean in unoccupied spaces.
- h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
- i. Wipe clean all tiled surfaces including wall tile.
- j. Wash and clean all horizontal and vertical surfaces such as window sills, baseboards, trim, wall tile, countertops, inside and outside of all cabinetry, etc.
- k. Clean transparent materials, including mirrors and glass in doors, windows and in restrooms. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
- l. Remove labels which are not required as permanent labels or required for inspection.
- m. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

- n. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- o. Replace parts subject to unusual operating conditions.
- p. Wipe clean and polish all chrome and metal surfaces such as faucets.
- q. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- r. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- s. Clean ducts, blowers, and coils if units were operated without filters during construction.
- t. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
- u. Clean and remove waste and debris from all gutters, downspouts, scuppers and drains.
- v. Clean any paint lines that are not neat, clean, straight and which are located in unintended locations.
- w. Leave Project clean and ready for occupancy.
- x. Remove temporary protection devices and facilities that were installed during the course of the Work such as barricades, temporary fencing and caution signage.

E. Refer to the construction waste management section for further disposal instructions.

END OF SECTION

SECTION 01 78 00 CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for closeout submittals.

1.2 SUBMITTALS

- A. Project closeout submittals required by the Contract Documents for the Work, or a portion thereof, shall be submitted by the Contractor at or prior to the time of its request for the Consultant or County Project Manager's inspection unless otherwise specified in this Section or elsewhere in the Contract Documents.
- B. Consultant (assisted by County staff and others as applicable) or County Project Manager will review project closeout submittals with the County for content, accuracy, and format:
 - 1. If the Consultant or County Project Manager disapproves or rejects any project closeout submittal, it shall be returned to the Contractor for correction and modification.
 - 2. The Contractor shall then submit its revised and corrected project closeout submittals to the Consultant or County Project Manager for review and approval.
 - 3. The Contractor shall continue to revise and resubmit project closeout submittals until all required submittals have been accepted by the Consultant or County Project Manager.
 - 4. The Consultant will forward approved project closeout submittals to the County prior to the County's Substantial Completion Inspection.
 - 5. Corrections or modifications of Project Closeout Submittals shall not be used as justification for an extension of Time.
- C. Submit closeout submittals under provisions of the Submittal Procedures with content and in formats specified within this Section and elsewhere in the Contract Documents

1.3 OPERATION AND MAINTENANCE DATA

- A. Quality Assurance:
 - 1. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Organization: Unless otherwise indicated, organize each manual into separate sections. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
 - 4. Name of Contractor and applicable subcontractor.
- C. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Contract name and number.
 - 4. Name and address of County Department.
 - 5. Date of submittal.
 - 6. Name, address, and telephone number of Contractor.
 - 7. Name and address of Consultant.
 - 8. Cross-reference to related systems in other operation and maintenance manuals.
- D. Format:
 - 1. Prepare data in the form of an instructional manual.

2. Bind in heavy-duty, commercial quality, vinyl or plastic covered 8-1/2 inch x 11 inch three D side ring binders with durable plastic covers, three inch maximum ring size:
 - a. When multiple binders are used, correlate data into related consistent groupings.
 - b. Provide sheet lifters for front and back of binder.
 - c. Cover: Identify each binder with typed or printed title "OPERATION AND MAINTENANCE INSTRUCTIONS"; identify Contract name and number; identify subject matter of contents.
 - d. Index Tab Dividers:
 - 1) Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
 - 2) Provide index tab sheet identified as "Contents" in front of the first page of the table of contents to prevent laser printer or copier toner from sticking to binder.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose CD/DVDs for electronic data.
4. Supplementary Text: Prepared on 8-1/2 by 11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversized drawings are necessary, fold drawings to same size as text pages and use as foldouts. Provide Photo reduced 11 x 17 inch copies folded in half of the as-built record drawings.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typed pages indicating drawing titles, descriptions of contents, and drawing locations

E. Contents, Each Volume:

1. Table of Contents: Provide Contract name and number; names, addresses, and telephone numbers of Consultant, Contractor and its subcontractors, subconsultants and suppliers; schedule of products and systems, indexed to content of the volume.
 - a. If record documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
2. For Each Product or System: List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts and applicable local maintenance subcontractors.
3. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
4. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
5. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
6. Warranties: Bind in copy of each.

F. Manual for Materials and Finishes:

1. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.
2. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
3. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
4. Additional Requirements: As specified in individual Product specification sections.
5. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

G. Manual for Equipment and Systems:

1. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
2. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
3. Include color-coded wiring diagrams as installed.
4. Operating Procedures:
 - a. Include start-up, break-in, and routine normal operating instructions and sequences.
 - b. Include regulation, control, stopping, shutdown, and emergency instructions.
 - c. Include summer, winter, and any special operating instructions.
5. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
6. Provide servicing and lubrication schedule, and list of lubricants required.
7. Include manufacturer's printed operation and maintenance instructions.
8. Include sequence of operation by controls manufacturer.
9. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
10. Provide control diagrams by controls manufacturer as installed.
11. Provide Contractor's coordination drawings, with color-coded piping diagrams as installed.
12. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
13. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
14. Additional Requirements: As specified in individual Product specification sections.
15. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

H. Instruction of County Personnel:

1. Provide copies of all instructional materials, including recorded documentation of training sessions or other instructional audio-visual materials, as specified in Demonstration and Training sections of the Contract Documents.
2. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

I. Submittals:

1. Review Copy:
 - a. Submit one copy of completed volumes at least 30 days prior to submitting Contractor's Request for Substantial Completion Inspection.
 - b. This copy will be reviewed and returned with comments by the Consultant, the County Project Manager, and other County consulting reviewers as applicable.
 - c. Revise content of all document sets as required by comments provide by the Consultant and the County prior to final submission.
2. Final Submittal:
 - a. Submit three sets of revised final volumes in final form prior to submitting Contractor's Request for Substantial Completion Inspection.
 - b. In addition to hard copies, scan and submit three sets of the closeout documents on CD/DVD in .pdf format.

1.4 MAINTENANCE MATERIALS

- A. Submit maintenance materials, equipment and accessories of the types and in the quantities specified within the respective specification sections.
- B. Provide maintenance materials, equipment and accessories in original manufacturer's packaging with manufacturer's original, clearly legible labeling.
- C. Coordinate delivery date and final storage location of maintenance materials, equipment and accessories to the County through the Consultant or County Project Manager prior to submittal of Contractor's Request for Substantial Completion Inspection.
- D. Do not utilize maintenance materials or equipment for cleaning, maintenance or other Contractor operations.
- E. Test and inspect maintenance materials, equipment and accessories to ensure operability, fitness for purpose and new condition prior to submitting to the County.

1.5 PRODUCT WARRANTIES

A. Summary:

- 1. This article specifies general administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers' standard warranties on products and special warranties. Additional warranty information can be found in the Warranties section of Division 1.
 - a. Refer to the Contract Documents for terms of the Contractor's special warranty of quality of work and materials if applicable.
 - b. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual specification sections.

B. Submittals:

- a. Applicability and requirements for special warranties may be included in the Project Manual in the respective specification sections. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or the Contractor and subcontractor, supplier or manufacturer. Submit a draft to the County for approval.
 - b. Submit draft copies to County Project Manager and Consultant of all proposed final warranty documents per the warranty specifications.
 - c. Edit warranty documents to make them project specific for the County.
 - d. Remove exclusions, disclaimers and limitations on product warranties not allowed by the Contract Documents.
 - e. Include terms and conditions in addition to the "standard" warranty as may be required by the Contract Documents.
 - f. Catalog copies or other "sample" warranty forms not presented in project specific format for the County shall be resubmitted.
- 2. Form of Submittal:
 - a. Prior to Substantial Completion compile three copies of each required warranty properly executed by the Contractor, or by the Contractor and its subcontractor, supplier, fabricator or manufacturer.

C. Timing of Submittals:

- 1. Draft warranty documents: Submit with shop drawings, product data or samples as otherwise required for the specified product. If no other submittals are required for a specific product, submit required draft warranty documents in a timely manner prior to delivery and installation of the product on the site.
- 2. Submit final warranty documents to the Consultant or County Project Manager not later than seven days after the date of Substantial Completion for the Work or a portion thereof as established on the Consultant's executed Consultant's Letter Establishing Substantial Completion Date.
- 3. If the County's executed Letter Establishing Substantial Completion Date designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the County.

4. When a designated portion of the Work is completed and occupied or used by the County, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Consultant or County Project Manager within seven days of completion of that designated portion of the Work.

1.6 PROJECT RECORD DOCUMENTS

A. General Requirements:

1. Do not use record documents for construction purposes.
2. Protect project records from deterioration and loss in a secure, fire resistive, waterproof location.
3. Provide access to record documents for reference by the Consultant, the County, and other County related personnel during normal business hours.
4. Make project record documents available for inspection by jurisdictional authorities at all times.
5. Ensure special protection of project record documents

B. Maintain at the Project site for the County one record copy of:

1. Drawings.
2. Copy of the final Contract Document Contract with executed contract.
3. Change Orders, Consultant's Supplementary Instructions and other modifications to the Contract.
4. Approved submittals including all administrative submittals as may be required in the Project Manual.
5. Field Test Records and Reports.
6. Contract Photography.

C. Maintenance of Project Record Documents:

1. Store documents and samples in Contractor's office apart from documents used for construction.
 - a. Provide fire-resistive, waterproof files and racks for storage of documents.
 - b. Provide locked fire-resistive, waterproof cabinets or secure storage spaces for storage of samples.
2. Filing Organization:
 - a. File all information concerning individual products to match the MasterFormat version utilized in the Contract Documents (such as 1995 or 2016).
 - b. File information concerning assemblies and systems according to the CSI/CSC UniFormat as published by the Construction Specifications Institute, edition current upon Notice to Proceed date.
3. Maintain documents in a clean, dry, legible condition and in order.

D. Record Drawings:

1. Maintain a clean, undamaged set of blue or black line on white prints of Contract Documents and Shop Drawings.
2. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown.
3. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Documents.
4. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
5. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
6. Mark new information that is important to the County, but was not shown on Contract Documents or Shop Drawings.
7. Note related Change Order numbers where applicable.
8. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
9. Content: Types of items requiring marking include, but are not limited to, the following:

- a. Dimensional changes to Drawings.
- b. Revisions to details shown on Drawings.
- c. Depths of foundations below first floor.
- d. Locations and depths of underground utilities.
- e. Revisions to routing of piping and conduits.
- f. Revisions to electrical circuitry.
- g. Design revisions.
- h. Actual equipment locations.
- i. Duct size and routing.
- j. Locations of concealed internal utilities.
- k. Changes made by Change Order or Construction Change Directive.
- l. Changes made following Consultant's or County Project Manager's written orders.
- m. Details not on the original Contract Documents.
- n. Field records for variable and concealed conditions.
- o. Record information on the Work that is shown only schematically.

E. Record Specifications:

- 1. Maintain one complete copy of the solicitation portion of the Contract Documents and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction.
- 2. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
- 3. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
- 4. Note related record drawing information and Product Data.
- 5. Upon completion of the Work, submit record Specifications to the Consultant or County Project Manager for the County's records.

F. Record Product Data:

- 1. Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted.
- 2. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations.
- 3. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation.
- 4. Note related Change Orders and markup of record drawings and Specifications.
- 5. Upon completion of markup, submit complete set of record Product Data to the Consultant or County Project Manager for the County's records.

G. Record Testing Data/Certifications

- 1. Record Testing Data/Certifications: Contractor shall submit three sets of signed and sealed reports prepared during the course of the construction. Testing Data shall include, but not limited to:
 - a. Soils compaction and density.
 - b. Concrete cylinder tests.
 - c. Asbestos tests / asbestos free material certifications.
 - d. Structural threshold inspector in-progress inspections.
 - e. Structural threshold inspector final structural certifications.
 - f. Structural welding certification.
 - g. Insulation certification.
 - h. As-built site lighting photometric plan.
 - i. Mechanical test and balance report.
 - j. Fire flow test.
 - k. Fire alarm system certification.
 - l. Lightning detection system certification.
 - m. Surge and lightning protection system certification.

- n. Fire suppression system certification.
- o. Total building commissioning report.
- p. Flood plain elevation certification.
- q. ADA compliance certification.

H. Record Sample Submitted:

- 1. Immediately prior to the date(s) of Substantial Completion, the Contractor will meet at the site with the Consultant or County Project Manager and other County's personnel to determine which of the submitted Samples that have been maintained during progress of the Work are to be transmitted to the County for record purposes.
- 2. Comply with delivery to the County

I. Record CAD As-Built Drawings:

- 1. Update all Electronic Contract Document CAD Drawings for all construction deviations and submit copies of the drawings to the County in native CAD .DWG and .PDF formats.
 - a. All redline markup shown on the field record set shall be incorporated into the electronic files at the end of the construction phase.
 - b. Include Civil As-built final survey with site and utility improvements.
 - c. Include all .plt, .pgp and external references.

J. Miscellaneous Record Submittals:

- 1. Assemble miscellaneous records required by other specification sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- 2. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference.
- 3. Submit to the Consultant or County Project Manager for the County's records.

1.7 SPARE PARTS

- A. Submit spare parts, materials and related accessories of the types and in the quantities specified within the respective specification sections.
- B. Provide spare parts and materials in original manufacturer's packaging with manufacturer's original, clearly legible labeling.
- C. Coordinate delivery date and final storage location of spare parts through the Consultant or County Project Manager prior to submittal of Contractor's Request for Substantial Completion Inspection.
- D. Do not utilize spare parts for any purpose during construction.
- E. Test and inspect spare parts to ensure operability, fitness for purpose and new condition prior to submitting to the County.

1.8 TERMITE PROTECTION

- A. If applicable, prepare a report of the final inspection results. Provide termite protection warranty.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 78 23 OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals.

1.2 ADDITIONAL DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 SUBMITTALS

- A. Initial Submittal: Submit two draft copies of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Consultant will return one copy of draft and mark whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit three copies of each manual in final form at least 15 days before final inspection.
 - 1. Correct or modify each manual to comply with Consultant or Owner's comments. Submit two of each corrected manual within 15 days of receipt of comments.

1.4 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 - 1. List of documents.
 - 2. List of systems.
 - 3. List of equipment.
 - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems", as amended.

2.2 MANUALS, GENERAL

- 1. Refer to Project Record Documents section for additional instructions.
- B. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to specification section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

- C. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single or multiple binders.
 - 1. Refer to Project Record Documents section for binder/manual requirements.
 - a. Identify each binder on front and spine, with printed title "Operation and Maintenance Manual," Contract name and number, and subject matter of contents. Indicate volume number for multiple-volume sets.

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - 1. Fire.
 - 2. Flood.
 - 3. Gas leak.
 - 4. Water leak.
 - 5. Power failure.
 - 6. Water outage.
 - 7. System, subsystem, or equipment failure.
 - 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
 - 1. Instructions on stopping.
 - 2. Shutdown instructions for each type of emergency.
 - 3. Operating instructions for conditions outside normal operating limits.
 - 4. Required sequences for electric or electronic systems.
 - 5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual specification sections and the following information:
 - 1. System, subsystem, and equipment descriptions.
 - 2. Performance and design criteria.
 - 3. Operating standards.
 - 4. Operating procedures.
 - 5. Operating logs.
 - 6. Wiring diagrams.
 - 7. Control diagrams.
 - 8. Piped system diagrams.
 - 9. Precautions against improper use.
 - 10. Licenses including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and warranty bonds (if applicable), as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties: Include copies of warranties and lists of circumstances and conditions that would affect validity of warranties or bonds. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference specification section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard printed maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties: Include copies of warranties and lists of circumstances and conditions that would affect validity of warranties. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.

2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared Record Drawings as detailed in Project Record Documents.
- G. Comply with the Closeout Procedures section for schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 01 78 36 WARRANTIES

PART 1 - GENERAL

1.01 NOT USED

1.02 SUMMARY

- A. This Section specifies general administrative and procedural requirements for warranties required by the Contract Documents such as manufacturer's standards and warranties on products and special warranties.
 - 1. General closeout requirements are included in Division 1.
 - 2. Specific requirements for warranties for the Work and products and installation that are specified to be warranted, are included in the individual specification sections.
 - 3. Certifications and other commitments and agreements for continuing services to County are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations:
 - 1. Manufacturer's disclaimers and limitations on product warranties do no relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor as applicable.

1.03 DESCRIPTION OF REQUIREMENTS/DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the County.
- B. Categories of Specific Warranties:
 - 1. It is recognized that warranties on the Work are in several categories, including those of the of the Contract Documents and including (but not necessarily limited to) the following specific categories related to the individual units of work specified in the specification sections:
 - a. Special Warranty (Guarantee): A warranty specifically written and signed by the Contractor for a defined portion of the Work; and, where, required, countersigned by the subcontractor, installer, manufacturer or other entity engaged by Contractor; generally recognized as (and sometimes specified in Contractor and subcontractor documents) a "guarantee".
 - b. Specified Product Warranty: A warranty which is required by Contract Documents to be provided for a manufactured product which is incorporated into the Work; regardless of whether the manufacturer has published the warranty without consideration for specific incorporation of product into the Work, or has written and executed the warranty as a direct result of Contract Documents requirements.
 - c. Coincidental Product Warranty: A warranty which is not specifically required by Contract Documents (other than as specified in this Section); but which is available on a product incorporated into the Work, by virtue of the fact that manufacturer of product has published the warranty in connection with purchases and uses of product without regard for specific applications except as otherwise limited by terms of the warranty.

C. Definition of Manufactured Product

1. A physical item for incorporation into the Work, which has been produced from raw or natural materials by a manufacturing process, and which is purchased from a manufacturer either specifically for the Work or for Contractor's stock from which it is drawn for incorporation into the work.

D. General Limitations:

1. It is recognized that specific warranties are intended primarily to protect County against failure of Work to perform as required, and against deficient, defective and faulty materials and work quality, regardless of sources. Except as otherwise indicated, specific warranties do not cover failures in Work which result from:
 - a. Damage or defect caused by abuse,
 - b. Modifications not executed by the Contractor,
 - c. Improper or insufficient maintenance,
 - d. Improper operations, or normal wear and tear under normal usage.
2. Although manufacturer's commitments in product warranties on products used in the Work are generally written to exclude product failures which result from failure of other work (such as failure of substrate supporting product), such limitations in product warranties do not relieve the Contractor of the more general warranties on Work which incorporates use of such products. Except as otherwise indicated, this same relationship applies to units of Work performed by other entities of the Contractor (other than manufacturers), such as fabricators, installers, and subcontractors who are required to countersign special project warranties with Contractor for such units of Work.

1.04 WARRANTY REQUIREMENTS

A. Related Damages and Losses:

1. When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty:

1. When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost:

1. Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the County has benefited from use of the work through a portion of its anticipated useful service life.

D. County's Recourse:

1. Written warranties made to the County are in addition to implied warranties, and shall not limit the duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the County can enforce such other duties, obligations, rights, or remedies.
 - a. Rejection of Warranties: The County Project Manager and Consultant reserve the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
2. The County Project Manager and Consultant reserve the right to refuse to accept Work for the project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.05 SUBMITTALS

A. Submit written warranties to the County Project Manager prior to the date certified for Final Payment.

1. When a special warranty is required to be executed by the Contractor, or the Contractor and its subcontractor, supplier, fabricator or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the County through the County Project Manager for approval prior to final execution.
 - a. Refer to individual sections of the technical specification section for specific content requirements for submittal of special warranties.
2. Submit specific warranties for beginning of the warranty periods. Date(s) will be inserted to correspond with certification or acceptance dates, as established by the Consultant and accepted by the County Project Manager.

B. Form of Submittal:

1. Compile three copies of each required warranty properly executed by the Contractor, or the Contractor and its subcontractor, supplier, fabricator or manufacturer. Organize the warranty documents into an orderly sequence based on the Table of Contents of this Project Manual.
2. Bind warranties in heavy-duty, commercial quality, durable 3-ring vinyl or plastic covered binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 by 11 inch paper.
 - a. Provide sheet lifters for front and back of binder.
 - b. Provide heavy paper or plastic dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
 - c. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES", the Contract name and number, and the name of the Contractor.
 - d. Provide index tab sheet identified as "Contents" in front of the first page of the table of contents.
 - e. Organize the warranty documents into an orderly sequence based on the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.
 - f. Separate each warranty with index tab sheets keyed to the Table of Contents listing.

- g. Provide full information, using separate typed sheets as necessary. For each warranty, list the applicable subcontractor, fabricator, supplier or manufacturer, with name, address, and telephone number.
- 3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 78 39 PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents.

1.2 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit three sets of marked-up Record Prints.
- B. Record Specifications: Submit three sets of Project's Specifications, including amendments and contract modifications.
- C. Record Product Data: Submit three sets of each Product Data submittal.
 - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.
- D. Record Testing Data: Submit three sets of record testing data, each test and each copy signed and sealed by testing agency or Professional Engineer.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- 1. Refer to Closeout Submittals section of Division 1.
 - 2. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 - 3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 4. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 5. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Transparencies: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Consultant. When authorized, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.
 - 1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
 - 2. Refer instances of uncertainty to Consultant for resolution.
 - 3. Owner will furnish Contractor with one set of transparencies of the Contract Drawings for use in recording information.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Consultant determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
 - 1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 - 2. Consult Consultant for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

- D. Format: Identify and date each Record Drawing; include the designation "Project Record Drawings" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
 3. Identification: As follows:
 - a. Contract name and number.
 - b. Date.
 - c. Designation "Project Record Drawings"
 - d. Name of Consultant.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 RECORD TESTING DATA/CERTIFICATION

- A. Refer to Closeout Submittals section of Division 1.

2.5 MISCELLANEOUS RECORD SUBMITTALS

- A. Refer to Closeout Submittals section of Division 1.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for County and Consultant's reference during normal business hours.

3.2 RECORD DOCUMENTATION MANUAL

- A. Organization: Include a section in the manual for each of the following:
 - 1. Table of Contents.
 - 2. Record Drawings.
 - 3. Record Specifications.
 - 4. Record Product Data.
 - 5. Record Testing Data/Certification.
 - 6. Miscellaneous Record Submittals.
- B. Tables of Contents: Include a table of contents for each record manual.
- C. File all information concerning individual products to match the MasterFormat version utilized in the Contract Documents (such as 1995 or 2016).

3.3 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate sections. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Contents of Manual.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Contract name and number.
 - 3. Address of Project.
 - 4. Name and address of Owner.
 - 5. Date of submittal.
 - 6. Name, address, and telephone number of Contractor.
 - 7. Name and address of Consultant.
 - 8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to specification section number in Project Manual.
 - 1. If record documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically.
 - 1. Binders: Heavy-duty, 3-ring, vinyl or plastic covered binder in thickness necessary to accommodate contents, sized to hold 8-1/2 by 11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data, organize data in each binder into groupings by sections. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "Record Documentation Manual," Contract name and number, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to specification section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose CD/DVDs of electronic data.
4. Supplementary Text: Prepared on 8-1/2 by 11inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversized drawings are necessary, fold drawings to same size as text pages and use as foldouts. Provide Photo reduced 11 x 17 copies folded in half of the as-built record drawings.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typed pages indicating drawing titles, descriptions of contents, and drawing locations.

END OF SECTION

SECTION 02 30 00 SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.1. DESCRIPTION OF SOILS INFORMATION

- A. When available, County may provide a geotechnical exploration/soils investigation report. Its accuracy or completeness is not guaranteed by Owner or Consultant and in no event is it to be considered part of the Contract Documents. The report and log of borings is for Contractor's information but is not a warrant of subsurface conditions. Neither Owner nor Consultant will be responsible in any way for additional compensation for excavation work performed under the Contract due to Contractor's assumptions based on sub-soil data prepared solely for Owner's use.

1.2. ADDITIONAL INFORMATION

- A. Contractor should visit the site and become acquainted with existing conditions. Prior to providing the project proposal, Contractor should make its own subsurface investigations to satisfy itself as to site and subsurface conditions.
- B. The Contractor is required to prepare the site for all new construction. Refer to the Drawings for the required maximum bearing capacity
- C. All organic material will be required to be removed.
- D. Submit soil compaction testing report to Consultant or County Project Manager prior to placing concrete.

END OF SECTION

SECTION 03 30 00 CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for footings, foundations, slabs, walls, etc.

1.2 ADDITIONAL DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified and registered Professional Engineer detailing fabrication, assembly, and support of formwork.
 - 1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.
- E. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials
 - 2. Admixtures
 - 3. Hardeners
 - 4. Form materials and form-release agents
 - 5. Steel reinforcement and accessories
 - 6. Fiber reinforcement
 - 7. Curing compounds
 - 8. Floor and slab treatments
 - 9. Bonding agents
 - 10. Adhesives
 - 11. Vapor retarders
 - 12. Semirigid joint filler
 - 13. Joint-filler strips
 - 14. Repair materials
- F. Field quality-control test and inspection reports

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced Installer qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician – Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician – Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5 and Section 7, "Lightweight Concrete."
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- G. Contractor should conduct a conference with its concrete installer at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent or project manager.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete installer.
 - e. Consultant or County Project Manager
 - f. Minutes of the meeting shall be recorded, typed, and distributed by the Contractor to all concerned parties, including the Consultant, within five days of the meeting.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, concrete repair procedures, and concrete protection.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 1. Plywood, metal, or other approved panel materials.
 2. Exterior-grade plywood panels, suitable for concrete forms, complying with structural plywood (DOC PS 1) and as follows:
 - a. Structural 1, B-B or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.
- E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- H. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.
- C. Plain-Steel Wire: ASTM A 82, galvanized.
- D. Deformed-Steel Wire: ASTM A 496.

2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar support contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I, gray.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of similar applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Lightweight Aggregate: ASTM C 330, 3/4-inch nominal maximum aggregate size.
- D. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
 - 1. Do not use Air-Entraining Admixture in concrete scheduled to receive polished finish.
- B. **Coordinate with any integral colored concrete requirements if applicable.**
- C. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

1. Approved Products:
 - a. Cortec Corporation MCI 2005NS
 - b. Grace Construction Products, W. R. Grace & Co. DCI-S
 - c. Master Builders, Inc. Rheocrete 222+
 - d. Sika Corporation FerroGard-901
 - e. Or approved equal

E. Shrinkage Reducing and Compensating Admixture: ASTM C 878 or Modified ASTM C157

1. Approved Products:
 - a. Euclid Chemical Company Conex
 - b. Or approved equal

2.7 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Approved Products:
 - a. Stego Wrap Vapor Barrier 15 mil
 - b. Fortifiber Corporation Moistop Ultra 15.
 - c. Raven Industries Inc. Vapor Block 15.
 - d. Reef Industries, Inc. Griffolyn Type-105.
 - e. Or approved equal

2.8 FLOOR AND SLAB TREATMENTS

A. Concrete Dye/Stain: Blend of metallic compounds, solvents and water that penetrate into concrete leaving behind a semi-transparent color.

1. Approved Products:
 - a. Vibra-Stain (mixes with water or alcohol) Vibra-Stain SB (mixes with Acetone) by Increte Systems/Euclid Chemical Company
 - b. Scofield Formula One Dye Concentrate (mixes with acetone) by the L.M. Scofield Company.
 - c. Or Approved Equal.
 - d. Colors: Chosen by Consultant or County Project Manager from manufacturer's standard colors.

B. Liquid Densifier: High performance, deeply penetrating concrete densifier; odorless, colorless, VOC - compliant, non-yellowing silicate and silicate based solution designed to harden, dustproof and protect concrete floors and to resist black rubber tire marks. The compound must contain a minimum solids content of 20% of which 50% is silicate.

1. Approved Product:
 - a. Euco Diamond Hard by Euclid Chemical Company
 - b. Formula One MP Lithium Densifier by the L.M. Scofield Company
 - c. Or approved equal

C. Non-film Forming Liquid Sealer: High performance, deeply penetrating concrete sealer; odorless, colorless, VOC - compliant, non-yellowing silicate and silicate based solution designed to harden, dustproof, waterproof, concrete floors and to resist chemical staining.

1. Product:
 - a. Euco-Guard 100 by Euclid Chemical Company

- b. Formula One Finish Coat by the L.M. Scofield Company
- c. Or approved equal

2.9 CURING MATERIALS

A. Curing Compound:

- 1. Kurez RC-100 removable curing compound by Euclid Chemical Company
- 2. Kurez DR VOX dissipating curing compound by Euclid Chemical Company
- 3. Or Approved Equal.

B. Or wet curing for a minimum of 14 days and a maximum of 28 days using the following materials.

- 1. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- 2. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- 3. Water: Potable.

2.10 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

- 1. Types I and II, non-load bearing, IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Reglets: Fabricate reglets of not less than 0.0217 inches thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

F. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inches thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.11 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

- 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
- 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
- 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
- 4. Compressive Strength: Not less than 5,000 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

- 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5,000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.12 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
 4. Use corrosion-inhibiting admixture in concrete mixtures.
 5. Use shrinkage reducing and compensating admixture in concrete mixtures for parking deck topping slab and drain area.

2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: 4,000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.50.
 3. Slump Limit: 5 inches, plus or minus 1 inch.
 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2 inches nominal maximum aggregate size.
- B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: 4,000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.40.
 3. Slump Limit: 5 inches, plus or minus 1 inch.
 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2 inches nominal maximum aggregate size.
- C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: 4,000 psi at 28 days.
 2. Minimum Cementitious Materials Content: 540 pounds per cubic yard (lb/cu. yd.)
 3. Maximum Water-Cementitious Materials Ratio: 0.40.
 4. Slump Limit: 4 inches, plus or minus 1 inch.

5. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2 inches nominal maximum aggregate size.
 6. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
 7. Air Content: Do not allow air content of polished finish floors to exceed 1 percent.
 8. Steel-Fiber Reinforcement: Add to concrete mixture, according to manufacturer's written instructions, at a rate of 50 lb/cu. yd.
 9. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd.
- D. Building Frame Members: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4,000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.40.
 3. Slump Limit: 5 inches, plus or minus 1 inch.
 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2 inches nominal maximum aggregate size.
- E. Building Walls: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4,000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.40.
 3. Slump Limit: 5 inches, plus or minus 1 inch.
 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2 inch nominal maximum aggregate size.
 5. Air Content: Do not allow air content of polished finish wall panels to exceed 1 percent.

2.14 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.15 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116 and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 90 minutes to 75 minutes; when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
1. Class A, 1/8 inch for smooth-formed finished surfaces.
 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
1. Install keyways, reglets, recesses, and the like, for easy removal.
 2. Do not use rust-stained steel form-facing material.

- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
 - 1. Leave formwork and shores for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Consultant or County Project Manager.

3.4 SHORES AND RESHORES

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
 - 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and re-shore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

- A. Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.6 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.7 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Consultant or County Project Manager.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 - 3. Contraction Joints shall be placed within 6 hours of placing concrete.

- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery at Project site, or during placement, unless approved by Consultant.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 degrees F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 4 - EXECUTION

4.1 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

4.2 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. **Finished concrete slabs shall have a minimum floor flatness rating of at least 50 UNO.**
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces indicated and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Consultant or County Project Manager before application.
- F. Polished Finish: Finish concrete using machine with plastic finish blades. Take care particularly to avoid burnishing the surface and to avoid tracking dirt, concrete, or other debris onto the surface. Additional information may be included in other Division 3 sections of the Project Manual.

4.3 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

4.4 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. (psf) x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

4.5 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.
- D. See Contract Documents for expansion joints and polished concrete floor joints requirements.

4.6 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Consultant or County Project Manager. Remove and replace concrete that cannot be repaired and patched.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Consultant or County Project Manager.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inches wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Consultant or County Project Manager's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Consultant or County Project Manager's approval.

4.7 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Contractor will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- B. Inspections:
1. Steel reinforcement placement.
 2. Headed bolts and studs.
 3. Verification of use of required design mixture.
 4. Concrete placement, including conveying and depositing.
 5. Curing procedures and maintenance of curing temperature.
 6. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 CY but less than 25 CY plus one set for each additional 50 CY or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 CY or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231 pressure method for normal-weight concrete; ASTM C 173/C 173M volumetric method for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 degrees F and below and when 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
11. Test results shall be reported in writing to Consultant and County Project Manager, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7 and 28 day tests.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Consultant or County Project Manager but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Consultant or County Project Manager. Testing and inspecting agency may conduct tests to

determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Consultant or County Project Manager.

14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

END OF SECTION

SECTION 04 20 00 UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete masonry units, associated components, and accessories.

1.2 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 530/530.1-Building Code Requirements and Specifications for Masonry Structures.
 - 2. ASCE 37 Design loads on structures during construction.
- B. ASTM International (ASTM):
 - 1. A82 Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. A153 Specifications for zinc coating (hot-dip) on iron and steel hardware
 - 3. C55 Specification for Concrete Brick.
 - 4. C90 Specification for Load bearing Concrete Masonry Units.
 - 5. C91 Specification for Masonry Cement.
 - 6. C129 Specification for Non-Load bearing Concrete Masonry Units.
 - 7. C144 Specification for Aggregate for Masonry Mortar.
 - 8. C150 Specification for Portland Cement.
 - 9. C270 Specification for Mortar for Unit Masonry.
 - 10. C331 Specification for Lightweight Aggregates for Concrete Masonry Units.
- C. Florida Building Code (see the References section of the Project Manual).
- D. International Organization for Standardization (ISO) 14021 as amended; Environmental Labels and Declarations

1.3 SUBMITTALS

- A. Submit properly identified product data on masonry units and each type of metal anchor and accessory, before starting work, which shall certify conformance to these specifications.
 - 1. Submittal is for information only. Neither receipt of list nor acceptance of mockup constitutes approval of deviations from Contract Documents unless such deviations are specifically brought to the attention of the Consultant or County Project Manager and approved in writing.
- B. Product Data: Submit product data for all concrete materials, accessories, and admixtures proposed for use including the following information:
 - 1. Recycled Content:
 - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
 - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

2. Regional Materials:
 - (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
- C. Samples for initial selection of the following:
 1. Unit Masonry samples in small-scale form showing the full range of colors and textures available for each different exposed masonry unit required.
 2. Colored-masonry mortar samples showing the full range of colors available (if applicable).
 3. Samples for verification of the following:
 - (a) Full-size units for each different exposed masonry unit required showing the full range of exposed colors, textures, and dimensions to be expected in the complete construction.
 - (b) Include size-variation data for Type FBS Brick, verifying that actual range of sizes for brick falls within ASTM C216 dimension tolerances.
- D. Colored-masonry mortar samples for each color required showing the full range of colors expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on the project. Label samples to indicate type and amount of colorant used.
- E. Weep holes/vents in color to match mortar color.
- F. Accessories embedded in the masonry.

1.4 QUALITY ASSURANCE

1. Refer to ACI 530/530.1 and FBC for inspection requirements. Note that for all masonry bearing walls, a 'special inspector' is required.
2. Certifications: Provide certification from concrete unit masonry (CMU) manufacturer stating the materials supplied meet specifications.
 - (a) Provide a certification for fire rating for each masonry unit type submittal.
 - (b) Submit compressive strength and absorption tests demonstrating compliance with specifications.
 - (c) Test reports shall be no older than one year and be representative of the batch characteristics of the proposed masonry unit(s).
3. Mason Certification:
 - (a) Masonry Installer shall perform under the direct supervision of a Certified Structural Masonry Contractor as recognized by the Florida Concrete & Products Association (FC&PA) or similar certifying agency.
 - (b) Masonry Installer: Shall be experienced with the installation of masonry and standard masonry practices.
 - (c) All Masonry Work: Under the direct, onsite supervision of a Certified Structural Mason.
4. Mock-Ups: Erect, at a minimum or as otherwise directed by Consultant or County Project Manager for size or quantity, a 6 foot long by 4 foot high by full thickness sample wall panel to represent completed exterior and interior masonry work for each type of masonry for qualities of appearance, materials, and construction.

- Retain sample wall in an undisturbed condition during construction for standard judging for completed masonry work.
5. Testing Agency Qualifications: Conform to ASTM C1083 and Quality Control section.
 6. Pre-construction testing: Perform the following pre-construction testing to establish compliance of proposed materials and construction with specified requirements:
 - (a) Prism Test: For each type of wall construction indicated, test masonry prisms per ASTM E447, Method B.
 - (b) Evaluate Mortar composition and properties per ASTM C780.
 - (c) Test grout compressive strength per ASTM C109.
 - (d) Provide additional testing as required below.
 7. Fire-Resistant Ratings: Provide materials and construction identical to those of assemblies with fire resistance ratings determined per ASTM E119.
 8. Single-source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from a single source and by a single manufacturer for each different product required.
 9. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacture for each cementitious component and from one source or producer for each aggregate.
 10. Preinstallation Conference: Conduct conference at project site to comply with requirements of the Project Management and Coordination section.
 11. Delivery, Storage, And Handling
 - (a) Store masonry units on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes.
 - (b) Store cementitious materials on elevated platforms, under cover, and in a dry location.
 - (c) Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
 - (d) Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
 12. Project Conditions:
 - (a) Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - (1) Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - (2) Where one wythe of multi-wythe masonry walls is completed in advance of the wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
 - (b) Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
 - (c) Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - (1) Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.
 - (2) Protect sills, ledges, and projections from mortar droppings.
 - (3) Protect surfaces of window and doorframes, as well as similar products with painted and integral finishes, from mortar droppings.
 - (4) Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

1.5 PROJECT CONDITIONS

1. Environmental Conditions
 - (a) Temperature: 40 degrees F. minimum and rising.
 - (b) Weather: No application during precipitation.
2. Special Requirements
 - (a) Comply with the following requirements:
 - (1) Cover masonry with a weather-resistant membrane for 48 hours after construction.
 - (2) Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 degrees Fahrenheit and above.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All concrete masonry units, brick, and steel reinforcement, anchors, ties, and accessories to contain recycled content and regional materials.

2.2 LOAD BEARING CMU

- A. Weight: Normal.
- B. Size: 8 inches x 16 inches x thickness indicated
 1. Two cell flush end type.
 2. Two cell stretcher type one end (to be used adjacent to concrete construction)
- C. Texture: Medium.
- D. Grade: ASTM C90, Type II.
- E. Shapes: Appropriate to suit conditions.
 - (a) Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions including partition top closures.
 - (b) Provide bullnose units for outside corners, unless otherwise indicated.

2.3 NON-LOAD BEARING CMU

- A. Weight: Normal.
- B. Size: 8 inches x 16 inches x thickness indicated
 1. Two cell flush end type.
 2. Two cell stretcher type one end (to be used adjacent to concrete construction)
- C. Texture: Medium.
- D. Grade: ASTM C129, Type II.
- E. Shapes: Appropriate to suit conditions
 - (a) Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions including partition top closures.
 - (b) Provide bullnose units for outside corners, unless otherwise indicated.

2.4 BRICK

- A. General: Provide shapes indicated and as follows for each form of brick required.
1. Provide units without cores or frogs and with exposed surfaces finished for ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces.
 2. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 - (a) Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 - (b) Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
 3. Face Brick: ASTM C216 and as follows:
 - (a) Grade and Unit Compressive Strength: Provide units with grade and minimum average net-area compressive strength indicated below:
 - (1) Grade: SW.
 - (2) 3000 psi (20.7 Mpa).
 - (b) Initial Rate of Absorption: Between 5 and 20g/30 square inches per minute when tested per ASTM C67.
 - (c) Type: FBS.
 - (d) Size: Bricks manufactured to the following actual dimensions with tolerances specified in ASTM C216; 4 inches x 4 inches x 12 inches nominal (3-5/8 inches x 3-5/8 inches x 11-5/8 inches actual).
 - (e) Application: Use where brick is exposed, unless otherwise indicated.
 - (f) Color and Texture: Match Consultant or County's samples.

2.5 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150, Type I, domestic.
- B. Masonry Cement: ASTM C91.
1. For pigmented mortars, use premixed, colored mortar cements of formulation required to produce color indicated, or if not indicated, as selected from manufacturer's standard formulations.
 2. Pigments: Do not exceed 5 percent of mortar cement by weight for mineral oxides nor 1 percent for carbon black.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C150, Type I or Type III, and hydrated lime complying with ASTM C207.
1. For pigmented mortars, use premixed, colored mortar cements of formulation required to produce color indicated, or if not indicated, as selected from manufacturer's standard formulations. Pigments: do not exceed 10 percent of mortar cement by weight for mineral oxides nor 5 percent for carbon black.
- E. Aggregate for Grout: ASTM C404.
- F. Mortar Pigments Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.
- G. Products: Subject to compliance with requirements, provide one of the following approved products:
1. Colored Masonry Cement:
 - (a) Brixment-in-Color manufactured by Essroc/Riverton Corp.
 - (b) Centurion Colorbond manufactured by LafargeHolcim.
 - (c) Custom Color Masonry Cement manufactured by Lehigh Hanson.

- (d) Flamingo Color Masonry Cement manufactured by Essroc/Riverton Corp.
 - (e) Or approved equal.
- 2. Colored Portland Cement-Lime Mix:
 - (a) Color Mortar Blend manufactured by Glen-Gery Corporation.
 - (b) Centurion Colorbond manufactured by LafargeHolcim.
 - (c) Lehigh Custom Color Masonry Cement manufactured by Lehigh Hanson.
 - (d) Riverton Portland Cement Lime Custom Color as manufactured by Essroc/Riverton Corp.
 - (e) Or approved equal.
- 3. Mortar Pigments:
 - (a) True Tone Mortar Colors manufactured by Davis Colors.
 - (b) Centurion Colorbond manufactured by LafargeHolcim.
 - (c) SGS Mortar Colors manufactured by Solomon Colors, Inc.
 - (d) Or approved equal.
- H. Sand: ASTM C144.
- I. Water: Potable.

2.6 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
- B. Mortar for Unit Masonry: ASTM C270, Type S, 1,800 psi use, and Type M-2500 psi. Mix accurately proportioned by volume.
- C. Grout for Unit Masonry: Comply with ASTM C476.
 - 1. Use grout of consistency indicated or, if not otherwise indicate, of consistency (fine or coarse) at time of placement that will completely fill spaces intended to receive grout.
 - 2. Use fine grout in grout spaces less than 2 inches in horizontal dimension, unless otherwise indicated.
 - 3. Use coarse grout in grout spaces 2 inches or more in least horizontal dimension, unless otherwise indicated.
 - 4. Slump for grout shall be between 8 inch and 11 inch.
 - 5. See also requirements in Cast-in-Place Concrete section.
- D. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's directions.

2.7 REINFORCEMENT, ANCHORS, TIES, AND ACCESSORIES

- A. Horizontal Joint Reinforcement: Continuous 9 gage truss (see below) design, deformed, galvanized steel.
 - 1. Approved manufacturers:
 - (a) AAWire Products
 - (b) Dur-O-Wall
 - (c) Hohmann & Barnard, Inc.
 - 2. Galvanized to meet ASTM A-153, Class B-2.
 - 3. Provide ladder type for reinforced walls, truss type for non-reinforced walls.
 - 4. Provide prefabricated corners and tees for use at wall intersections.
 - 5. Widths to suit thickness of block to within 1 inch of each face.

- B. Buck Anchors: 16 gage corrugated galvanized steel, 1-1/4 inch wide, 8 inch long leg, with 2 inch upturned end, punched for fastenings, complete with No.10 galvanized machine screws and metal expansion anchors for securement to concrete.
- C. Dovetail Slots: 22 gage galvanized with filler, 1 inch wide x 1 inch deep.
- D. Dovetail Anchors: 16 gage corrugated galvanized steel, 1 inch wide x 5-1/2 inch long, sized to fit dovetail slots.
- E. Embedded Flashing Materials:
 - 1. Concealed Through-Wall Flashing: Manufacturers full sheet of copper, 7 ounces per square foot, laminated between and bonded to two layers of asphalt impregnated fiberglass fabric.
 - 2. Adhesive Backed Membrane Flashing: Manufacturer's standard composite flashing product consisting of pliable and highly adhesive rubberized asphalt compound, 32 mils thick, bonded completely and integral to a high-density, cross laminated polyethylene film, 8 mils thick to produce an overall thickness of 40 mils.
 - (a) Primer: Flashing manufacturer's standard product or product recommended by flashing manufacturer for bonding flashing sheets to masonry and concrete.
 - 3. Solder and Sealants for Sheet-Metal Flashings: As specified in Flashing and Sheet Metal section.
 - 4. Products: Subject to compliance with requirements, provide one of the following concealed through-wall flashing approved products:
 - (a) FCO Copper-Fabric Flashing manufactured by AFCO Products, Inc.,
 - (b) H & B C-Fab Flashing manufactured by Hohmann & Barnard, Inc.
 - (c) Approved equal.
- F. Miscellaneous Masonry Accessories:
 - 1. Compressible Filler: Premolded filler strips complying with ASTM D1056, Type Class A, Grade 1; compressible up to 35 percent; of width and thickness indicated; formulated from the following material:
 - (a) Neoprene.
 - (b) Urethane.
 - (c) Polyvinyl chloride (PVC).
 - 2. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
 - (a) Styrene-Butadiene Rubber Compound: ASTM D2000, Designation M2AA-805.
 - (b) Weep Holes: Provide the following:
 - (1) Vinyl Weep Hole/Vent: One-piece, offset, T-shaped units formed to fit in a vertical mortar joint by injection molding of flexible polyvinyl chloride and consisting of a louvered vertical leg, flexible wings to seal against ends of masonry units, and top flap; in color approved by Consultant or County Project Manager to match that of mortar.
 - 3. Cavity Drainage Material: Two inch thick, reticulated, nonabsorbent mesh, made from polyethylene strands and shaped to maintain drainage at weep holes without being clogged by mortar droppings.
 - (a) Product: Subject to compliance with requirements, provide "Mortar Net" by Mortar Net USA, Ltd or approved equal.

2.8 MASONRY CLEANERS:

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned.
 - 1. For masonry not subject to metallic oxidation stains, use formulation consisting of a concentrated blend of surface-acting acids chelating, and wetting agents.
 - 2. For dark-colored masonry not subject to metallic oxidation stains, use formulation consisting of a liquid blend of surface-acting and special inhibitors.
 - 3. For masonry subject to metallic oxidation stains, use formulation consisting of a liquid blend of organic and inorganic acids and special inhibitor.
- B. Products: Subject to compliance with requirements, provide one of the following approved products:
 - 1. 202 New Masonry Detergent by Diedrich Technologies, Inc.
 - 2. 200 Lime-Solv by Diedrich Technologies, Inc.
 - 3. 202V Vana-Stop by Diedrich Technologies, Inc.
 - 4. Sure Klean 600 Detergent by PROSOCO, Inc.
 - 5. Sure Klean 101 Lime Solvent by PROSOCO, Inc.
 - 6. Sure Klean Vana Trol by PROSOCO, Inc.
 - 7. Or approved equal.

PART 3 EXECUTION

3.1 PREPARATION

- A. Examination:
 - 1. Verify that the surfaces, substrates and conditions are satisfactory to receive unit masonry, and are free from deviations affecting quality of the work.
 - 2. Examine conditions, with Masonry Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of unit masonry. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - (a) For the record, prepare written report, endorsed by Masonry Installer, listing conditions detrimental to performance of unit masonry.
 - (b) Examine rough-in and built-in construction to verify actual locations of piping connections prior to Installation.

3.2 LOCATION OF MASONRY SYSTEMS (unless noted otherwise on Drawings)

- A. Load Bearing Units: For partitions and walls 8 inches or greater.
- B. Load Bearing Lightweight Units: For partitions and walls as indicated.
- C. Non-Load Bearing Units: For partitions 4 or 6 inches.
- D. Concrete Brick: Filling-in to suit conditions.
- E. Corners and Special Shapes: As required to suit conditions, including corners, returns, offsets, and to maintain bond.

3.3 LOCATION OF REINFORCEMENT, ANCHORS, TIES, AND ACCESSORIES

- A. Horizontal Joint Reinforcement: Every second block course and at first joint above and below openings, for all masonry, interior or exterior.
- B. Buck Anchors: Every second block course for masonry walls and partitions abutting precast concrete and wherever dovetail anchors cannot be incorporated. Secure upturned ends to concrete with specified screws and anchors.

- C. Dovetail Anchors: Every second block course for masonry walls and partitions abutting cast-in-place concrete with continuous dovetail anchor slots.

3.4 ERECTION

A. General:

1. Ensure scaffolds and loadings conform to requirements of ASCE 37-02, as amended.
2. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of thickness indicated.
3. Build chases and recesses to accommodate items specified in this and other Sections.
4. Leave openings for equipment to be installed before completion of masonry. After installing equipment, complete masonry to match construction immediately adjacent to the opening.
5. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
6. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.

B. Laying Units:

1. Lay masonry plumb, true to line, with level and accurately spaced courses.
2. Keep bond plumb throughout.
3. Lay corners and reveals plumb and true.
4. Avoid over plumbing of corners and jambs to fit stretcher units after they are set in position.
5. Where adjustment must be made after mortar has started to harden, remove mortar and replace with fresh mortar.
6. Use concrete brick to course out walls concealed in the finished work.
7. Vertical cells to be grouted shall be aligned to provide unobstructed openings for grout.
8. Stopping and Resuming Work: In each course, rack back one-half (1/2) unit length for one-half (1/2) running bond or one-third (1/3) unit length for one-third (1/3) running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar prior to laying fresh masonry.

C. Tolerances:

1. Conform to tolerances listed in ACI 530.1, Part 3.

D. Bond:

1. Provide common bond, with vertical joints centered over masonry unit below, except where other bonds are indicated.
2. Lap alternate masonry courses at corners and intersections.

E. Joint Treatment:

1. Block Exposed to View: Tooled concave joints mortar thoroughly compacted and pressed against edges of units and float finish joints.
2. Concealed Block: Joints struck flush.
3. Joint Thickness: 3/8 inch.

F. Jointing Methods:

1. Where block cores are indicated to be filled with grout, lay in full mortar beds and full mortar end joints.
2. Lay all other concrete block with full beds of mortar on vertical and horizontal face shells.
3. Furrowing of mortar not allowed.
4. Shove vertical joints tight.
5. Finish tooled joints to uniformly straight and true lines and surfaces, smooth and free of tool marks.
6. Uniformly rake joints between masonry and doorframes to 3/8 inch depth to receive caulking or sealant.
7. Rake joints around flush electrical outlets in wet locations to receive caulking or sealant.

8. Remove masonry protrusions extending 1/2 inch or more into cells or cavities to be filled.
- G. Mortar Filled Units:
1. First cell of blocks abutting doorjambs and window frames.
 2. Cells of blocks at free ends of partitions and walls.
 3. Where necessary for embedment of anchors, and where otherwise shown.
 4. Voids around ducts, pipes, and other items passing through masonry work.
 5. Hollow metal door frames and elevator hoistway door frames in masonry walls and partitions:
 - (a) Grout solid with mortar as masonry is laid.
 - (b) Include tops of door frames.
 - (c) Load Bearing Masonry Walls:
 - (1) Erect masonry before reinforced concrete building frame.
 - (2) Close masonry top course cores under poured concrete beams with paper stuffing or metal caps.
 - (3) Do not use flush end type units against columns or poured concrete walls.
- H. Non-Load Bearing Masonry Wall and Partition Anchorage:
1. Erect masonry after steel and concrete frames are in place, and after concrete floors and roof decks are in place.
 2. After forms are stripped, remove slot fillers.
 3. At edges of non-bearing interior masonry walls and partitions abutting concrete columns and poured concrete walls, provide corrugated dovetail type anchors.
 4. Grout dovetail slots and space between end of masonry units and concrete solid.
 5. Point up all joints solid and flush on both sides of partitions.
- I. Partition Heights:
1. Partitions to be continuous from floor to underside of floor or roof construction above unless otherwise noted on Drawings.
 2. Full height partitions and walls to be wedged tight with tile or brick set in mortar.
 3. Use brick or solid units for top masonry course unless otherwise noted on Drawings.
 4. Point up all joints solid and flush on both sides of walls and partitions.
 5. Where suspended ceilings on both sides of partitions are indicated, the partitions other than those shown to be continuous may be terminated approximately four inches above the ceiling level, where noted on drawings.
- J. Concrete Grout Fill for Masonry Cores:
1. Coordinate masonry work to allow placing of grout as indicated and as specified in this section.
 2. Fill top courses of masonry walls with grout before placing or use concrete brick for top courses to assure solid masonry.
- K. Pipe Chase Walls and Partitions: Erect after pipes are in place, tested, and accepted.
- L. Slots, Chases, Recesses and Openings: Provide as required for work of other trades.
- M. Setting of Items Furnished Under Other Sections: Set anchors, bolts, sleeves, access panels, doorframes, and other items occurring in masonry as the work proceeds.
- N. Securing Hollow Metal Door Frames: Set in hollow metal frames on floor, floor clips secured and frames braced in proper position. Grout anchors into masonry joints as walls are erected.
- O. Lintels: Set reinforced precast concrete or coordinate installation of cast-in-place concrete lintels as indicated.
1. Precast concrete lintels to be set in full mortar beds with 8 inches minimum bearing each end.
 2. Cast-in-place lintels shall be used at openings, which have cast-in-place columns at either or both ends.
 3. Lintels shall be appropriately sized for the opening and shall have openings cast into the unit each end to allow for the passage of vertical reinforcing.

P. Flashing, Weep Holes, And Vents:

1. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
2. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer before covering with mortar.
3. Install flashing as follows:
 - (a) At composite masonry walls, including cavity walls, extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4 inches, and to the surface of the waterproofing membrane applied to the outer face of the inner wythe.
 - (b) At lintels and shelf angles, extend flashing a minimum of 4 inches into masonry at each end. At heads and sills, extend flashing 4 inches at ends and turn up not less than 2 inches to form a pan.
 - (c) Interlock end joints of sheet-metal flashing by overlapping ribs not less than 4 inches, and seal lap with elastomeric sealant complying with requirements of Joint Sealants section for application indicated.
 - (d) Extend sheet-metal flashing 1/2 inch beyond face of masonry at exterior and turn down to form a drip.
4. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
 - (a) Form weep holes with product specified.
 - (b) Space weep holes 24 inches on center.
 - (c) Place cavity drainage material immediately above flashing in cavities.

Q. Installation of Horizontal Wall Reinforcement:

1. In masonry areas indicated to have concrete filled cores, provide reinforcement in every horizontal joint.
2. At other areas, provide reinforcing in every second block course joint and at first joint above and below openings for exterior and interior masonry.
3. Provide prefabricated corners and tees at all wall intersections.
4. Extend reinforcement 6 inches into concrete tie columns and concrete encasement of steel columns poured after block is in place.
5. Unless walls have cast-in-place concrete corner tie columns, make wall and partition joint reinforcing continuous around corners and at intersections according to manufacturer's published directions.
6. Lap splices in joint reinforcement no less than 6 inches. Reinforcement shall not be continuous through expansion or control joints.

R. Covers: At work stoppage, provide waterproof covers secured over exposed wall tops for weather protection.

S. Pointing: Point holes in masonry. Cut out and point up defective joints.

3.5 MASONRY WASTE DISPOSAL:

1. Recycling: Undamaged, excess masonry materials are Contractor's property and removed from the Project site for his use.
2. Disposal as Fill Material: Dispose of clean masonry waste, including broken masonry units, waste mortar, and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
 - (a) Crush masonry waste to less than 4 inches in greatest dimension.
 - (b) Mix masonry waste with at least 2 parts specified fill material for each part masonry waste. Fill material is specified in Section 02300-Earthwork.
 - (c) Do not dispose of masonry waste as fill within 18 inches of finished grade.
3. Excess Masonry Waste: Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste and legally dispose from Owner's property. Refer to Construction Waste section.

3.6 FIELD QUALITY CONTROL

- A. A qualified independent testing agency will perform the following testing for field quality control. Re-testing of materials failing to meet specified requirements shall be done at Contractor's expense. Additional information can be found in the Quality Control section.
- B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5,000 square feet of wall area or portion thereof.
- C. Mortar composition and properties will be evaluated per ASTM C780.
- D. Prism-Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM E447, Method B. and as follows:
 - 1. Test prior to construction.
 - 2. Test for every 5,000 square feet of wall area or portion thereof.
- E. Evaluation of Quality Control Tests: In the absence of other indications of non-compliance with requirements, masonry will be considered satisfactory if results from construction quality-control tests comply with minimum requirements indicated.

END OF SECTION

SECTION 05 40 00 COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Load bearing and non-load bearing steel stud walls and soffit systems.
- B. Steel joists and rafters.
- C. Steel trusses.

1.2 RELATED SECTIONS

- A. Divisions 8 and 9 of the Project Manual.

1.3 REFERENCES

- A. International Organization for Standardization (ISO) 14021; Environmental Labels and Declarations, as amended.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit properly identified manufacturer's literature and technical data including specifications and installation instructions before starting work.
 - 2. Recycled Content:
 - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
 - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- B. Samples:
 - 1. Metal framing.
 - 2. Required accessories.
- C. Shop Drawings: Show layouts and sections coordinated with contract documents showing framing, anchorage accessories, and connection details.
 - 1. For systems not completely detailed in Contract Documents, provide the following in addition to shop drawings:
 - (a) Structural design calculations for framing members, connections and accessories. (to be provided upon request)
 - (b) Calculate structural properties of framing and accessories in accordance with AISI "Specification" for the Design of Cold Formed Steel Structural Members.
 - (c) Trusses: ASTM A 653/653M steel G60 galvanized. Provide manufacturer's standard chord and web member profiles with mechanical properties as required by structural design calculations. Shop fabrication required.
 - (d) Design trusses in accordance with AISI "Design Guide for Cold-Formed Steel Trusses, Publication RG-9518."
 - (e) Determine mechanical properties by testing in accordance with ASTM A 370.
 - (f) Configure web members as shown on Shop Drawings.
 - 2. Calculations and Engineered Shop Drawings shall be signed and sealed by a Florida Registered Professional Engineer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Light Gage Metal Framing:
 - 1. Clark Framing Systems, Inc.
 - 2. Dietrich Metal Framing.
 - 3. Marino\Ware Industries, Inc.
 - 4. Unimast Incorporated (USG).
 - 5. Or approved equal.

2.2 MATERIALS

- A. All manufactured cold formed metal framing products are to contain recycled content.
- B. Steel Studs thickness and grade as required by Drawings or Shop Drawings, but not less than the following:
 - 1. 4 inch, 20 gage (minimum), galvanized.
 - 2. 6 inch, 20 gage (minimum), galvanized.
 - 3. 8 inch, 18 gage (minimum), galvanized.
- C. Steel Runner Track thickness and grade as required by Drawings or Shop Drawings, but not less than the following:
 - 1. 20 gage for 4 inch and 6 studs.
 - 2. 18 gage for 8-inch studs.
- D. Coating: Steel studs and runner track shall comply with ASTM 525 and have a G-60 galvanized coating.
- E. Steel Studs, Runner Track, and Accessories:
 - 1. 12, 14, and 16 Gage: Form of steel meeting the requirements of ASTM A653, Grade D, with a minimum yield of 50,000 psi.
 - 2. 18, 20 and 22 Gage: Form of steel meeting with the requirements of ASTM A653, Grade A, with a minimum yield of 33,000 psi.
- F. Metal Screws: Corrosion resistant coated, self-drilling, pan or hex washer head. Provide screw type and size as required by Drawings or Shop Drawings (as applicable).

PART 3 EXECUTION

3.1 INSPECTION

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

3.2 INSTALLATION

- A. Use of powder- actuated shots is prohibited, except in anchoring tracks to concrete or steel.
- B. Stud Spacing: Maximum 16 inches on center, unless otherwise indicated on the drawings.
 - 1. Frame corners with three studs.
 - 2. Frame wall openings wider than stud spacing with double 20 gage studs at each jamb. Connect studs with clips at a minimum 48 inches above finished floor and one at head.
- C. Runner Track: Securely anchor to floor and overhead structure as detailed on Drawings or Shop Drawings (as applicable).
- D. Seat studs squarely in runner track with stud web and flanges abutting track web, plumbed and aligned, and securely attached to flanges each side or web of both upper and lower runner tracks, with No. 8 screws, unless otherwise noted.
- E. Install framing accessories and bridging as shown on Drawings or Shop Drawings as applicable.

END OF SECTION

SECTION 06 05 73 WOOD TREATMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preservative treatment of lumber and plywood.

1.2 RELATED SECTIONS

- A. Divisions 1 and 6 of the Project Manual.

1.3 ADDITIONAL REFERENCES

- A. American Wood Protection Association (AWPA) U1 – Use Category System: User Specification for Treated Wood
- B. AWPA M4 – Standard for the Care of Preservative Treated Wood Products
- C. AWPA P5 – Standard for Waterborne Preservatives
- D. Western Wood Preservers Institute (WWPI)

1.4 SUBMITTALS

- A. Wood Treatment Data: Submit treatment manufacturer's instructions for use, handling, storing, installation, and finishing.
- B. Preservative Treatment: For each type specified, including certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and conformance with applicable standards.
- C. Water-Borne Treatment: Include statement that moisture content of treated materials was reduced to levels indicated before shipment to project site.

1.5 QUALITY ASSURANCE

- A. Wood treatment shall comply with the References section of the Project Manual such as:
 - 1. Florida Building Code (FBC) such as Chapters 453, 602 and 2303
 - 2. Florida Fire Prevention Code (FFPC)
- B. Obtain treated wood products from a single source.
- C. Kiln dry after treatment (KDAT):
 - 1. Lumber to a maximum moisture content of 19 percent or less
 - 2. Plywood to a moisture content of 18 percent or less.

1.6 WARRANTY

- A. Provide manufacturer's standard warranty of at least 20 years.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Preservative Treatment:
 - 1. Where lumber or plywood is specified to be treated, comply with applicable requirements of AWPA standards.
 - 2. Mark or label each treated item to show compliance with these specifications.
 - 3. Pressure treat above ground items with water-borne preservatives to comply with AWPA Standard U1.
 - 4. Treat indicated items and the following:

- a. Wood cants, nailers, curbs, blocking, stripping, and similar members in connection with roofing, windows, flashing, vapor barriers, and waterproofing.
 - b. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - c. Wood Framing Members: Within 18 inches above grade.
 5. Pressure treat the following with water-borne preservatives complying with AWP Standard U1:
 - a. Wood members in contact with ground.
 - b. Wood members in contact with fresh water.
 6. Pressure treat lumber, timber and plywood for wood foundation systems with water-borne preservatives for ground contact to comply with AWP Standard U1.
 7. All field cuts on members that provide structural support to a permanent structure shall be field treated in accordance with AWP M4.
 8. Complete fabrication of treated items before treatment when possible.
 9. Inspect each product after drying. Discard damaged or defective products as legally required.
 10. Fasteners and Metal Hardware in Preservative Treated Wood : For treated wood and where wood is in contact with the ground, subject to high relative humidity, or exposed to weather, provide corrosion resistant steel fasteners with hot-dip zinc coating per ASTM A153/A153M, provide corrosion resistant hardware per ASTM A653 / A653M Class G-185 in compliance with building code requirements.
- B. Fire-Retardant Treatment (FRTW):
1. Where FRTW is specified, pressure impregnate lumber and plywood with fire-retardant chemicals which comply with Military Specification MIL-L-19140E as amended.
 2. Comply with AWP for treatment type indicated.
 3. Identify FRTW products with appropriate classification of UL, U.S. Testing or other testing and inspecting agency accepted by the authorities having jurisdiction.
 4. Inspect each FRTW product after drying. Discard damaged or defective products as legally required.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

- A. Prevent wood products exposure to moisture and dimensional changes in accordance with instructions from the manufacturer.

3.2 APPLICATION

- A. Place treated lumber and plywood as detailed above and in Drawings.
- B. For FRTW, provide inspection access panels for annual inspection of the condition of the structure and the connector per FBC Chapter 453.11, as amended.

END OF SECTION

SECTION 06 10 00 ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Grounds, nailers, blocking, miscellaneous framing, plywood backing panels, plywood sheathing, preservative treatment, and necessary accessories indicated or specified in this section.

1.2 RELATED SECTIONS

- A. Divisions 1, 6 and 10.

1.3 REFERENCES

- A. American Softwood Lumber Standards (ASLS).
- B. American Society of Testing and Materials (ASTM).
 - 1. D6007 Determination of Formaldehyde Concentration in Air from Wood Products.
 - 2. D6330 Determination of Volatile Organic Compounds (Excluding Formaldehyde) Emissions from Wood-Based Panels.
 - 3. E1333-Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber
- C. The Engineered Wood Association (APA).
- D. Forest Stewardship Council (FSC) FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- E. GREENGUARD™ Product Emission Standard.
- F. Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including latest addenda (Standard Practice).
- G. Southern Pine Inspection Bureau (SPIB).

1.4 SUBMITTALS

- A. Certification of Compliance: Include data for wood-preservative and fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Product Data
 - 1. Low Emitting Materials.
 - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
 - (b) Submit manufacturer's certification that all products comply with Standard Practice or GREENGUARD Product Emission Standard.
 - 2. Recycled Content:
 - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
 - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
 - 3. Regional Materials:
 - (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.

- (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
- 4. Sustainable Forestry:
 - (a) Forest Stewardship Council (FSC): Provide of Chain-of-custody certificates signed by the lumber supplier validating compliance with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
 - (b) Submit copies of invoices indicating cost data and the FSC certification numbers for each product.
 - (c) Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.

1.5 QUALITY ASSURANCE

- A. Factory mark each piece of lumber and plywood to identify type, grade, agency providing inspection service, producing mill and other qualities as specified.
- B. Forest Certification: Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001.
- C. Engineered Wood Products:
 - 1. Determine formaldehyde concentrations in air from wood products under test conditions of temperature and relative humidity in accordance with ASTM D6007 or E1333.
 - 2. Determine Volatile Organic Compounds (VOC), excluding formaldehyde, emitted from manufactured wood-based panels in accordance with ASTM D6330.

1.6 DELIVERY AND STORAGE

- A. Keep materials dry during delivery and storage.
 - 1. Protect against weather and contact with damp or wet surfaces.
 - 2. Stack lumber and plywood and provide air circulation.

1.7 SITE CONDITIONS

- A. *Power driven fasteners are not allowed.*

PART 2 PRODUCTS

2.1 MATERIALS

- A. All engineered wood products to contain recycled wood materials.
- B. All wood products shall comply with FSC STD-01-001.
- C. All plywood products shall comply with Standard Practice or GREENGUARD Product Emission Standard.
- D. Exterior Plywood:
 - 1. Conform with US Department of Commerce PS 1-66, bearing APA grade mark.
 - 2. Grade: APA rated sheathing, EXT, span rating to suit rafter spacing.
 - 3. Thickness: Indicated on Drawings.
- E. Interior Plywood (Concealed): Where plywood will be concealed by other Work, provide exterior type plywood C-D plugged grade, unless otherwise specified.
- F. Interior Plywood (Painted Finish): Same as concealed, except with hardwood plywood or medium density overlay, Grade MDO EXT-101; smooth surface with no grooves.
- G. Interior Plywood (Transparent Finish):
 - 1. Exterior type plywood, Grade A veneers on exposed surfaces, Grade B veneers on semi-exposed surfaces, and Grade D or better veneers on concealed surfaces.

- (a) Oak: Plain Sliced.

H. Lumber Standard:

1. Comply with American Softwood Lumber Standards PS-20 by U.S. Department of Commerce.
2. Nominal sizes are shown or specified, except as shown by actual dimensions.
3. Provide actual sizes complying with minimum size requirements for PS-20 for moisture content specified for each use.
4. Moisture Content: Seasoned lumber with 19 percent maximum moisture content at time of dressing and complying with dry size requirements of PS-20, unless otherwise specified.
5. Bottom plate: At wet locations, such as in restrooms and where bleach will be used for floor cleaning, use a marine grade or ground contact bottom plate.

I. Boards:

1. Complying with dry size requirements of PS-20 where lumber less than 2 inches in nominal thickness and 2 inches or more in nominal width is shown or specified.
2. Moisture Content (Exposed Work and Concealed Work): Moisture content of 19 percent maximum, S-DRY Southern Pine No. 2 per SPIB for paint finish.

J. Dimension Lumber and Timber:

1. Lumber complying with grading rules under provisions of requirements of National Grading Rule for Dimension Lumber of American Lumber Standards Committee established under PS-20.
2. Light Framing (2 inches minimum thickness and 4 inches minimum width): "Stud" grade lumber for stud framing and "standard" grade for other light framing.

K. Miscellaneous Materials:

1. Fasteners and Anchorages:
 - (a) Provide size, type, material, and finish and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers, and anchoring devices.
 - (b) Provide metal hangers and framing anchors of size and type recommended by the manufacturer for each use including recommended nails.
 - (c) Where rough carpentry Work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with hot-dipped zinc, ASTM A153.
2. Building Paper: ASTM D226, Type I; asphalt saturated felt, non-perforated, 15-pound type.

L. Treated Wood: Under provisions of Section 06300 - Wood Treatment.

PART 3 EXECUTION

3.1 PREPARATION

- A. Protect installed carpentry Work from damage by Work of other trades until accepted by the Owner. Review proposed protection methods with Consultant and County Project Manager for acceptance.
- B. Examine substrates, adjoining construction, and conditions where Work is to be installed.
- C. Do not proceed with Work where unsatisfactory conditions exist.
- D. Where rough carpentry is fitted to other Work, obtain measurements of other Work and verify dimensions shown on shop drawing details.
- E. Apply heavy brush coat of same chemical treatment material to surfaces exposed by sawing, cutting, or drilling.

3.2 INSTALLATION

- A. Materials: Use only sound, thoroughly seasoned materials of longest practical lengths and sizes to minimize jointing, free from warp that cannot be easily corrected by anchoring and attachment.
- B. Installation
 - 1. Closely fit and accurately set members to required lines and levels, and rigidly secure in place.
 - 2. Attachment and Anchorage:
 - (a) Ensure nail size and nail spacing is sufficient to develop adequate strength for connection without splitting the member.
 - (b) Countersink nail heads on exposed carpentry Work and fill holes.
 - (c) Provide hot dip galvanized finish for anchors and attachments, except where otherwise shown
 - (d) Use common wire nails, except as otherwise shown or specified.
 - (e) Use finishing nails for finish Work.
 - (f) Select fasteners of size that shall not penetrate members where opposite side will be exposed to view or shall receive finish materials.
 - (g) Make tight connections between members.
 - (h) Install fasteners without splitting wood, pre-drill as necessary.
 - 3. Wood Grounds, Nailers, Blocking, and Sleepers:
 - (a) Provide as shown and as required for screeding or attachment of other Work.
 - (b) Form to shapes as shown and cut as required for true line and level of Work to be attached.
 - (c) Set true to line and level, plumb, with intersections true to required angle.
 - (d) Coordinate location with other work involved.
 - (e) Provide wood blocking to strengthen and supplement horizontal metal stud framing members between studs required for recessed and surface mounted items including, but not limited to, cabinets, finish hardware, magnetic door holding devices, markerboards.
 - (f) Cut blocking to fit between framing members and rigidly attach thereto.
 - (g) Secure blocking and nailers to building structure as indicated and as specified.
 - (h) Provide wood grounds for attachment of finish trim and other Work to plaster.
 - (i) Grounds: Dressed, preservative treated. Use key-beveled lumber not less than 2-inch nominal width and of thickness required to bring face of ground to exact thickness of finish material involved.
 - (j) Remove temporary grounds when no longer required.
 - 4. Roof Sheathing: Nail or staple to framing and use spacer clips at edges for expansion and construction control.

END OF SECTION

SECTION 06 40 00 ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Casework.
- B. Work Surfaces, Backsplashes, and Side splashes.
- C. Hardware for Casework including locks and magnetic catches.
- D. Tracks for sliding drawer and cabinet door assemblies.
- E. Laminate and Veneer.
- F. Glazing.
- G. Sealant.

1.2 RELATED SECTIONS FROM THE PROJECT MANUAL

- 1. Other Division 6 sections.
- 2. Division 12 for countertops other than laminate, if applicable

1.3 REFERENCES

- A. AWI-Architectural Woodwork quality Standards Illustrated; Architectural Woodwork Institute (AWI).
- B. BHMA A156.9-American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association (ANSI/BHMA).
- C. GREENGUARD Product Emission Standard.
- D. GSA CID A-A1936-Adhesive, Contact, Neoprene rubber; Federal Specifications and Standards.
- E. NEMA LD 3-high-Pressure Decorative Laminates; National Electrical Manufacturers Association.
- F. PS 1-construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce).
- G. PS 20-American softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce)
- H. Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including latest addenda (Standard Practice)
- I. FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- J. ASTM - American Society for Materials and Testing
 - 1. D6007-Determination of Formaldehyde Concentration in Air from Wood Products.
 - 2. D6330-Determination of Volatile Organic Compounds (Excluding Formaldehyde) Emissions from Wood-Based Panels.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate AWI Quality Grades, plans, elevations, component profiles, details of construction and installation, dimensions, finishes, fittings and fastenings, hardware and accessories.
- B. Product Data: Submit data for items used by architectural woodworker.
 - 1. Low Emitting Materials.
 - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
 - (b) Submit manufacturer's certification that all products comply with Standard Practice or GREENGUARD Product Emission Standard.
 - 2. Recycled Content:
 - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.

- (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- 3. Regional Materials:
 - (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
- C. Samples:
 - 1. Submit plastic laminate manufacturer's sample chain of color chips and samples of hardware.
 - 2. Submit samples of each wood species with finishes.

1.5 QUALITY ASSURANCE

- A. Lumber Grading: Comply with NIST Voluntary Product Standard PS20.
- B. Standards: Grades as defined by AWI "Quality Standards".
- C. Cabinets shall be designed to support 75 pounds per linear foot per row of shelving. This includes design of attachment to wall or blocking.

1.6 MOCK-UP

- A. Product mock-up of full size base cabinet, which includes plumbing accessories and fittings.
- B. Locate where directed.
- C. Mock-up may not remain as part of the work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from damage and moisture.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All engineered wood, plastic laminate, and hardware materials to contain recycled content.

2.2 PLASTIC LAMINATED FINISHED CASEWORK

- A. Quality Grade: AWI Custom.
- B. Construction: Details conforming to AWI Flush overlay design (unless shown otherwise on Drawings).

2.3 WOOD

- A. All wood products shall comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. All engineered wood products such as plywood and fiberboard shall comply with Standard Practice or GREENGUARD Product Emission Standard.
- C. Face Frame Rail: 3/4 inch thick lumber.
- D. Plywood: 3/4 inch thick for counters, doors, drawer faces, shelves, cabinet bodies etc.
 - 1. Countertops in which sinks occur must have a core of exterior grade plywood.
- E. Fiberboard: Cabinet backs and drawer bottoms: 1/4-inch thickness minimum, tempered with factory applied gloss surface.

- F. Shelves: 3/4 or 1 inch thickness plywood per AWI and Article 1.3 C above.
- G. Particleboard is not permitted.

2.4 LAMINATE MATERIALS

- A. Plastic Laminate: NEMA LD 3, GP-50 General Purpose type; 0.050 inches thick; for horizontal and vertical applications; colors as selected by Consultant or County Project Manager.
- B. Cabinet Liner: NEMA LD 3, BK20, Backing grade, undecorated plastic laminate; 0.020 inches thick plus or minus 0.004 inches; Color: White.
- C. Approved manufacturers:
 - 1. Formica.
 - 2. Nevamar.
 - 3. Pionite.
 - 4. Wilsonart.
 - 5. Laminart.
 - 6. Or as stated on the Drawings.

2.5 HARDWARE

- A. The types below are listed as a standard of comparison:
 - 1. Drawer Slides: Grant Model No. 329, self-closing clear chromate finish.
 - 2. Surface Mounted Adjustable Shelf Standards: Knappe & Vogt #80; satin. All standards within 6 inches of the end of the shelving and space not more than 30 inches apart.
 - 3. Surface Mounted Adjustable Shelf Brackets: Knappe & Vogt #180.
 - 4. Recessed Mounted Adjustable Shelf Standards: Knappe & Vogt Mfg. Co. No. 255 aluminum shelf standards; length to suit application; unfinished.
 - 5. Recessed Mounted Adjustable Multiple Holes Shelf Clips: Knappe & Vogt Mfg. Co. No. 239; zinc-plated steel.
 - 6. Fixed Shelf Brackets: Hafele America No. 287.31.035 and No. 287.31.044; finish: stainless steel.
 - 7. Full Mortise Butt Steel Hinges: Stanley CB Series; heavy weight, 5 knuckle concealed bearing, stainless steel non-rising pin; US32D finish, limited lifetime warranty.
 - 8. Cabinet Hinges: RPC 376-26D-5 knuckle wrap around type allowing 270 degree turn at end of cabinet work unit.
 - (a) Doors up to 48 inches high: Provide 2 hinges.
 - (b) Doors Greater than 48 inches: Provide 3 hinges.
 - 9. Cabinet Pulls (Bar style): Richelieu 2102 stainless steel bar pull, 5-1/32 to 6-1/2 inches long
 - 10. Cabinet Pull (Edge style): Richelieu 576 edge pull, stainless steel, 4 inch minimum length.
 - 11. Continuous Hinges: Stanley No. STS314-1/4; Type 302 stainless steel; plain finish.
 - 12. Cabinet Locks and Cylinders: Schlage No. CL1000-Series Door Lock or Olympus 700 SC; Solid Brass Cylinder; 626 finish.
 - 13. Drawer Locks and Cylinder: Schlage No. CL2000 Series Drawer Lock or Olympus 800 SC; Solid Brass Cylinder; 626 finish.
 - 14. Cabinet and Drawer Keys: All casework in individual rooms shall be keyed alike. Provide at least three keys to open these.
 - 15. Surface Bolts: Stanley No. CD4060; solid brass; US3 finish.
 - 16. Grommets: Doug Mockett & Co., Inc. No. EDP-3 Set; Color: to match cabinets.

2.6 ACCESSORIES

- 1. Adhesive: Type recommended by laminate manufacturer to suit application.
 - (a) Toxicity/IEQ: Comply with South Coast Air Quality Management District (SMAQMD) Rule #116 or GREENGUARD Product Emission Standard.
- 2. Fasteners: Size and type to suit application.
- 3. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; corrosive-resistant finish in concealed locations and chrome-plated finish in exposed locations.

2.7 FABRICATION

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings. Field fabricated cabinetwork is not acceptable.
- B. Fit shelves, doors, and exposed edges with plastic laminate edging. Use full-length pieces only.
- C. Door and Drawer Fronts: 3/4 inch thick.
- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- E. Apply plastic laminate finish in full-uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline. Locate counter butt joints minimum 2 feet from edge of sink cutouts.
- F. ***Install so that grain and patterns run in the same direction (such as for all drawers, cabinet fronts, frame and doors). See image(s) below.***
- G. Cap exposed plastic laminate edges with material of same finish and pattern.
- H. Mechanically fasten backsplash to countertops with steel brackets at 16 inches on center.
- I. Apply cabinet liner to reverse side of plastic laminate finished surfaces.
- J. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.
- K. Accurately locate and securely install all hardware. Job adjust to operate properly and re-align doors, drawers, etc. as required for proper operation.
- L. Countertops to have rounded corners in the horizontal plane.



Image 1: Laminate installed improperly. The cabinet door's grain/pattern is oriented north and south and the drawer's grain/pattern is oriented east and west.

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify adequacy of backing and support framing.

- B. Verify location and sizes of utility rough-in associated with work of this section.
- C. Field measurements: Verify all critical dimensions in field prior to fabrication.

3.2 INSTALLATION

- A. Do not proceed with casework installation until resilient flooring has been installed under casework locations.
- B. Set and secure casework in place rigid, plumb, and level.
- C. All laminate patterns shall be facing the same direction; i.e. the cabinet doors shall all have laminate pattern facing up.
- D. Carefully scribe casework, which is against other building materials, leaving gaps of 1/16 inch maximum. Do not use additional overlay trim for this purpose.
- E. Use purpose designed fixture attachments at concealed locations for wall mounted components.
- F. Use threaded steel concealed joints fasteners to align and secure adjoining cabinet units and counter tops.
- G. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- H. Counter-sink anchorage devices at exposed locations used to wall mount components and conceal with solid plugs of material to match surrounding material. Finish flush with surrounding surfaces.
- I. After installation, fill gaps between casework and walls, soffits, etc. with sealant. Provide continuous bead of sealant at joint between cabinet base and flooring. Color shall match cabinets.
- J. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.
- K. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF SECTION

SECTION 06 61 13 SIMULATED STONE FABRICATIONS

PART 1 - GENERAL

1.01 THIS SECTION INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING HORIZONTAL AND TRIM QUARTZ SURFACING PRODUCT TYPES:

- A. Countertops
- B. Countertops with integrated sinks and lavatory bowls
- C. Countertops with undermount sinks and lavatory bowls
- D. Countertops with drop-in sinks and lavatory bowls
- E. Hot and cold cafeteria and kitchen surfaces
- F. Other interior counter or surfacing applications as shown on Drawings

1.02 RELATED REQUIREMENTS

- A. Divisions 6, 12 and 22 of the Project Manual.

1.03 REFERENCES

- A. CSA B45/IAPMO ANSI Z124 (previously ANSI Z124.6 – Plastic Sinks).
 - 1. CSA B45/IAPMO ANSI Z124 Section 5.7.1.3 – Point Impact tests.
 - B. ASTM C170 – Standard Test Method for Compressive Strength of Dimension Stone.
 - C. ASTM C370 – Standard Test Method for Moisture Expansion of Fired Whiteware Products.
 - D. ASTM C373 – Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products, Ceramic Tiles, and Glass Tiles.
 - E. ASTM C501 – Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.
 - F. ASTM C1028 – Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
 - G. ASTM D570 – Standard Test Method for Water Absorption of Plastics.
 - H. ASTM D696 – Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer.
 - I. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - J. ASTM D792 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
 - K. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 - L. ASTM G21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
 - M. ASTM G22 – Standard Practice for Determining Resistance of Plastics to Bacteria.
 - N. CSA B45.5-11/IAPMO Z124-2011 – Plastic Plumbing Fixtures.
 - O. NEMA LD 3 – High Pressure Decorative Laminates.
 - 1. NEMA LD 3-3.3 – Light Resistance.
 - 2. NEMA LD 3-3.5 – Boiling Water Resistance.
 - 3. NEMA LD 3-3.6 – High Temperature Resistance.
 - 4. NEMA LD 3-3.8 – Ball Impact Resistance.
 - 5. NFPA (National Fire Protection Association) - NFPA 101®, Life Safety Code®.
 - P. NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials.
 - Q. ISO (International Organization for Standardization) - ISO 14001 – Environmental Management Systems.
 - R. UL (Underwriters Laboratories) - UL 723 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 - S. ULC (Underwriters Laboratories of Canada) – ULC/CAN-S102 – Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - T. NSF (NSF International) NSF/ANSI Standard 51 – Food Equipment Materials.
 - U. New York City Construction Codes, Office of Technical Certification and Research, MEA (Materials and Equipment Acceptance), <http://www1.nyc.gov/>.
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- V. UL Environment/GREENGUARD - UL 2818 – Standard for Chemical Emissions for Building Materials, Finishes and Furnishings, Section 7.1.
- W. UL Environment/GREENGUARD - UL 2818 – Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings, Section 7.1 and 7.2.
- X. UL 2824 – GREENGUARD Certification Program, Method for Measuring Microbial Resistance From Various Sources Using Static Environmental Chambers.
- Y. SCAQMD (South Coast Air Quality Management District) VOC (Volatile Organic Content) Rule 1168 for Adhesive and Sealant Applications

1.04 SUBMITTALS

- A. Submit product data for each type of product indicated.
 - 1. Submit manufacturer's product data on material characteristics, performance properties, fabrication instructions, installation instructions and maintenance instructions.
- B. Shop Drawings:
 - 1. Show location of each item; provide complete detailed and dimensioned plans and elevations, large-scale details, attachment devices and other components.
 - a. Show the following:
 - 1) Full-size details, edge details, attachments, etc.
 - 2) Locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.
 - 3) Fabrication details for brackets and other structural supports.
 - 4) Locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacle and other items installed in quartz surface.
 - 5) Locations and sizes of cutouts for sink installation and lavatory installation.
 - 6) Type of sealant.
 - 7) Type of adhesive.
 - 8) Seam locations.
- C. Samples:
 - 1. For each type of product indicated:
 - a. Submit minimum 2-inch-by-2-inch sample in specified color. For viewing pattern or veining, submit minimum 4-inch-by-4-inch samples.
 - b. Cut sample and seam together for representation of seaming techniques.
 - c. Indicate full range of color and pattern variation.
 - d. Approved samples will be retained as a standard for work.
 - e. Sealant colors.
- D. Product Data:
 - 1. Indicate product description, fabrication information and compliance with specified performance requirements.
- E. Sustainable Design Reporting (if applicable):
 - 1. Provide documentation from manufacturer of the amounts of pre-consumer and/or post-consumer recycled content for products.
 - 2. Provide documentation from manufacturer that products meet or exceed emissions guidelines for volatile organic compounds (VOCs).
 - 3. Provide documentation from manufacturer indicating that adhesives and sealants applied on project site meet or exceed emissions guidelines for volatile organic compounds (VOCs) and comply with SCAQMD Rule #1168.

F. LEED Submittals (if applicable):

1. LEED® 2009, Credits MR Credit 4 – Recycled Content.
 - a. Provide documentation for cost of products having recycled content indicating percentages by weight of post-consumer plus 1/2 of pre-consumer content.
2. LEED® 2009, Credits MR Credit 5 – Regional Materials.
 - a. Provide documentation showing manufacturing locations and origins of materials for products manufactured and sourced within 500 miles of project location. The point of manufacture is place of final assembly of components. Provide documentation for cost of materials or products that have been extracted, harvested or recovered and regionally manufactured within 500 miles of the project site.
3. LEED® 2009, Credits MR Credit 4.1– Low-Emitting Materials – Adhesives and Sealants
 - a. Provide documentation from manufacturers indicating that adhesives and sealants applied on project site meet or exceed emissions guidelines for volatile organic compounds (VOCs) and comply with SCAQMD Rule #1168.
4. LEED® NC v4, EQ: Indoor Environmental Quality, EQ Credit: Low-Emitting Materials.
 - a. Provide documentation from manufacturers that products meet or exceed emissions guidelines for volatile organic compounds (VOCs).
 - b. Provide documentation from manufacturers that adhesives and sealants meet or exceed emissions guidelines for volatile organic compounds (VOCs) and comply with SCAQMD Rule #1168.
5. LEED® NC v4, MR Credit: Building Product Disclosure and Optimization - Material Ingredients.
 - a. Provide manufacturer's Health Product Declaration (HPD).
6. LEED® NC v4, MR Credit: Building Product Disclosure and Optimization.
 - a. Provide manufacturer's EPD (Environmental Product Declaration)

G. Fabricator/Installer Qualifications:

1. Provide supporting information in accordance with the References section in Division 1.

H. Certificates: Certify that products meet or exceed requirements:

1. UL Environment– GREENGUARD and GREENGUARD Gold, current low emitting VOC certification of quartz surface and solid surface products.
2. UL Environment– GREENGUARD and GREENGUARD Gold, current low emitting VOC certification for manufacturer's recommended adhesive and/or sealant.
3. UL Environment – Mold Resistance Certification in accordance with UL 2824.

I. Fire test response characteristics:

1. Provide Class A surface burning characteristics as determined by testing products per UL 723 (ASTM E 84, NFPA 255) or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - a. Flame Spread Index: 25 or less.
 - b. Smoke Developed Index: 450 or less.

J. Maintenance Data:

1. Submit manufacturer's care and maintenance data.
2. Include in project closeout documents.

1.05 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications:

1. Work of this section shall be by a certified fabricator/installer, certified in writing by the surfacing manufacturer or designated representative. Refer to Division 1 References section.

B. Allowable tolerances:

1. Variation in component size: $\pm 1/8$ inch (3 mm) over a 10 foot length.
2. Location of openings: $\pm 1/8$ inch (3 mm) from indicated location.
3. Minimum of $1/16$ inch and a maximum of $1/8$ inch (3 mm) clearance between quartz surfaces and each wall.

C. Coordination drawings:

1. Shall be prepared indicating:
 - a. Plumbing work.
 - b. Electrical work.
 - c. Miscellaneous steel and supporting structure for the general work.
 - d. Indicate location of all walls (rated and non-rated), blocking locations and recessed wall items, etc.
2. Content:
 - a. Project-specific information, drawn accurately to scale.
 - b. Do not base coordination drawings on reproductions of the contract documents or standard printed data.
 - c. Indicate dimensions shown on the Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements.
 - d. Provide alternate sketches to County Project Manager or Consultant for resolution of such conflicts.
 - 1) Minor dimension changes and difficult installations will not be considered changes to the contract.
3. Drawings shall be produced in $1/2$ inch scale for all fabricated items.

D. Pre-installation conference:

1. Conduct conference at project site to comply with requirements in Division 1.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver no components to project site until areas are ready for installation.
- B. Store components indoors in clean and dry area prior to installation.
- C. Handle materials to prevent damage to finished surfaces.
- D. Follow manufacturer's safe handling and storage recommendations.
- E. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.07 WARRANTY

- A. Provide manufacturer's minimum 10-year warranty from date of Substantial Completion.

1.08 MAINTENANCE

- A. Provide maintenance requirements as specified by the manufacturer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, provide products by one of the following approved manufacturers:
1. Affinity Surfaces
 2. Corian
 3. Silestone
 4. Caesarstone
 5. Formica
 6. Wilsonart
 7. Or as detailed in the Drawings

2.02 MATERIALS

- A. Material:
1. Natural quartz with pigments and resin or combination of pre-consumer and/or post-consumer glass, natural quartz, pigments and resin.
- B. Thickness: 3/4 inch unless otherwise indicated on Drawings.
- C. Edge treatment
1. Exposed Edge
 - a. Eased edge
 - b. Mitered
 2. Or as detailed in the Drawings.
 3. Appliance Edge: Finished.
- D. Seam width: 1/16 inch nominal unless otherwise specified.
- E. Sink mounting: Refer to Drawings, will include one of the following:
1. Integrated.
 2. Undermount.
 3. Drop in.
- F. Backsplash: Applied, at all walls.
- G. Endsplash: Applied.
- H. Certifications and Approvals:
1. NSF/ANSI Standard 51, Listed by NSF.
 2. UL Environment/GREENGUARD Certified.

3. UL Environment/GREENGUARD Gold Certified.
4. UL 2824 - Mold Resistant.

I. Cafeteria/Kitchen Surfaces — hot and cold:

1. Refer to manufacturer's fabrication and design recommendations.
 - a. Quartz surface is intended to be a decorative material. All equipment should be independently supported by the substructure, not the quartz surface.
 - b. Quartz surface is adhesively joined with exposed seams.
 - c. Provide expansion joints in countertop as detailed on the drawings.
 - d. Make cutouts to templates furnished by the equipment manufacturer.
 - e. Reinforce edges and cutouts as recommended by Corian® Design.
 - f. Provide insulation between material and adjacent hot water pans and food warmers.
 - g. Thermally isolate hot applications from cold.
 - h. Provide venting of cabinets as required.

2.03 ACCESSORY PRODUCTS

A. Mounting Adhesives:

1. 100 percent Silicone Sealant as approved by the surfacing manufacturer.

B. Seam Adhesive:

1. Joint Adhesive approved by the surfacing manufacturer to create color-coordinated seam.

C. Mounting hardware for undermount sinks/bowls:

1. Manufacturer's approved sink setters, bowl clips and fasteners for attachment of undermount sinks/bowls.

2.04 FABRICATION

A. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.

B. Form joints between components using manufacturer's standard joint adhesive. Reinforce as required.

1. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
2. Rout and finish component edges with clean, sharp returns.
3. Rout cutouts, radii and contours to template.

C. Smooth edges.

2.05 FINISHES

A. Select from the manufacturer's standard color chart if not indicated in the Drawings or below.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General

1. Install countertop materials in accordance with manufacturer's instructions.
2. Additional weight from attached sink or lavatory will affect maneuverability of tops during transportation and installation.
3. Carefully plan work to avoid damaging finished tops during transportation and installation.

B. Install components plumb and level, in accordance with approved shop drawings and product installation details.

1. Tops:
 - a. Flat and true to within 1/8 inch (3 mm) of a flat surface over a 10-foot length.
 - b. Allow a minimum of 1/16 inch to a maximum of 1/8 inch (3 mm) clearance between surface and each wall.
 - c. Form field joints using manufacturer's recommended adhesive with joint widths no greater than 1/8 inch (3 mm) in finished work.
 - d. Keep components and hands clean when making joints.

C. Sinks/Lavatory Bowls:

1. Adhere undermount sinks/lavatory bowls to countertops using manufacturer's recommended adhesive and mounting hardware.
2. Adhere drop-in sinks/bowls to countertops using silicone sealant and manufacturer-recommended adhesives.

D. Provide backsplashes and end splashes as indicated on the Drawings.

1. Adhere to countertops using silicone sealant. Keep components and hands clean when working with silicone sealant.

3.02 CONNECTIONS:

- A. Make plumbing connections in accordance with Division 22.
- B. Make electrical connections in accordance with Division 26.

3.03 CLEANING AND PROTECTION

- A. Keep components and hands clean during installation.
- B. Remove adhesives, sealants and other stains in accordance with manufacturer's instructions.
 1. Clean exposed surfaces in accordance with manufacturer's instructions.
 2. Components shall be clean on date of substantial completion.
 3. Protect surfaces from damage until date of final completion.
 4. Replace or repair damaged work in a satisfactory manner.

END OF SECTION

SECTION 06 61 16 SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes solid surface acrylic for the following:

1. Countertops and vanities
2. Backsplashes and endsplashes
3. Apron fronts and skirts
4. Sinks
5. Walls
6. Window sills
7. Adhesives and sealants

1.2 REFERENCES

- A. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
B. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
C. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer.
D. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
E. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
G. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
H. ASTM G22 - Standard Practice for Determining Resistance of Plastics to Bacteria.
I. ANSI Z-124.3 - Plastic Lavatories.
J. American National Standards Institute / NSF International (ANSI/NSF) 51 - Food Equipment Materials.

1.3 ACTION SUBMITTALS

- A. Product Data: For countertop, wall and sill materials and sinks including manufacturer's technical data sheet and published written instructions.
- B. Sustainable Design Submittals:
1. Product Data: For adhesives and sealants, indicating VOC content.
 2. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, terminations, support structure, type of wood or plywood, and cutouts.
1. Show locations and details of joints, attachments and support details and coordination with adjacent work.
 2. Show direction of directional pattern, if any.
 3. Compliance with these specifications.
- D. Samples for Initial Selection: For each type of material exposed to view.
- E. Submit minimum 2-inch x 2-inch samples for verification and County approval: For the following products:
- F. Certificates: For the following certifications:
1. For locations with food preparation such as kitchens and eating areas:

- a. United States Food and Drug Administration (FDA) compliance for food contact materials described in 21 CFR 174 to 21 CFR 190.
 - b. Compliant with NSF/ANSI 51 food zone/food equipment materials and FDA direct-food contact
- 2. UL GREENGUARD® Gold Certified product for low-chemical emissions.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops, include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

- A. Fabricator/Installer Qualifications: Refer to the References section in Division 1 for manufacturer and fabricator qualifications.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets and countertop supports are installed but before countertop fabrication is complete.

1.7 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops and backsplashes.
- B. Coordinate locations of structural supports.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and installer agree to repair or replace sheet material not free from defects in materials, fabrication, or quality of work within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOLID SURFACE ACRYLIC MATERIALS

- A. Composition Solid-Surface Material: Solid homogeneous-filled plastic or acrylic resins and fillers complying with ANSI/ICPA SS-1 (International Cast Polymer Association), with color and pigments continuous throughout the full thickness.
 - 1. Subject to compliance with specified requirements, provide products by one of the following approved manufacturers:
 - a. Affinity Surfaces
 - b. Avonite Surfaces
 - c. Corian
 - d. Formica Corporation
 - e. Meganite Inc.

- f. Wilsonart LLC
 - g. Or as detailed in the Drawings
2. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 3. Stain resistance: No effect, tested to ANSI Z-124.3.
 4. Impact resistance: Pass 0.5 pound ball drop, tested to ANSI/NEMA LD 3-3.3.
 5. Integral Sink:
 - a. Filled methyl methacrylate with integral drain and overflow holes
 - b. ADA compliant and comply with CSA B45.5/IAPMO Z124
 - c. Rectangular shape UNO on the Drawings
 - d. Color to be chosen by County or Consultant UNO on the Drawings
 6. Colors and Patterns: As selected by County Project Manager or Consultant from manufacturer's full range unless otherwise stated in the Drawings.

2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards "for premium grade.
- B. Configuration:
 1. Front: Straight, slightly eased at top with separate apron or as indicated on Drawings; clearance under the countertop must meet ADA requirements.
 2. Backsplash: Straight, slightly eased at corner or as indicated on Drawings.
 3. End Splash: Match to backsplash.
 4. All finishes to be uniform and consistent.
- C. Countertops: 1/2- inch thick, solid surface acrylic material with front edge built up with same material (so it appears to be one continuous, thick countertop or slab).
- D. Backsplashes: 1/2-inch or 3/4-inch thick, solid surface acrylic material. Install at all wall edges.
- E. Fabricate tops with shop-applied edges unless otherwise indicated.
- F. Fabricate in accordance with manufacturer's instructions and County approved Shop Drawings.
- G. *Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.*
 1. Fabricate with loose backsplashes for field assembly unless Drawings specify an integral, coved backsplash.
 2. Install integral sink bowls in countertops in the shop.
 3. Fabricate components in shop to greatest extent possible, to sizes and shapes indicated.
 4. Provide components in largest practical pieces.
- H. Joints: For countertops of 6 feet length or less, fabricate countertops without joints.
- I. Form joints between pieces using joint adhesive, to be inconspicuous and without voids. Use reinforcement strips on seams.
- J. Joints: Fabricate countertops in sections for joining in field, with joints at locations indicated.
 1. Joint Locations: Not within 3 inches of a cutout or cooktop, 1 inch from inside corner for conventional seams, and not where countertop sections less than 36 inches long would result, unless unavoidable.

K. Cutouts and Holes (if applicable):

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop.
2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical. Finish the edges uniformly, sanded to a smooth finish.
3. Fittings: Drill countertops in shop for plumbing fittings, waste dispensers, and similar items.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by the solid surface manufacturer.

1. Adhesives shall have a VOC content of 70 gallons per liter or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
3. Joint Adhesive: Two components type or as recommended by the solid surface manufacturer.
4. Countertop Adhesive: Silicone, flexible neoprene or as recommended by the solid surface manufacturer.
5. Joint Sealant: Mildew-resistant, FDA-compliant, 100 percent silicone sealant recommended by solid surfacing manufacturer; color to match solid surfacing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive solid surface materials and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Deliver components in protective coverings with identification labels.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install countertops level with a maximum sag or bow of 1/8 inch in 10 feet. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Maximum variation in location of openings: +/- 1/8 inch from indicated location.
- C. Set the surface plumb, level and rigid, scribed to adjacent surfaces.
- D. Fasten countertops by adhering with 100-percent silicone material in dab format (not bead format) to base units into underside of countertop at 18 to 24 inches on center. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- E. For installation over a plywood substrate (*particleboard and fiberboard will not be accepted*), fasten countertops by adhering with 100-percent silicone material in dab format (not bead format) to base units into underside of countertop at 18 to 24 inches on center. Shim as needed to align substrate in a level plane.
- F. For installation over a plywood substrate, secure countertops to substrate or wood-web frame with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with surface manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

- G. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 - 1. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- H. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- I. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- J. Buff out minor scratches and abrasions.
- K. Protect surfaces from damage by other trades by using non-staining coverings until final completion.

END OF SECTION

SECTION 07 46 46 FIBER CEMENT SIDING AND SOFFITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide fiber cement lap siding, panels, shingle, trim, fascia, soffits, molding and accessories.

1.2 RELATED SECTIONS

- A. Divisions 1, 5, 7 and 9 of the Project Manual

1.3 ADDITIONAL REFERENCES

- A. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.
- B. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
- C. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets
- D. Miami-Dade County or Florida Notice of Acceptance (NOA)

1.4 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Notice of Acceptance (NOA)
- C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: If requested by County or Consultant, provide one sample of each product specified, at least 4 by 6 inches, representing actual product, color, and pattern.

1.5 QUALITY ASSURANCE

- A. Experienced Installer Qualifications: Refer to Division 1 for experience requirements.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and quality of application.
 - 1. Finish areas designated by County or Consultant
 - 2. Do not proceed with remaining work until work quality, color, and sheen are approved by County or Consultant.
 - 3. Remodel mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Minimum limited, non-pro-rated product Warranty as follows:
 - 1. Lap and vertical siding: 30 years.
 - 2. Soffit panels: 15 years
 - 3. Shingle cladding: 30 years.
 - 4. Trim and Molding: 15 years.
 - 5. Finish for manufacturer colored products: 15 years

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with these specified requirements, provide products from one of the following approved manufacturers:
 - 1. Allura USA
 - 2. James Hardie Building Products, Inc. HZ10 products
 - 3. Nichiha USA Inc.
 - 4. Substitutions may be submitted in accordance with the Product Substitution Procedures section of the Project Manual.

2.2 SIDING, SOFFITS AND TRIM

- A. All fiber cement products shall comply with the following, at a minimum:
 - 1. ASTM C 1186 Type A Grade II.
 - 2. ASTM E 136 as a noncombustible material.
 - 3. ASTM E 84 Flame Spread Index = 0 and Smoke Developed Index = 5
 - 4. Miami Dade County Notice of Acceptance (NOA)
 - 5. Without asbestos
- B. **LAP SIDING**
 - 1. Thickness: 1/4 to 1/2 inch
 - 2. Size: Refer to Drawings
 - 3. Type and Texture: Refer to Drawings for type such as bevel, shiplap, beadboard and V groove and texture such as smooth or wood grain
- C. **SOFFIT PANELS**
 - 1. Factory sealed on five sides
 - 2. Type and Texture: For most eaves/soffits, the soffit panels will be smooth, perforated (vented) unless otherwise noted on the Drawings
 - 3. Width: 24 inch
 - 4. Thickness: 1/4 to 1/2 inch
 - 5. Install on metal or p.t. furring strips at 16 inches on center or as required by the NOA.
- D. **TRIM AND FASCIA**
 - 1. Type: Refer to Drawings
 - 2. Thickness: 3/4 inch minimum
 - 3. Size: Refer to Drawings
 - 4. Texture: Refer to Drawings for texture such as smooth, rustic or wood grain

2.3 FASTENERS

- A. Refer to the Drawings and the NOA for minimum spacing and type of fasteners.
- B. When fastening through 1 inch thick foam insulation, increase the length of the fastener by the thickness of the insulation.

2.4 FINISHES

- A. Primer: Provide factory applied primed fiber cement product or apply primer as recommended by the fiber cement manufacturer.
 - 1. Some manufacturers do not recommend oil-based primers as this may result in loss of adhesion, chalking and cracking.
 - 2. Paint: Refer to Division 9.
 - 3. Provide complete finishing system includes pre-packaged touch-up kit provided by fiber cement manufacturer. Provide quantities as recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Correct all unsatisfactory framing before proceeding.
- C. Install water-resistive barriers and claddings to dry surfaces.
- D. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
- E. Protect siding from other trades, weather, rodents and damage.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install a water-resistive barrier is required in accordance with local building code requirements.
- D. The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.
- E. Install weather barrier in accordance with local building code and NOA requirements.
- F. Use seam tape and joint and laps.
- G. Install flashing.

3.3 INSTALLATION OF LAP SIDING

- A. Install materials in strict accordance with manufacturer's installation instructions and NOA.
- B. Install a minimum 1/4 inch thick lath starter strip at the bottom course of the wall. Apply planks horizontally with minimum 1-1/4 inches wide laps at the top. The bottom edge of the first plank overlaps the starter strip.
- C. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.

- D. Align vertical joints of the planks over framing members.
- E. Butt joints must not fall within 4 inches) of a stud. Do not nail within 2 inches of the end of planks.
- F. Maintain clearance between siding and adjacent finished grade.
- G. Locate splices at least one stud cavity away from window and door openings.
- H. Face nail to sheathing.
- I. Locate splices at least 12 inches (305 mm) away from window and door openings.
- J. Siding shall be continuous; do not splice together small pieces.

3.4 INSTALLATION OF VERTICAL SIDING

- A. Install materials in strict accordance with manufacturer's installation and NOA instructions.
- B. Block framing between studs where siding horizontal siding joints occur.
- C. Install galvanized metal Z flashing and provide a 1/4 inch gap at horizontal panel joints.
- D. Place fasteners no closer than 3/8 inch from panel edges and 2 inches from panel corners.
- E. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
- F. Maintain clearance between siding and adjacent finished grade.
- G. Siding shall be continuous; do not splice together small pieces.
- H. Factory Finish Touch Up: Apply touch up paint to cut edges in accordance with manufacturer's printed instructions.
 - 1. Touch-up nicks, scrapes, and nail heads in pre-finished siding using the manufacturer's touch-up kit pen.
 - 2. Touch-up of nails shall be performed after application, but before plastic protection wrap is removed to prevent spotting of touch-up finish.
 - 3. Use touch-up paint sparingly. If large areas require touch-up, replace the damaged area with new pre-finished siding. Match touch up color to siding color through use of manufacturer's branded touch-up kits.

3.5 INSTALLATION OF SHINGLE CLADDING

- A. Install materials in strict accordance with manufacturer's installation and NOA instructions.
- B. Substrate: Install a minimum 7/16 inch thick wall sheathing or equivalent braced walls complying with applicable building codes.
- C. Starting: Install a minimum 1/4 inch thick lath starter strip at the bottom course of the wall.
- D. Maintain clearance between siding and adjacent finished grade.
- E. Apply starter course of 10 inches shingles or 9-1/2 inches lap siding overlapping the starter strip.
- F. Apply subsequent courses horizontally with a minimum 10 inches overlap at the top and a minimum 2 inches side lap. The bottom edge of the first two courses overlaps the starter strip.
- G. Fasten between 1/2 and 1 inch in from the side edge and between 8-1/2 and 9 inches up from the shingle bottom edge.
- H. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
- I. Ensure vertical joints of overlapping shingle course do not align.

3.6 INSTALLATION OF TRIM BOARDS

- A. Install materials in strict accordance with manufacturer's installation and NOA instructions. Install flashing around all wall openings.
- B. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.
- C. Place fasteners no closer than 3/4 inch and no further than 2 inches from side edge of trim board and no closer than 1 inch from end. Fasten maximum 16 inches on center.
- D. Maintain clearance between trim and adjacent finished grade.
- E. Trim inside corner with a single board trim both side of corner.
- F. Outside Corner Board: Attach trim on both sides of corner with 16 gage corrosion resistant finish nail 1/2 inch from edge spaced 16 inches apart, weather cut each end spaced minimum 12 inches apart unless otherwise noted.
- G. Allow 1/8 inch gap between trim and siding.
- H. Seal gap with high quality, paint-able caulk.
- I. Shim frieze board as required to align with corner trim.
- J. Fasten through overlapping boards. Do not nail between lap joints.
- K. Overlay siding with single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten trim boards to each other.
- L. Shim frieze board as required to align with corner trim.
- M. Install fascia boards to rafter tails or to subfascia.
- N. Siding shall be continuous; do not splice together small pieces.

3.7 FINISHING

- A. Finish unprimed siding with a minimum one coat high quality, alkali resistant primer and one coat of either 100 percent acrylic or latex or oil based, exterior grade topcoats or two coats high quality alkali resistant 100 percent acrylic or latex, exterior grade topcoat within 90 calendar days of installation. Follow paint manufacturer's written product recommendation and written application instructions.
- B. Finish factory primed siding with a minimum of one coat of high quality, 100 percent acrylic or latex or oil based exterior grade paint within 180 calendar days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

3.8 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Final Completion.

END OF SECTION

SECTION 07 61 13 STANDING SEAM METAL ROOFING

PART 1 - GENERAL

1.1 SCOPE

- A. Furnish all material, labor, and equipment to complete installation of standing seam metal roof system, including pre-coated hot-dipped zinc coated steel sheet with fluoropolymer coating, flashings and counter-flashings and trim.

1.2 QUALITY ASSURANCE

- A. Installer's Qualifications: Similar project experience in application of roofs of type herein specified. Installer must be trained and certified by the manufacturer; see Division 1 References section for installer's qualifications.
- B. Additional Regulatory Requirements: Roofing system and all its components shall comply with those included in the reference standards section of the Project Manual including the latest edition of the Florida Building Code (FBC) as included in the References section.
- C. Roofing system shall meet Miami-Dade County and/or State of Florida Product Approvals/Notices of Acceptance (NOA) including High Velocity Hurricane Zones (HVHZ).
- D. Additional Requirements: The installed roof system shall comply with the Product Approvals as a minimum standard. The Contract Documents, including the Drawings and Project Manual, are designed to be more stringent and shall be strictly follow. If a conflict between the FBC and the Contract Documents is discovered, notify Consultant or County Project Manager prior to proceeding with the installation. Failure to provide notification will result in the Contractor being responsible for all corrective work for no additional compensation.

1.3 REFERENCES

- A. Florida Building Code (FBC); refer to Division 1 section about References
- B. FBC Testing Application Standard (TAS) No. 100 Test Procedure for Wind and Wind Driven Rain Resistance of Discontinuous Roof Systems
- C. TAS 125 Standard Requirements for Metal Roofing Systems
- D.
- E. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMCCNA) "Architectural Sheet Metal Manual", latest edition.
- F. Project Manual and Drawings
- G. National Roofing Contractors Association (NRCA) for roofing and waterproofing manual and handbook of accepted roofing knowledge.
- H. ASTM A 653/A 653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- I. ASTM A 792/A 792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- J. ASTM A 1011 Standard Specification for Steel, Sheet and Strip, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability and Ultra-High Strength
- K. ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- L. ASTM E 1514 Standard Specification for Structural Standing Seam Steel Roof Panel Systems
- M. ASTM E 1592 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- N. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
- O. ASTM E 1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.
- P. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies
- Q. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings.
- R. UL 2218 Impact Resistance of Prepared Roof Covering Materials
- S. UL 263 Fire Tests of Building Construction and Materials
- T. Factory Mutual (FM) 4471 Class 1 Panel Roofs (if applicable)

1.4 WARRANTY

- A. Provide manufacturer's 20-year (minimum) warranty for labor and materials, No Dollar Limit Warranty shall be the highest level, most comprehensive warranty (equal to Englert Level 4), available from the manufacturer. Include coverage for degradation of metal finish, water tightness and integrity of seals, certified by the manufacturer.
- B. Manufacturer shall provide a 30-year (minimum) finish warranty against peeling, blistering, chalking, and fading (color change).
- C. The Installer shall issue a separate, minimum 2-year guarantee against defects in the installed materials and quality of work including a minimum 2-year weather tightness warranty for both systems.
- D. Warranty shall begin from date of substantial completion of the project.

1.5 SUBMITTALS

- A. Product technical data including manufacturer's preparation recommendations, storage and handling requirements and recommended installation methods.
- B. Shop drawings: Complete shop drawings; including roof plan and/or elevations and sections of each condition, shall be submitted for approval prior to fabrication. Such drawings shall also include material type, metal thickness, finish, and installation procedures. Indicate material profile, jointing pattern, jointing details, and fastening methods. Submit installation details if any deviation is required from Contract Document details. Deviations must be approved prior to installation.
- C. Design submittal and sealed statement by Professional Engineer, licensed in the State of Florida, stating that roofing assembly will conform to the FBC wind requirements. Calculations shall show wind pressures, clip spacing, and fastener quantity, size, type, and spacing.
- D. Submit a product samples of no less than 12 x 12 inches with the selected color and finish for Consultant or County Project Manager's approval. Samples shall show finish, color and texture.
- E. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.
- F. Manufacturer's comprehensive warranty for the specified period.
- G. Miami-Dade County Product Approvals for metal roofing and underlayments.
- H. Test and evaluation reports showing compliance with specified performance characteristics and physical properties.

1.6 PRE-INSTALLATION MEETING

- A. Prior to scheduled commencement of metal roofing installation and associated work, meet at project site with Installer, installer of each component of associated work, installer of deck or substrate construction to receive roofing work, installer of roof-top units and other work in and around roofing which must precede or follow roofing work (including mechanical work if any), Consultant or County Project Manager, roofing system manufacturer's representative, and other representatives directly concerned with performance of the work including (where applicable) Owner's insurers, test agencies, and governing authorities. Record discussions of conference and decisions and agreements (or disagreements) reached and furnish copy of record to each party attending. Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:
- B. Tour representative areas of roofing substrates (decks) inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.
- C. Review structural loading limitations of steel deck and inspections of steel deck and inspect deck for loss of flatness and for required mechanical fastening.

1.7 STORAGE AND HANDLING

- A. Stack performed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Prevent contact with materials during storage which may cause discoloration or staining.
- B. Slope the materials to prevent puddling and to allow for drainage.
- C. Store panels properly and adequately to protect from damage on jobsite.
- D. Protect roofing from adverse job conditions (i.e., moisture) prior to installation.
- E. Protect roofing from other trades after installation.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Drexel Metals Inc. www.drexmet.com
- B. Englert Inc. www.englertinc.com
- C. Fabral, Inc. www.fabral.com
- D. Firestone Metal Products www.firestonebpco.com
- E. McElroy Metal, Inc. www.mcelroymetal.com/
- F. Peterson Aluminum Corp. (PAC) www.pac-clad.com
- G. Or approved equal/substitution

2.2 MATERIALS

A. Panels:

1. Standing Seam Metal Panels:

- a. Pre-coated Sheet: 24 gauge steel with galvalume finish ASTM A-792-83, AZ50, 50 KSI yield point, 52 KSI tensile strength, shop finished with polyvinylidene fluoride (PVDF) coating consisting of 0.2 mil primer on both sides with 0.8 mil 70 percent PVDF top coat of selected color.
- b. Additional or Alternate Product for an additional cost: 0.032 to 0.040 inches, Aluminum Alloy 3105-H14 for locations near brackish or saltwater.
- c. Additional cost will be acceptable for installing manufacturer's premium (non-standard) colors.
- d. Standing Seam Profile: Mechanical 180 degree interlocking seams unless otherwise noted on the Drawings.
- e. Refer to Drawings for rib size/height and spacing. If not specified on Drawings, provide minimum 16 inch width panels with 1-1/2 inch minimum high seams.
- f. Panels shall be factory or field fabricated with no visible oil canning.

B. Flashings and Trim:

- 1. All exposed adjacent flashings and trim to be of same material, thickness, and finish as panel system to which they are attached.
- 2. On vertical surfaces a two-piece flashing and counter flashing is to be used to allow for proper expansion at vertical surface.
- 3. Concealed continuous cleats shall be installed at all ridge, rake, and eave conditions. Cleats (dependent upon Notice of Acceptance) shall be minimum 20 gauge and shall be fastened to the substrate with #12 stainless steel screws at 8 inches o.c. maximum.

C. Felt Underlayment:

- 1. Base sheet (dependent upon Notice of Acceptance): 30 lb. Class 'A' fire-rated VersaShield by GAF underlayment, or approved equal, in compliance with ASTM D 226 Type II over 30# felt. Installation shall comply with product's NOA requirements.
- 2. Second Layer (dependent upon Notice of Acceptance): 90 pound W.R. Grace & Company Grace Ice and Water Shield HT peel and stick roofing membrane over the fire rated underlayment in compliance with ASTM D 1970. Installation shall comply with the product's NOA requirements.

D. Fastening system:

1. Standing seam fasteners shall be non-corrosive stainless steel with neoprene washers. All fasteners to be concealed unless noted on plans. Finish exposed fasteners same as flashing metal. Attach to roof deck or structure below with #8 wafer head stainless steel screws, minimum 2 per clip. Screws to penetrate through deck/structure by a minimum of 5/8 inch.
2. If the substrate is exposed, varied screw lengths shall be provided over the crimp and over the panels so as to provide the minimum embedment without penetrating the finish surface below.

E. Pop Rivets: Stainless steel rivets shall be installed at all locations where screw fastening is not possible. End laps between flashings, drip edge, ridge caps, rake trims, etc. shall all receive rivets.

F. Circular Roof Penetration Flashings:

1. Install flasher, prefabricated ethylene propylene diene monomer (EPDM) (grey) pipe flashings specifically designed for metal roof applications.
2. Provide continuous sealant between the flashing flange and the metal roof panel.
3. Fasten the flashing to the substrate using self sealing fastener described above.
4. Pipe boots shall accommodate pipes 1/4 inch to 26 inches. Prefabricated pipe collars shall be utilized for larger pipes.

G. Sealants:

1. Caulking shall be polyurethane and shall be done in a neat manner with excess caulking removed from exposed surfaces. Caulking shall be used in conjunction with the specified flashing and shall never be used in place of the specified flashings.
2. Tape sealant shall be butyl sealant, as recommended by the manufacturer, and applied in continuous tape or gun grade form.

H. Closure strips: Pre-molded, pre-glued inside and outside closure pieces shall be supplied and installed at eaves and ridge caps

2.3 FINISH

- A. Topside Finish: Primer shall be 0.2 to 0.3 mils thick. PVDF (such as Kynar 500® or Hylar 5000®) top coat shall be 0.8 to 0.9 mils. Reverse side finish shall be 0.2 to 0.3 mil primer with a wash coat. Total dry film thickness for the coating system shall be 1.00 mil nominal. All measurements per NCCA Technical Bulletin II-4 or ASTM D1005-84.
- B. Color to be selected by Owner from manufacturer's standard and premium (metallic) colors; refer to Drawings for selected color.
- C. Energy Star® certified.
- D. When required, LEED compliant.

2.4 PROTECTIVE COATING

- A. Coat the roofing material with a factory applied, strippable plastic film coating, for protection during fabrication and shipping. Remove protective coating before field installation.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections. Replace all substrate material that is damaged or deteriorated.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place.
- C. Verify that substrate layout complies with shop drawing layout.
- D. Verify that decking has been inspected and is properly fastened according to standard building codes. Install additional fasteners if existing fastening is deficient.

- E. Report any variations and potential problems to the Consultant or County Project Manager.
- F. Do not start work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Panels shall be continuous lengths from eave to ridge, unless approved otherwise.
- B. The roofing shall be installed plumb, straight, and true to adjacent work.
- C. Fasten panels to substrate over center rib and at each side rib. Spacing of fasteners shall be 12 inches o.c. minimum, or closer as determined by calculations prepared by a Professional Engineer.
- D. At eaves and perimeters panels should be fastened 4 inches o.c.
- E. Trimming and Cutting Steel Panels:
 - 1. Whether cutting with the profile (length wise) or across the profile (width wise), it is best to use an electric nibbler, shears or hand tinsnips.
 - 2. Cut panels one at a time with the finish side of the panel facing down on wood blocks.
 - 3. Care should be taken to ensure that the hot metal particles and filings from cutting and screwing to do not become embedded in the panel.
 - 4. Filings from screw and panel cuttings must be cleaned off the panels after screws have been applied through the panel to avoid rust marks or “bleeding” on the panels. Failure to comply with the above procedures will make the contractor responsible for replacing any panel with such damage or deterioration of the finish.
- F. ***Do not install a penetration through a seam, a crimp, or end lap. Coordinate panel placement with any existing roof penetrations.***
- G. ***Do not block water flow down the roof panel.*** When pipe is encountered that is too large to fit in the flat of the panel without blocking the water flow, use a prefabricated pipe curb to allow water to flow around the pipe and to provide a large, flat area in which to seal the roof jack to the roof surface.
- H. Install crickets behind all vertical rectangular penetrations.
- I. Conform with manufacturer's instructions and applicable standards of SMACNA, FBC, and Contract Documents.
- J. Apply felt underlayment in a single layer. Install and lap in accordance with Product Approval.
- K. Install flashings and accessories as recommended by manufacturer and as detailed in the Contract Documents.
- L. Refer to Drawings for seam spacing. Allow for thermal movement at each panel joint. Arrange screws to allow for positive uniform load conforming to wind load requirements.
- M. Coat contacting dissimilar metals with bituminous coating, 7-1/2 mil dry film thickness, minimum, applied to each contacting metal face.
- N. Install continuous cleats at ridge, rake, and eave conditions; No exceptions.
- O. When end laps are approved (panel lengths greater than 30 feet), end lap the panels a minimum of 12 inch to insure proper drainage. Two strips of butyl sealant tape should be used at the end lap. Fasteners should be on the uphill side of the strips of butyl sealant tape.

3.3 CLEANING AND INSPECTION

- A. Clean work in accordance with manufacturer's recommendations.
- B. Complete all items on punch list.
- C. Touch up minor scratches and abrasions.
- D. Remove all excess metal shavings from drilling, pop rivets, etc.
- E. Remove all debris resulting from work under this section.

END OF SECTION

SECTION 07 71 23 MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Pre-finished metal gutters and downspouts.
 - 2. Pre-cast concrete splash pads/blocks.

1.2 REFERENCES

- A. ASTM
- B. ANSI-SPRI/ES-1 Wind Design Standard for Edge Systems Used with Low-Slope Roofing Systems
- C. Florida Building Code; see the References section of the Project Manual.
- D. National Roofing Contractors Association (NRCA)
- E. Sheet Metal and Air-Conditioning Contractor's National Association, Inc. (SMACNA) "Architectural Sheet Metal Manual", latest edition. Details for fabrication of units, including flanges and installation to coordinate with type of roofing indicated.
- F. Drawings.
- G. References and roofing sections of the Project Manual.

1.3 DESIGN REQUIREMENTS

- A. Conform to SMACNA Manual for sizing components for rainfall intensity determined by a storm occurrence of 1 to 5 years.
- B. Conform to Florida Building Code and Miami-Dade County Product Approval requirements for size and method of rain water discharge.
- C. Maintain one copy of each document on site.
- D. Colors available shall match those of the roof.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations and installation details.
- B. Product Data: Provide data on pre-fabricated components.
- C. Submit one sample, 24 inches long, illustrating component design, finish, color and configuration.

1.5 DELIVERY, STORAGE AND PROTECTION

- A. Stack materials to prevent twisting, bending or abrasion; provide ventilation. Slope to drain.
- B. Prevent contact with materials during storage which may cause discoloration, staining or damage.

1.6 PROJECT CONDITIONS

- A. Regulatory Requirements: Ensure flashing and sheet metal complies with requirements of Florida Building Code, NRCA, SMACNA, and ANSI-SPRI/ES-1.
- B. Coordinate application of gutters and downspouts with application of roofing, protruding material, and roof accessories to provide a complete weather-tight installation under provisions of the specified warranty requirements.
- C. Coordinate the work with downspout discharge pipe inlet.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metal provided shall match the roofing metal used (typically either galvanized steel or aluminum).
- B. Pre-finished Aluminum Sheet: ASTM B 209; 0.032 in. thick.

1. Finish: Plain, shop pre-coated with polyvinylidene fluoride (PVDF such as Kynar 500® or Hylar 5000®) top coating.
 2. Color: As selected from manufacturer's standard or metallic colors and to match the roof color.
- C. Pre-finished Galvanized Steel: ASTM A 653; 24 gauge, 0.0276 in thick.
1. Finish: Plain, shop pre-coated with PVDF top coating.
 2. Color: As selected from manufacturer's standard or metallic colors and to match the roof color.
- D. Protective Backing Paint: Zinc molybdate alkyd.

2.2 COMPONENTS

- A. Gutters: Rectangular box or K-style profile.
- B. Downspouts: Plain rectangular profile.
- C. Anchors and Supports: Profiled to suit gutters and downspouts.
 1. Anchoring Devices: Type recommended by fabricator.
 2. Gutter Supports: Brackets.
 3. Downspout Supports: Straps.
- D. Fasteners: Same material and finish as gutters and downspouts, with soft neoprene washers.

2.3 ACCESSORIES

- A. Precast Concrete Splash Pads/Blocks:
 1. Minimum 3,000 psi at 28 days, with minimum 5% air entrainment.
 2. 24 to 30 inches long with recess formed in top to deflect water away, unless noted otherwise on the Drawings.

2.4 FABRICATION

- A. Form gutters and downspouts of profiles and size indicated.
- B. Fabricate with required connection pieces.
- C. Form sections square, true and accurate in size, in maximum possible continuous lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories. Seal watertight.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Protect all stored products with plastic or equivalent wrapping.
- B. Verify existing conditions before starting work.
- C. Verify that surfaces are ready to receive work. Do not begin installation until substrates have been properly prepared.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of at least 15 mils.

3.3 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
- B. Slope gutters a minimum of 1/8 inch per foot.
- C. Set splash pads under downspouts
- D. Protect installed products until final completion of project.

END OF SECTION

SECTION 07 91 26 JOINT FILLERS (CONCRETE)

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all labor, products and equipment required to properly install semi-rigid filler in joints in the interior concrete floor slabs.

1.2 SCOPE OF WORK

- A. Fill all contraction (control) and construction (formed) joints in the interior concrete floor slab where the joints will be exposed in polished and sealed concrete surfaces.

1.3 APPLICABLE STANDARDS

- A. Products and installation shall be in compliance or exceed the joint filling criteria established in the latest ACI 302 and ACI 360 Committee published documents.

1.4 QUALITY ASSURANCE

- A. The Applicator shall be experienced in the installation of semi-rigid fillers on industrial floors.
- B. Use only manufacturer's approved applicators for work covered by this section.
- C. Use tools and equipment specifically designed for the preparation and placement of industrial joint fillers.
- D. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.
- E. Pre-construction Joint Sealer-Substrate Tests: Submit substrate materials representative of actual joint surfaces to be sealed to manufacturer of joint sealer products for laboratory testing of sealants for adhesion to primed and unprimed substrates and for compatibility with secondary seals, if required, as indicated below:
 - 1. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates under environmental conditions that will exist during actual installation.
 - 2. Testing will not be required when joint sealer manufacturer is able to submit joint preparation data required above which is acceptable to Consultant or County Project Manager and is based on previous testing of current sealant products for adhesion to, and compatibility with joint substrates matching those submitted.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each joint sealer product required, including instructions for joint preparation and joint sealer application.
- B. Samples for Initial Selection Purposes: Submit manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available, for each product exposed to view.
- C. Samples for Verification Purposes: Submit samples of each type and color of joint sealer required. Install joint sealer samples in ½ inch wide joints formed between two 6 inches long strips of material matching the appearance of exposed surfaces adjacent to joint sealers in the work.
- D. Test Reports: Submit the following test reports:
 - 1. Certified test reports for polyuria joint fillers evidencing compliance with requirements specified based on comprehensive testing of current product formulations within a 24-month period preceding date of submission of test reports to Consultant or County Project Manager. Include test results for aged performances including hardness, stain resistance, adhesion and cohesion under cyclic movement, low-temperature flexibility, modulus of elasticity at 100% strain, effects of heat aging, and effects of accelerated weathering.
- E. Certificates: Submit certificates from the manufacturer(s) of joint sealers attesting that their products comply with specification requirements and are suitable for the use indicated.
- F. Submit to Consultant or County Project Manager the manufacturer's approved applicator certificate.
- G. Color: Submit custom color sample matching the floor for approval.

1.6 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials to project site in original unopened containers or bundles with labels 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 and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.
- C. Refer to other Specification Sections for any additional requirements.

1.7 WARRANTY

- A. Special Installer's (or Applicator's) Warranty: Standard form in which the Installer/Applicator agrees to repair or replace polyuria joint fillers that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Minimum Warranty Period: Three years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which polyuria joint filler manufacturer agrees to furnish polyuria joint filler to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Minimum Warranty Period: Ten years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of polyuria joint filler from the following:
 - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 CONTROL JOINT FILLER

- A. Provide semi-rigid, two-part, self-leveling, 100% solids content polyuria control and construction joint fillers intended for each condition listed.
- B. Utilize products with physical properties meeting the following minimum values.
 - 1.

PROPERTY TEST METHOD	PROPERTY VALUE
a. Shore A Hardness.....ASTM D2240.....	85 or greater
b. Tensile Strength.....ASTM D638.....	500 psi or greater
c. Adhesion to ConcreteASTM D4541.....	350 psi or greater
d. Solids Content.....	100%
e. Acceptable for use in U.S Dept. of Agriculture, (USDA), U.S. Food and Drug Administration (FDA) or Canadian Food inspection Agency (CFIA) regulated facilities.	
- C. Products: Subject to compliance with requirements, utilize products manufactured by Metzger/McGuire Co. or approved equal.
 - 1. Joint filler for all areas with operating temperatures of 40°F or higher, shall be SPAL-PRO RS88 Rapid Set Polyurea Joint Filler or equivalent.

2.2 ACCESSORIES

- A. Silica sand may be used at contractor's option to choke-off shrinkage cracks beneath filler. Silica must be dry, bagged, of 20 to 40 grit.
- B. The use of compressible foam backer rod is strictly prohibited in ALL saw-cut control joints.

- C. Compressible foam backer rod may be used in through slab construction joints only but must be placed at a minimum depth of 2 inches. No other use of backer rod will be allowed. Refer to installation section and product technical data for additional information.
- D. Joint Cleanout and preparation should be done utilizing dust-free, diamond blade equipped cleanout saws such as those manufactured by Sawtec/US Surface Preparation or equivalent.

PART 3 - EXECUTION

3.1 PREPARATION

- A. At Contractor's direction, Installer/Applicator, joint filler manufacturers' representatives, and other trades whose work affects installation of joint filler, should meet at the project site to review procedures and time schedule proposed for installation of joint filler which is coordinated with other, related work.
- B. Surface Cleaning of Joints: Clean out joints immediately before installing joint filler to comply with recommendations of joint filler manufacturers and the following requirements:
 - 1. Remove all foreign material from joint substrates which could interfere with adhesion of joint filler, including dust; paints, except for permanent, protective coatings tested and approved for filler adhesion and compatibility by filler manufacturer, oil, grease, waterproofing, water repellents, water, and surface dirt.
 - 2. Clean concrete surfaces by brushing, grinding, blast cleaning, mechanical abrading, acid washing or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint filler. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 - 3. Remove laitance and form release agents from concrete.
- C. Joint Priming: Prime joint substrates where indicated or where recommended by joint filler manufacturer based on preconstruction joint filler-substrate tests or prior experience. Apply primer to comply with joint filler manufacturer's recommendations. Confine primers to areas of joint filler bond; do not allow spillage or migration onto adjoining surfaces.
- D. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove filler smears. Remove tape immediately after tooling without disturbing joint filler.

3.2 PROJECT CONDITIONS

- A. Work area should be free of obstructions and other trades.
- B. Slab should be visibly dry and all floor scrubbing/washing activities should be suspended at least 48 hours prior to filler installation.
- C. Joint Width Conditions: Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

3.3 TIMING OF INSTALLATION

- A. The American Concrete Institute (ACI) recommends that filling be deferred as long as possible to allow for maximum slab shrinkage and joint widening. Deferring filler installation as long as possible will help to minimize the occurrence of joint filler separation due to excessive joint widening during concrete cure (and shrinkage).
- B. For ambient temperatures, a 90 to 120 day slab cure is advisable. Deferring filling until after facility is under permanent temperature control is best, if possible. At a minimum slab cure time should exceed 28 days per ACI 302.

3.4 EXAMINATION OF CONDITIONS

- A. The Contractor shall require its Installer/Applicator to inspect project and joint conditions, and to notify the Contractor in writing of any deficiencies that might adversely affect the quality or durability of the work performed.
- B. Start of work by the Installer/Applicator implies acceptance of conditions.

3.5 PRE-INSTALLATION SAMPLE

- A. Before start of actual work, the Installer/Applicator shall install samples to demonstrate his intended procedures and finished product. Sample shall include at least 25 feet each of both contraction and construction joints and be performed in the presence of Contractor and Consultant or County Project Manager.
- B. If procedures and finished product are approved, they will be considered a standard for the entire project.

3.6 JOINT PREPARATION

- A. Prior to installation of joint fillers, all saw-cut joints shall be thoroughly cleaned to their full original depth., typically 1-1/4 to 1-1/2 inch in a 6 inch slab, 2 inch in an 8 inch slab. Where the original saw-cut depth exceeds 2 inches, joint preparation and filling must be performed to a minimum depth of 2 inches.
- B. Construction (formed, through slab) joints that are not saw-cut shall be cleaned to a minimum depth of 2 inches.
- C. Preparation shall be performed using a vacuum-equipped saw that will reach the base of the saw-cut joint or to a depth of 2 inches in the case of through slab construction joints, and shall be used in a manner that takes both joint walls back to bare concrete, removing all saw laitance, curing compounds, sealers, debris, etc. Joint cleaning may be performed using two cleaning passes, one along each side of the joint. Or, if only one cleaning pass is performed, the diamond blade width must be slightly wider than the joint to be cleaned.
- D. Where joints have minor edge chips, said chips shall be “squared off” and filled along with the joint itself.
- E. Keep prepared joints free of dust, moisture, and jobsite debris prior to filling.

3.7 CHOKING-OFF JOINT BOTTOM

- A. Compressible backer rod is prohibited in saw-cut joints unless they exceed 2 inches deep.
- B. Compressible backer rod may be used in through-slab (non-sawn) construction joints but must be recessed at least 2 inches below the slab surface. Caution: The use of backer rod in any saw-cut joints less than 2 inches deep will result in the rejection of all saw-cut joints work.

3.8 JOINT FILLER INSTALLATION

- A. Installation of SPAL-PRO RS 88 Rapid Set Polyurea Joint Filler or equivalent.
 - 1. Pre-mix Part “A” component (polyol) to re-distribute any settlement that may have occurred during shipping or storage.
 - 2. Because of extremely short pot life, joint filler must be dispensed using dual-component power dispensing equipment or through dual-component cartridge units. Pump, reservoir tanks and dispensing wand should be heated for all freezer work.
 - 3. Fill joint in one pass, from bottom to top, slightly overfilling the joint.
 - 4. After joint filler has fully cured, razor off excess to leave a flush filler profile. Timing of the razoring (30 minutes to 1 hour typically) can affect flushness; test for shave time that will result in flush shave.
 - 5. If low spots exist or if the finish profile is not flush, abrade the filler surface with a wire brush, wire wheel, or other means and apply an additional cap bead of joint filler. Allow to cure, and razor flush to the floor surface.

3.9 QUALITY ASSURANCE

- A. Joint filler deficiencies:
 - 1. Contractor and Installer/Applicator is advised that significant deficiencies in work quality including less than proper filler depth, inadequate joint cleaning, concave filler profile, etc., shall be removed and properly replaced.
 - 2. Joint filler installed to depths less than specified in this Section shall be removed and replaced at no additional cost to the Owner. As each sector of work is completed the Contractor, using a 1/8 inch drill bit, shall drill through the filler to verify filler depth. Contractor shall test drill at an approximate rate of one core every 500 lineal feet. Location of core and filler depth found shall be recorded and provided to the owner prior to project completion.

END OF SECTION

SECTION 07 92 00 JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sealants and caulking for joints between dissimilar materials and to close other joints. The applications include, but are not limited to, the following:
 - 1. Around penetrations in floors and walls for piping, ducts, conduit and similar items.
 - 2. At joints between masonry walls and concrete.
 - 3. At perimeter of louvers, vents, windows, doors and metal frames.
 - 4. Expansion joints.
 - 5. At other locations as indicated on the Drawings.

1.2 REFERENCES

- A. ASTM C 834 Standard Specification for Latex Sealants.
- B. ASTM C 919 Standard Practice for Use of Sealants in Acoustical Applications.
- C. ASTM C 920 Standard Specification for Elastomeric Joint Sealants.
- D. ASTM D 1056 Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
- E. GREENGUARD Product Emission Standard, if applicable.
- F. Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
- G. Sealant, Waterproofing and Restoration Institute (SWRI): Sealants: The Professional's Guide.

1.3 SUBMITTALS

- A. Product Data: Indicate chemical characteristics, performance criteria, limitations and color chart for all materials.
- B. Low Emitting Materials.
 - 1. Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
 - 2. Submit manufacturer's certification that all products comply with Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including with latest addenda.
- C. Samples: Submit samples of each type of sealant and caulking.
- D. Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- A. Single source responsibility: Obtain materials from a single manufacturer.
- B. Applicator Qualifications: Company experienced in performing the work of this section; refer to Division 1 for more information.

1.5 WARRANTY

- A. Replace sealants and caulking which fails because of loss of cohesion or adhesion or does not cure.
- B. Furnish written warranty that work executed under this section is free from defects of material and quality for a minimum period of 5 years from date of substantial completion of the entire project.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Toxicity/IEQ: All joint sealant materials are to comply with Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including latest addenda.

- B. Sealant Type 1:
 - 1. Polyurethane base, one-part, chemical curing.
 - 2. Non-sagging type for application in vertical joints.
 - 3. Capable of being immersed in water, withstand movement up to 25 percent of joint width and satisfactorily applied throughout a temperature range of 40 degrees to 90 degrees Fahrenheit.
 - 4. Shore A hardness: Minimum 15, maximum 50.
 - 5. Conforming to Requirements of ASTM C920 Type S Grade NS, Class 25, T, NT, O, M, G, I.
 - 6. Non-staining and non-bleeding.
 - 7. SWRI Sealant Validation.
 - 8. Color: Selected by Consultant or County Project Manager.

- C. Sealant Type 2:
 - 1. Polyurethane base, two-part, chemical curing.
 - 2. Self-leveling type for application in horizontal joints.
 - 3. Capable of being continuously immersed in water, withstand movement of up to 25 percent of joint width and satisfactorily applied throughout a temperature range of 40 degrees to 90 degrees Fahrenheit.
 - 4. Uniform, homogenous, and free from lumps, skins, and coarse particles when mixed.
 - 5. Shore A hardness: Minimum 30; maximum 35.
 - 6. Conforming to requirements of ASTM C920 Type M, Grade P, Class 25, Use T, NT, M, G, A, O, I.
 - 7. Non-staining and non-bleeding.
 - 8. Color: Selected by Consultant or County Project Manager.

- D. Sealant Type 3:
 - 1. Polyurethane, two-part, chemical cure.
 - 2. Non-sag type for vertical applications.
 - 3. Capable of being continuously immersed in water; withstand movement up to 50 percent of joint width and satisfactory applied throughout a temperature range of 40 degrees to 90 degrees Fahrenheit.
 - 4. Uniform, homogenous, and free from lumps, skins, and coarse particle when mixed.
 - 5. Shore A hardness: Minimum 30, Maximum 40
 - 6. Conforming to requirements of ASTM C920 Type M, Grade NS, Class 25 use T, NT, M, G, A, O.
 - 7. Non-Staining and non-bleeding.
 - 8. Color: Selected by Consultant or County Project Manager.

- E. Sealant Type 4:
 - 1. Acrylic base, one-part, solvent curing.
 - 2. Capable of being continuously immersed in water, withstand movement up to 7-1/2 percent of joint width and satisfactorily applied throughout a temperature range of 40 degrees to 90 degrees Fahrenheit.
 - 3. Shore A hardness: Maximum 55.
 - 4. Non-staining and non-bleeding.
 - 5. Conforming to requirements of ASTM C834.
 - 6. Color: Selected by Consultant or County Project Manager.

F. Sealant Type 5:

1. Silicone base, one-part, neutral curing.
2. Withstand movement up to 50 percent of joint width and satisfactorily applied throughout a temperature range of 40 degrees to 90 degrees Fahrenheit.
3. Shore A hardness: Maximum 30.
4. Conforming to requirements of ASTM C920, Type S, Grade NS, Class 50, US = NT, M, G, A.
5. Selected by Consultant or County Project Manager.
6. SWRI Sealant validation.

G. Sealant Type 6:

1. Synthetic Butyl Rubber, one-part moisture cure.
2. Non-sag acoustical sealant.
3. Non-hardening, non-bleeding.
4. Unexposed joints only.

H. Sealant Type 7:

1. Silicone base, one-part moisture cure
2. Shore A hardness: 15
3. Conforming to requirements of ASTM C920 Type S, Grade NS, Class 100/50, Use T, NT, M, G, A and O.
4. SWRI sealant validation.
5. Color: Selected by Consultant or County Project Manager.

I. Back-up Materials:

1. As recommended by caulking or sealant manufacturer and compatible with each material.
2. Preformed material sized to require 25 percent to 50 percent compression upon insertion in joint.
3. Do not use materials impregnated with oil, bitumen or similar materials.

J. Bond Breakers: Where joints are not of sufficient depth to receive back-up material install polyethylene bond-breaking tape at back of joint.

K. Primer:

1. As recommended by manufacturers of caulking or sealant used.
2. Type that will seal the surfaces and prevent absorption of the vehicle essential to the retention of elasticity by the caulking or sealant compound.

L. Accessories: Provide solvent, cleaning agents and other necessary materials as recommended by the caulking or sealant manufacturer essential for a complete installation.

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify joint dimensions, physical and environmental conditions are acceptable to receive work of this Section.
- B. Verify that substrate surfaces and joint openings are ready to receive work.
- C. Verify that joint backing and release tapes are compatible with sealant.
- D. Remove loose materials and foreign matter, which might impair adhesion of sealant.

- E. Clean and prime joint under provisions of manufacturer's instructions.
- F. Perform preparation under provisions of manufacturer's instructions.
- G. Protect elements surrounding work of this section from damage or disfiguration.

3.2 INSTALLATION

- A. Perform work under provisions of ASTM C 804 for solvent release and ASTM C 790 for latex base sealants.
- B. Install sealant under provisions of manufacturer's instruction.
- C. Measure joint dimensions and size materials to achieve required width/depth ratios.
- D. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.
- E. Install sealant free of air pockets, foreign embedded matter, ridged and sags.
- F. Apply sealant within recommended temperature range. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Apply generally with caulking gun of proper nozzle size to fit joints.
- H. Apply with sufficient pressure to fill joint from backing to surface.
- I. For joints in flat surfaces, neatly tool compound slightly concave with proper tools.
- J. Execute finishing of caulking around frames with coving tool.
- K. As work progresses, immediately remove compound that may accidentally flow onto adjoining surfaces using manufacturer's recommended solvent and cleaners. Remove excess material from joints immediately.
- L. At completion, carefully check all joints for damage and repair-damaged joints.
- M. Clean adjoining surfaces.
- N. Protect sealants and caulking until cured.

3.3 SCHEDULES

- A. Exterior:
 - 1. Perimeters of exterior openings where frames meet exterior facade of building: Type 1 or 3.
 - 2. Expansion and control joints in exterior surfaces of poured-in-place concrete walls: Type 1 or 3.
 - 3. Expansion and control joints in exterior surfaces of pre-cast tilt-up wall panels: Type 7 (unpaintable) or Type 3 (paintable polyurethane).
 - 4. Exterior joints in horizontal wearing surfaces: Type 2 in areas subject to foot and vehicular traffic; Type 3 at plazas, malls, patios etc.
 - 5. Skylights and glazing: Type 5.
- B. Interior:
 - 1. Seal interior perimeters of exterior openings: Type 1.
 - 2. Expansion and control joints in interior surfaces of poured-in-place concrete walls: Type 1 or Type 3.
 - 3. Expansion and control joints in interior surfaces of pre-cast tilt-up wall panels: Type 1 or Type 3.
 - 4. Interior control and expansion joints in floor surfaces: Type 1 or Type 2.
 - 5. Perimeters of interior frames: Type 1.

6. Perimeters of bath fixtures: Type 4.
7. Exposed interior control joints in drywall: Type 4.
8. Control joints in drywall, perimeter, and between metal framing and substrate in sound rated partitions: Type 6.

END OF SECTION

SECTION 08 11 13 HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire rated and non-fire rated standard steel doors, frames and associated accessories that are indicated on the drawings and in schedules.
- B. Specification does not include the use of aluminum doors.

1.2 RELATED SECTIONS

- A. Divisions 1, 4, 8 and 9 sections of the Project Manual.

1.3 REFERENCES (LATEST EDITION)

- A. American Society for Testing and Materials (ASTM):
 - 1. A1011A/1011M-Specifications for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High Strength Low-Alloy with improved Formability.
 - 2. A653/A653M-Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed by the Hot Dipped Process (Commercial Steel).
 - 3. A1008/A1008M-Specification for Steel Sheet and Strip, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength, Low-Alloy with Improved Formability.
 - 4. C270-Mortar for Unit Masonry.
 - 5. E 152-Fire Test of Door Assemblies.
- B. ANSI/NAAMM HMMA 861-Guide Specifications for Commercial Hollow Metal Doors and Frames.
 - 1. American National Standards Institute (ANSI)
 - 2. National Association of Architectural Metal Manufacturers (NAAMM)
 - 3. Hollow Metal Manufacturers Association (HMMA)
- C. ANSI/SDI A250.8-Recommended Specifications for Standard Steel Doors and Frames.
- D. Florida Building Code (FBC).
- E. Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA).
- F. International Organization for Standardization (ISO) 14021; Environmental Labels and Declarations.
- G. National Builders Hardware Association (NBHA) - "Recommended Locations for Builder's Hardware".
- H. National Fenestration Rating Council (NFRC).
- I. NFPA 80-Fire Doors and Windows (National Fire Protection Association).
- J. NFPA 252-Standard Methods of Fire Tests of Door Assemblies.
- K. Steel Door Institute (SDI)
- L. Underwriters Laboratories (UL).

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements prior to start of manufacture.
 - 1. Recycled Content:
 - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.

- (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
 - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
 - 2. Energy Efficiency:
 - (a) Submit product data indicating energy performance in accordance with the National Fenestration Rating Council (NFRC) methodology.
 - 3. Manufacturer's specifications and catalog cuts.
- B. Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, required reinforcement, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door hardware and reinforcements, details of joints and connections. Show anchorage and accessory items. Show allowable design pressures and impact resistance certification for doors exposed to wind loading.
- 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
 - 2. Indicate coordination of glazing frames and stops with glass and glazing requirements.
 - 3. Doors and frames shall meet or exceed wind pressure and impact requirements shown on Contract Documents.
- C. Label Construction Certification: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, submit manufacturer's certification for each door and frame assembly constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.
- D. Exterior Doors: Submit complete current Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA).

1.5 QUALITY ASSURANCE

- A. Provide doors and frames complying with ANSI/SDI 250.8 for Standard doors and ANSI/NAAMM HMMA 861 for custom doors if applicable.
- B. Fire-Rated Door Assemblies: Where fire rated door assemblies are indicated or required, provide fire-rated door and frame assemblies complying with NFPA 80 and have been tested, listed, and labeled according to ASTM E152 by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.
- C. Provide factory applied metal labels on fire-rated doors and frames. Field applied labels shall not be acceptable.
- D. The Owner reserves the right to select at random up to 2 doors and frames to verify the construction for compliance with this specification. Cost of replacement of these two doors and frames shall be included in the Contract Sum/Total Price and entered in the Schedule of Values as a separate line item.
- E. All work shall be performed in accordance with referenced standards.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver steel doors and frames cartoned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory-finished doors.
- B. Inspect steel doors and frames upon delivery for damage. Minor damage may be repaired if refinished items are equal in all respects to new work and acceptable to owner. Remove and replace damaged items as directed.
- C. Doors and frames shall be stored at the building site under cover in a vertical position. Doors and frames shall be separated and spaced using wood blocking. Place units on minimum 4 inches high wood blocking. Avoid use of non-vented plastic or canvas shelters that could create a humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4 inch spaces between stacked doors to promote air circulation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers are accepted upon certification that all requirements of this specification are met. Previously utilized manufacturers include Schlage Lock Company and Gensteel.

2.2 MATERIALS

- A. All steel door and frame materials to contain recycled content.

2.3 HOLLOW METAL DOORS AND TRANSOMS

- A. Fabricate exterior doors of 16 gauge and interior doors of 16 gauge bonderized hot-dip zinc coated steel in accordance with ASTM A653, galvanneal with a coating weight A60 for all doors.
- B. Types: Custom type, flush, seamless hollow construction with louvers or vision cutouts as shown or specified. Refer to Door Hardware section for mounting heights of hardware.
- C. Sizes and Thickness: Sizes shall be as indicated, and thickness shall be 1-3/4 inches unless otherwise specified or shown.
- D. Door Perimeters:
 - 1. Stile Edges:
 - (a) Reinforce stile edges full height with 16 gauge bonderized zinc coated steel channels. Seams shall be continuously welded and ground smooth. Fill and sand depressions.
 - (b) Reinforce door edge at each hinge location with minimum 7-gauge steel hinge reinforcement.
 - (c) Vertical Edges of Single Acting Doors: Bevel 1/8 inches in 2 inches.
 - 2. Door Tops:
 - (a) Reinforce door tops with full width, 16 gauge, bonderized, zinc coated, continuous, recessed steel channels, spot-welded to face sheets.
 - (b) All exterior door tops shall have flush, full width, 16 gauge, bonderized, zinc coated steel filler channel. Seams shall be welded and ground smooth. Fill and sand depressions to assure watertight.
 - 3. Door Bottoms:
 - (a) Reinforce door bottoms with full width 16 gauge bonderized zinc coated steel channels, spot welded to face sheets.
 - (b) Provide three 1/8-inch diameter weep holes in bottom channel of exterior doors.
- E. Stiffeners: Provide 22 gauge "Z" or high hat shaped vertical members spaced not more than 6 inches o.c. with welds 5-inch o.c. maximum.
- F. Core Fill: Mineral wool batt fiberglass blanket insulation. Pack insulation tight in all door panel cavities.
- G. Sound-Control Door Assemblies: Provide acoustical hollow metal door and frame assemblies for walls and partitions with STC ratings of 48 or more.
- H. Hardware Reinforcements:
 - 1. Mortise and reinforce as indicated on the Drawings, in this Section and as follows:
 - (a) Drill/tap for mortised hardware according to accepted door hardware schedule and templates furnished by hardware supplier.
 - (b) Drilling and tapping for surface applied hardware shall be done in the field.

- (c) Locate door hardware according to "Recommended Locations for Builder's Hardware," published by National Builders Hardware Association or as directed in Section 08710-Door Hardware.
 - (d) All door closers shall be through bolted with sex bolts.
 - 2. Butt (Hinge) reinforcing: Steel plate 3/16 inch (7 gauge) thick by 1-1/2 inch wide by 10 inches long. Offset and secured by not less than six spot welds.
- I. Light Opening in Doors:
- 1. Provide light openings of sizes indicated.
 - 2. At light opening cut outs, provide 16 gauge zinc coated steel channel closures welded into opening perimeter installed at factory.
 - 3. At light opening cut outs, provide 18 gauge bonderized zinc coated steel channel type stops tightly fitted to opening, with square and true butt joints.
 - (a) Drill and dimple countersink stops for fastenings. Provide zinc plated No. 6 oval head screws into opening frames at not over 12 inches o.c.
 - (b) Exterior stops shall be integral with opening frame, integral with door or welded in place.
 - 4. At exterior doors caulk perimeter seam between closure channel and door face sheet with grade exterior sealant prior to finish painting.
 - 5. All light openings shall be cut, reinforced and stops applied in the shop. No field cutting of the doors.
- J. Louvers: Louvers shall be 18 gauge, galvanized, inverted Y blades with mitered weld corners and counter sunk mounting holes with fasteners. Finish shall be manufactures standard prime paint or baked on enamel.

2.4 DOOR FRAMES

- A. Fabricate exterior and interior frames to profiles indicated of at least 16 gauge base metal thickness for all frames, bonderized hot-dip zinc coated sheet steel in accordance with ASTM A653, galvanealed with a coating weight of A60 for all frames.
- B. Types: Custom type, fully welded and ground smooth and flush, with faces mitered, and stops butted. Head and jamb members with integral stops and with combination buck and trim as shown. Knocked-down (KD) frames are not acceptable.
 - 1. Corners shall have continuous flush and smooth welds without dishing.
 - 2. Minimum stop depth shall be 5/8 inch.
 - 3. Refer to Door Hardware section for mounting heights of hardware.
- C. Hardware Reinforcements and Preparations:
 - 1. Frames shall be mortised, reinforced, and drilled/tapped for mortised hardware according to approved door hardware schedule and templates by hardware supplier.
 - (a) Drilling and tapping for surface applied hardware shall be done in the field.
 - (b) Locate door hardware according to "Recommended Locations for Builder's Hardware" published by National Builders Hardware Association or as directed in Door Hardware section.
 - 2. Butt (Hinge) Reinforcing:
 - (a) Top Hinge: Steel plate 3/16 inch thick (7 gauge) by full width of jamb by 10 inches long, offset as required to have faces of butts flush with doorframe edge and secured by not less than 12 spot welds.
 - (b) Other Hinges: Steel plate 3/16 inch thick (7 gauge) by 1-1/4 minimum by 10 inches long, offset as required to have faces of butts flush with doorframe edge and secured by not less than 12 spot welds.

3. Strike Reinforcement: Offset clips of 12-gauge steel, 1-1/2 inch x 3/4 inches longer than strike top and bottom.
4. Closer Shoe Reinforcing:
 - (a) 10 gauge steel plates (minimum 14 inches long) width of stop near corner of hinge jamb.
 - (b) Provide styrofoam or treated wood over plates to allow closer foot screws to seat without interference from grout fill.
- D. Silencer (Mute) Provisions: Punch frames to receive silencers on strike jamb (except in weather stripped frames) scheduled in Section 08710-Door Hardware. Provide 3 silencers for single door and 2 silencers for each leaf in pair of doors at head of frame. Install silencers before grouting.
- E. Grout Guards at Grouted Frames (refer to Installation below for locations): Provide at masonry openings only; 26 gauge sheet metal covers welded to the back of frames at hinges, lock, bolts, tapped reinforcements at hardware.
- F. Jamb Anchors for Masonry:
 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
- G. Jamb Anchors for Cast-In-Place Concrete:
 1. Provide "Hat" sections or "pipe spacers" standard to the manufacturer.
 2. Provide at least three anchors up to 7 feet 6 inches high opening and one anchor for each additional 30 inches of opening height or part thereof for both strike and hinge jambs.
 3. Provide complete with minimum 3/8-inch diameter cadmium plated flush head screw complete with expansion anchors.
- H. Jamb Anchors for Drywall Stud Partitions:
 1. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
- I. Floor Anchors: Provide minimum 14 gauge galvanized sheet steel angle shaped anchors for each jamb extending to the floor, punched for not less than two 3/16 inches diameter cadmium plated bolts and washers each side. Shim anchors to slab with nylon shims.
- J. Spreaders: Provide frames with temporary steel spreader bars tack welded to jambs to maintain full rigidity and proper alignment during installation.
- K. Security Switch Preparation: Refer to the Drawings.

2.5 FINISHING AND SHOP PAINTING

- A. After Fabrication: Grind exposed weld marks smooth and flush, clean and degrease surfaces, apply metallic filler, sand smooth, and apply shop coat of manufacturer's standard zinc-rich rust-inhibitive metal primer baked on.
- B. Prime Coat: Thoroughly cover all surfaces to provide uniform dry film thickness of not less than 1.0 mil without runs, smears, or bare spots. Do not paint over fire rating labels.
- C. Primer Coat: Use manufacturer's standard rust inhibiting primer complying with ANSI A210.10

2.6 ACCESSORIES

- A. Grout: Provide a mortar mix complying with ASTM C270a, Type S-1800-psi minimum UNO.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

A. Frames:

1. Install plumb, level, and true to line, secured in openings.
2. Install frames according to accepted shop drawings, manufacturer's printed instructions.
3. Fill door frames with grout (jambs and head) at concrete block and masonry walls exterior and interior.
4. Install fire-rated frames according to NFPA 80.
5. Fill surface depressions of hollow metal frames with metallic paste filler and grind smooth to finish.
6. Finish paint frames prior to hardware installation. Do not paint over fire rating labels.

B. Doors:

1. Install in openings plumb, level, and true to line.
2. Apply hardware and adjust to achieve smooth and quiet operation.
3. Install insect/rat screens on interior of exterior door louvers. At exterior doors, caulk perimeter seam between closure channel and doorframe sheet with paint grade exterior sealant, prior to finish paint.
4. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.
5. Finish paint doors prior to hardware installation. Do not paint over fire rating labels.

3.3 ADJUST AND CLEAN

- A. Prime Coat Touch-Up: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Protection Removal: Immediately before final inspection, remove protective plastic wrappings from prefinished doors.
- C. Final Adjustments: Check and readjust operating door hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition. Provide final adjustment as follows:
 1. Door Contact with Silencers: Doors shall strike a minimum of two silencers without binding lock or latch bolts in the strike plate.
 2. Head, Strike, and Hinge Jamb Margin: 1/8 inch.
 3. Meeting Edge Clearance, Pairs of Doors: 1/8 inch.
 4. Bolts and Screws: Leave tight and firmly seated.
 5. Soundseal gasketing: Full contact with no gaps.
 6. Vermin Protection:
 - (a) Drop Seal: Full contact with no gaps.
 - (b) Brush weatherstripping: Full contact.

END OF SECTION

SECTION 08 95 43 FLOOD VENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Provide engineered flood vents for wet floodproofing for use in humid locations susceptible to flooding by brackish water and saltwater. Refer to Drawings for number of flood vents required and locations. Included in the unit prices for the Prototype Restroom with Janitor Closet and Prototype Restroom with Office are the costs to provide these flood vents as shown in the Drawings.
- B. The flood vent shall be operable at all times of the year and shall not be blocked by landscaping, waste receptacles, vending machines, etc.

1.2 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Product offered and provided shall comply with the latest editions of the following:
 - 1. Florida Building Code (FBC).
 - 2. International Code Council (ICC) ICC-ES Acceptance Criteria for Mechanically Operated Flood Vents (AC364).
 - 3. FEMA Technical Bulletin 1: Openings in Foundation Walls and Walls of Enclosures (TB-1).
 - 4. National Flood Insurance Program (NFIP) Flood Insurance Manual.
 - 5. American Society of Civil Engineers (ASCE) Flood Resistant Design and Construction (ASCE 24).
- B. Flood vent shall be constructed from one of the following materials:
 - 1. Marine grade stainless steel (T316L)
 - 2. Stainless steel
- C. Construction Type: Flood vent shall be designed for installation within a masonry or concrete wall.
- D. Dimensions: approximately 8 inches high by 16 inches wide by at least 2 inches deep.
- E. Door Style: Bi-directional and self-pivoting without the need for electric or intervention.
- F. Colors: Offer at least three colors to choose from. If not specified on Drawings, color shall match the roof or wall louvers installed on the building.

1.3 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. ICC-ES approval
 - 5. FBC compliance
 - 6. FEMA/NFIP Acceptance
 - 7. Color selections
 - 8. Operation and maintenance guides from the flood vent manufacturer

1.4 WARRANTY

- A. Provide the manufacturer's minimum one-year warranty against product defects.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Smart Vent Products, Inc.: www.smartvent.com
- B. Or approved equal in accordance with Division 1.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect delivered product for finish, marring, etc. A time extension will not be provided due to failure to properly inspect and correct any deficiencies at time of delivery.
- B. Verify rough opening size matches requirements of the manufacturer.
- C. Inspect areas to receive flood vents. Notify the County Project Manager or Consultant of conditions that would adversely affect the installation or subsequent utilization of the louvers. Do not proceed with installation until unsatisfactory conditions are corrected.
- D. If opening preparation is the responsibility of another installer, notify the County Project Manager or Consultant of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Review and coordinate setting drawings, templates, and related items that are to be embedded in concrete and masonry.
- C. Verify that no obstructions exist that will interfere with the proper operation of the vents.
- D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 DELIVERY, STORAGE AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.
- C. Protect materials and finishes during handling and installation to prevent damage.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

3.4 SEQUENCING AND INSTALLATION

- A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
- B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress
- C. Install in accordance with manufacturer's instructions, FBC and ICC-ES requirements.
- D. Install vents plumb, level, square, true to line, and rigid.
- E. Attach vents securely in place using adhesives or fasteners supplied by or approved by the flood vent manufacturer.
- F. Separate incompatible materials to prevent galvanic corrosion.
- G. Adjust flood vents for proper operation.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Repair or replace damaged products before Final Completion.

END OF SECTION

SECTION 08 62 23 TUBULAR SKYLIGHT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide tubular daylighting devices and accessories.

1.2 RELATED SECTIONS

- A. Divisions 1 and 7 of the Project Manual.

1.3 ADDITIONAL REFERENCES

- A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. ASTM A 463/A 463M - Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process.
- D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process.
- E. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- F. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
- G. ASTM E 283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- H. ASTM E 308 - Standard Practice for Computing the Colors of Objects by Using the CIE System.
- I. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors.
- J. ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference.
- K. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- L. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricane.
- M. ASTM D 635 - Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position.
- N. ASTM D 1929 - Test Method for Ignition Properties of Plastics.
- O. ASTM D 2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics.
- P. ASTM F 1642 - Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loading.
- Q. ASTM F 2912 - Standard Specification for Glazing and Glazing Systems Subject to Airblast Loading.
- R. AAMA/WDMA/CSA 101/I.S.2/A440 - Standard/Specification for Windows, Doors, and Unit Skylights
- S. FM Standard 4431 - The Approval Standard for Skylights
- T. FEMA P-361 - Safe Rooms for Tornadoes and Hurricanes
- U. ICC 500 - Standard for the Design and Construction of Storm Shelters.

- V. UL 2108 - Low Voltage Lighting Systems
- W. GSA-TS01-2003: Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings
- X. Florida Building Code (FBC) Testing Application Standard (TAS) 201 - Impact Test Procedures.
- Y. FBC TAS 202 - Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure Loading.
- Z. FBC TAS 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading
- AA. OSHA 29 CFR - 1910.23 (e)(8) (Guarding Requirements for Skylights); 1926 Subpart M (Fall Protection); 1926.501(b)(4)(i); 1926.501(i)(2); 1926.501(b)(4)(ii).

1.4 PERFORMANCE REQUIREMENTS

- A. SOLATUBE BRIGHTEN UP 290 DS (Suspended or Open Ceilings)
 - 1. AAMA/WDMA/CSA 101/IS2/A440, Class CW-PG70 size tested 14 inch (356 mm), Type TDDCC.
 - a. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
 - b. Water Resistance Test:
 - 1) Passes water resistance; no uncontrolled water leakage with a pressure differential of 10.7 psf (512 Pa) or 15 percent of the design load (whichever is greater) and a water spray rate of 5 gallons/hour/sf for 24 minutes when tested in accordance with ICC-ES AC-16, ASTM E 547 and ASTM E 331.
 - c. Uniform Load Test: All units tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
 - 1) No breakage, permanent damage to fasteners, hardware parts, or damage to make system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 60 psf (2.87 kPa) in accordance with ICC AC-16 Section A, or Negative Load of 70 psf (3.35 kPa) if tested per ICC AC-16 Section B.
 - d. Hurricane Resistance:
 - 1) Meets Florida Building Code TAS, 201, TAS, 202 and TAS 203 for Impact and non-impact components.
 - 2) Meets ASTM E 1886 and ASTM E1996 for missile and cyclic pressure differential testing.
 - e. Fire Testing:
 - 1) When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the International Building Code.
 - 2) Self-Ignition Temperature - Greater than 650 degrees F per ASTM D-1929.
 - 3) Smoke Density: Rating no greater than 450 per ASTM E 84 in way intended for use. Classification C.
 - 4) Rate of Burn and/or Extent: Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D 635.
 - 5) Rate of Burn and/or Extent: Maximum Burn Extent: 1 inch (25 mm) Classification CC-1 per ASTM D 635.

1.5 SUBMITTALS

- A. Submit under provisions of the Submittal Procedures section of the Project Manual.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Data sheets showing roof dome assembly, flashing base, reflective tubes, diffuser assembly, and accessories.
 - 4. Installation requirements.
- C. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including rough opening and framing dimensions, anchorage, roof flashings and accessories.
- D. Verification Samples: As requested by County Project Manager or Consultant.
- E. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.
- F. LEED Submittals: Provide documentation of how the requirements of Credit will be met if LEED certification is required:
 - 1. List of Daylight Credits available for the products specified.
 - 2. Data on Energy Optimization Performance Credits for the products specified.
 - 3. Data on Perimeter and Non-Perimeter Controllability of Systems for use of Daylight Dimmer option with the products specified.
 - 4. Data on potential Innovation in Design Credits which may be available for the innovative use of the products specified.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Refer to Division 1 References section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.
- B. Store products in manufacturer's unopened packaging until ready for installation.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

- A. Daylighting Device: Manufacturer's standard warranty for at least 10 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Solatube International, Inc. www.solatube.com
- B. Or approved equal in accordance with Product Substitution Procedures section of the Project Manual.

2.2 TUBULAR DAYLIGHTING DEVICES

- A. Tubular Daylighting Devices General: Transparent roof-mounted skylight dome and self-flashing curb, reflective

tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.

B. Daylighting System

1. Solatube Brighten Up Series Model 290 DS (14 inch) or approved equal used for daylighting systems with suspended or hard ceilings. AAMA Type TDDCC.
2. Capture Zone:
 - a. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube. The following are components of Solatube but if
 - 1) Acrylic Dome Plus Shock Inner Dome Glazing: Solatube Type DAI, Inner dome is 0.115 inch (2.9 mm) minimum thickness classified as CC1 material or approved equal. High impact resistant injection molded acrylic required for high velocity wind zones.
 - 2) Tube Ring: Attached to top of base section; injection molded high impact acrylic; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.
 - 3) Dome Seal: Polyethylene foam seal, 2 PCF polyethylene foam.
 - 4) LightTracker Reflector, made of aluminum sheet, thickness 0.015 inch (0.4 mm) with Spectralight Infinity. Positioned in the dome to capture low angle sunlight.
 - b. Flashings:
 - 1) Roof Flashing Base:
 - a) One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M or ASTM A 792/A 792M.
 - 1) Base Pitched: Solatube Pitched Type FP or approved equal, 22.5 degrees slope from horizontal, 4 inches (102 mm) high.
3. Transfer Zone:
 - a. Extension Tubes: Aluminum sheet, thickness 0.015 inch (0.4 mm). At least one extension tube if required for diffuser mounting. Top and bottom 30 degree angle tubes are provided with the Solatube Brighten Up series.
 - 1) Reflective Tubes:
 - a) Reflective Extension Tube: Solatube Type EXX or approved equal with total length of run as indicated on the Drawings.
 - b) Interior Finish: Solatube Spectralight Infinity with INFRAREDuction Technology or approved equal combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance.
 - c) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
4. Delivery Zone:
 - a. Ceiling Ring: Injection molded impact resistant acrylic.
 - b. Ceiling Ring Seal: Polyethylene foam seal, white, 2 PCF polyethylene foam with low-tack pressure sensitive adhesive.
 - c. Upper glazing: PET GAG plastic with EPDM low density sponge seal to minimize condensation and bug, dirt, and air infiltration per ASTM E283.
 - 1) Natural Effect Lens: Type LN UNO on the Drawings.
 - d. Round Diffusers/Decorative Fixtures: Dual Glazed Diffuser Assembly.
 - 1) Lower glazing with integral injection molded acrylic Solatube Dress Ring or approved equal classified as CC2 material.

- a) Solatube Classic Vusion Diffuser Type L4 or approved equal, molded acrylic plastic classified as CC2 material with injection molded acrylic Diffuser Trim Ring UNO on the Drawings..

5. Solatube Product Number: S290DS-DAI-FP-EXX-L4-LN UNO on the Drawings.

2.3 ACCESSORIES

- A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.
- B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.
- C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and other conditions.
- C. If substrate and rough opening preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Coordinate requirements for power supply, conduit and wiring if applicable.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. Coordinate installation with substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing to ensure that each element of the Work performs properly and that finished installation is weather tight.
 - 1. Install flashing to produce weatherproof seal with curb and overlap with roofing system termination at top of curb.
 - 2. Provide thermal isolation when components penetrate or disrupt building insulation. Pack fibrous insulation in rough opening to maintain continuity of thermal barriers.
 - 3. Coordinate attachment and seal of perimeter air and vapor barrier material.
- C. Where metal surfaces of tubular unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, provide permanent separation as recommended by manufacturer
- D. Align device free of warp or twist, maintain dimensional tolerances.
- E. **After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Consultant, County Inspector or County Project Manager. Correct if needed before proceeding with installation of subsequent units.**
- F. Inspect installation to verify secure and proper mounting. Test each fixture to verify operation, control functions, and performance. Correct deficiencies.

3.4 CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08 71 00 DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish hardware items required for swinging doors indicated on schedules and/or shown on drawings including hinges, lock or latch sets, dead locks, cylinders, bolts, exit devices, push/pull units, closers and miscellaneous door control devices, protection plates, and other miscellaneous hardware.

1.2 SYSTEM DESCRIPTION

- A. Furnish labor and material to complete hardware work indicated, as specified, or as may be required by actual conditions at building.
- B. Include all necessary screws, bolts, expansion shields, and all other devices and accessories, if necessary, as required for proper hardware application. The hardware supplier assumes all responsibility for correct quantities.
- C. Ensure all hardware meets or exceeds the requirements of federal, state and local codes having jurisdiction over this project, notwithstanding any real or apparent conflict therewith in these specifications. This includes all ADA, wind load, and Owner's requirements.
- D. Exterior Doors: Open outwards 180 degrees (except when in an alcove or against 90 degree wall).
- E. Copies of the hardware schedule, templates and keying schedules: Shall be submitted and approved before ordering.

1.3 SUBMITTALS

- A. Before ordering any materials, prepare and submit shop drawings of all hardware materials with complete hardware schedule to Consultant or County Project Manager and Broward County Parks Maintenance Group for review. The hardware schedule shall be specific and conclusive with respect to catalog numbers, finishes, template requirements, type of fasteners and locations. Incomplete schedule will not be reviewed.
- B. At the completion of review, make corrections as directed and resubmit the corrected schedule for final approval.
- C. Approval of schedule will not relieve Contractor of the responsibility for furnishing all necessary hardware, including the responsibility for furnishing correct quantities.
- D. After the hardware schedule has been approved, coordinate with the door and frame manufacturers and any other trade affected. Furnish templates required by manufacturing contractors to facilitate accurate fitting and preparation for proper installation.
- E. Furnish templates in ample time to facilitate progress of work.
- F. Door numbers and hardware sets are not to be changed.
- G. Submit initial draft of hardware schedule at earliest possible date in order to facilitate the fabrication of other work, particularly hollow metal frames, which are critical in the project construction schedule. Include with schedule product data or other shop drawings and information essential to coordinated review of hardware schedule. Include in schedule installation dimensions for the benefit of the installer.
- H. Contractor: Check specified schedule against latest revised plans when making up schedule for approval. Schedule each door separately and, where practical, schedule item numbers the same as door numbers shown on drawings and schedules and in consecutive sequences.
- I. Submit final draft of hardware schedule, after approvals are complete, for use on project. Six copies are required.

- J. Prepare detailed keying schedule after obtaining Owner's instructions and requirements and submit for approval.
- K. Samples, if requested, shall be submitted to Consultant or County Project Manager for approval. Approved samples, if of proper finish, will be delivered to job for ultimate use; otherwise samples will be returned to contractor upon completion.
- L. Provide four sets of operating and maintenance manuals for all hardware.
- M. Complete current Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA).

1.4 QUALITY ASSURANCE

- A. Provide written guarantee that all materials furnished under this Section will be free from defects in materials and quality for a period of one year from date of final Certificate of Acceptance. Provide documentation for those products with longer warranties.
- B. Provide certification that all materials furnished have been properly located under provisions of the hardware schedule and installed under provisions of the manufacturer's instructions.
- C. Hardware supplier shall make three inspections: The first shall be just before installation, the second shall be a month later to verify that the items are being installed properly and in the proper location, and the third inspection shall be during the punch list phase to verify that items are properly installed, are in the correct location, and master-key system is maintained. Report improper application of hardware to Owner. The Owner's representative or Contractor may require additional meetings or inspections with proper notification to the hardware supplier.
- D. Ensure the provision, proper coordination and functioning of finish hardware required for all openings, whether or not hereinafter listed in the detailed schedule, including proper type of strike plates, length of spindle, hand, backset and bevel of locks, hand and degree opening for closers, length of kick plates, length of rods and flush bolts, type of door stop and other functions or mechanism to meet the requirements of the project.
- E. Fire-Rated Openings:
 - 1. Provide hardware for fire-rated openings in compliance with A.I.A. (NBFU) Pamphlet No. 80 and NFPA Standards No. 101. This requirement takes precedence over other requirements for such hardware. Provide only hardware that has been tested and listed by UL for the types and sizes of doors required, and complies with the requirements of the door and doorframe labels.
 - 2. Where panic exit devices are required on fire-rated doors, provide supplementary marking on door UL label indicating Fire Door to be equipped with fire exit hardware and provide UL label on exit device indicating "Fire Exit Hardware".
- F. Fasteners:
 - 1. Hardware shall conform to published templates generally prepared for machine screw or through-bolt installation.
 - 2. Furnish each item complete with all screws, through-bolts, or other fasteners required for installation.
 - 3. Concealed Type Fasteners: Furnish hardware units which have exposed screws with Phillips flat heads screws. Finished to match adjacent hardware.
 - 4. Install door closers and exit devices with closed head through bolts (sex bolts).
 - 5. Coordinate work with requirements of other sections.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Send duplicate lists of hardware in each shipment to the Contractor. The original list shall accompany the first shipment. The Owner shall not be responsible for shipping and delivery charges that shall be the hardware suppliers' responsibility.

- B. Coordinate delivery of hardware to respective shops of subcontractors as required. Ensure timely delivery of hardware components.
- C. Sort and deliver hardware to jobsite marked to correspond with item numbers of vendor's approved schedule and be specific as to exact opening and other locations for which items are packaged. Each door opening: receive separate item number of hardware schedule.
- D. Check all shipments to determine proper accessories and templates have been received.
- E. Deliver hardware only after detailed schedule, keying diagrams and samples have been approved.
- F. Provide secure lock-up for hardware delivered to the project. Control handling and installation of hardware items, which are not immediately replaceable so that the completion of the work will not be delayed by hardware losses.

1.6 WARRANTY

- A. Ensure material furnished is warranted for at least one year after installation or longer as the individual manufacturer's warranty permits. Provide documentation for items with a longer warranty.
- B. Mechanical Locks and Electronic Access Locks: Warranted in writing by the manufacturer against failure due to defective materials and quality, for a minimum period of seven years for cylindrical locks, a limited lifetime warranty for mortise locks and a minimum three-year warranty for electric locks commencing from the date of purchase. Exit devices shall be warranted for a minimum period of five years.
- C. Other Electronic Hardware Accessories (Power supplies, EL/RX/LX switches, etc.): Warranted for at least one year from Date of Purchase.
- D. Overhead Door Closers: Warranted in writing by the manufacturer against failure due to defective materials and quality, for a minimum period of 10 years commencing on the Date of Final Completion and Acceptance, and in the event of failure, the manufacturer is to promptly repair or replace the defective with no additional cost to the Owner.
- E. Submit copies of the certification of windstorm testing in compliance with the Florida Building Code (FBC) High Velocity Hurricane Zones (HVHZ) Protocols and required product Notice of Acceptance (NOA).

PART 2 PRODUCTS

2.1 HOLLOW METAL (HM) FRAMES

- A. Provide Levels and Models in accordance with ANSI/SDI A250.8 as indicated in the door schedule.
- B. Interior frames: Frame configuration and depth as indicated. Minimum thickness as follows:
 - 1. Level 3 Extra heavy-duty: For use with:
 - a. Door Model 2 (seamless design): 0.053 inch (1.3 mm) (16 gage) minimum steel frame thickness.
- C. Exterior frames: Provide in accordance with ANSI/SDI A250.8 in the frame configuration and depth as indicated on the Drawings. Minimum thickness as follows:
 - 1. Level 4 Maximum-duty: For use with:
 - a. Door Model 2 (seamless design): 0.067 inch (1.7 mm) (14 gage) minimum steel frame thickness.
- D. Provide units of galvanized steel in the following locations:
 - 1. Exterior openings, as noted on door schedule.
 - 2. Kitchens, as noted on door schedule.
 - 3. Toilets, as noted on door schedule.
 - 4. Washrooms and restrooms, as noted on door schedule.
 - 5. Showers, as noted on door schedule.

- E. Provide face welded type frames unless otherwise indicated.
- F. Provide frames, other than slip-on drywall type with a minimum of three anchors per jamb suitable for the adjoining wall construction. Provide anchors of not less than 0.042 inch (1.0 mm) in thickness or 0.167 inch (4.2 mm) diameter wire. Frames over 7 feet 6 inches (2286 mm) shall be provided with an additional anchor per jamb.
- G. Base anchors shall be provided, other than slip-on drywall type, with minimum thickness of 0.042 inch (1.0mm). For existing masonry wall conditions that do not allow for the use of a floor anchor, an additional jamb anchor shall be provided.
- H. Prepare all frames for all mortise template hardware and reinforced only for surface mounted hardware. Drilling and/or tapping shall be completed by others.
- I. Minimum hardware reinforcing gages shall comply with Table 4 of ANSI/SDI A250.8.

2.2 HOLLOW METAL (HM) DOORS

- A. Interior doors: Provide interior doors in accordance with ANSI/SDI A250.8 and in the configuration and sizes as indicated on the door schedule:
 - 1. Level 3 - Extra heavy-duty 1-3/4 inches (44.5 mm):
 - a. Model 2 - Seamless
- B. Exterior doors: Provide exterior doors in accordance with ANSI/SDI A250.8 and in the configuration and size as indicated on the door schedule:
 - 1. Level 4 - Maximum-duty 1-3/4 inches (44.5 mm):
 - a. Model 2 - Seamless
- C. Face steel sheet shall meet at least one or more of the following requirements:
 - 1. Level 3
 - a. Model 3 - 0.053 inch (1.3 mm) (16 gage) minimum thickness
 - 2. Level 4
 - a. Model 2 - 0.067 inch (1.7 mm) (14 gage) minimum thickness
- D. End closure: The top and bottom of the doors shall be closed with channels or closures. The channels or closures shall have a minimum material thickness of 0.042 inch (1.0 mm).
- E. Flush closure channels: Set back face of channel web flush with door top/bottom.

2.3 SOLID CORE FLUSH WOOD DOORS

- A. ANSI/WDMA I.S. 1A Quality Standard: Window and Door Manufactures Association Quality Standards for grade of door, core, construction, finish, and other requirements.
- B. ANSI/WDMA I.S. 1A, Extra Heavy Duty
- C. Solid Core Flush Wood Doors:
 - 1. 1-3/4 inches (45 mm) thick, staved lumber or particleboard core, 5-ply construction.
 - 2. Face Veneer: Medium density overlay (MDO) for painted finish *OR*
 - 3. Face Veneer: White maple, White birch, Red oak, White oak for transparent finish, see drawings.
 - 4. Adhesive: Interior Doors - Type II.
 - 5. Blocking for Hardware: Provide blocking such that no through bolting is required for hardware installation. Provide blocking for closers on all doors whether or not closers are scheduled.
- D. Smoke-and-Draft and Fire Rated Doors:
 - 1. 1-3/4 inches (45 mm) thick, match non-rated door appearance.

2. Fire Resistance Rating:
 - a. B Label: 1-1/2 hours.
 - b. C Label: 3/4 hour.
 3. Labels:
 - a. Comply with NFPA 252, UL 10C, and labeled by qualified testing and inspection agency showing fire resistance rating.
 - b. Metal labels with raised or incised markings.
 4. Core: Manufacturer's standard as allowed by labeling requirements.
 5. All Smoke-and-Draft and Fire Rated Doors shall be pre-cored on the hinge side, 3/8 inch diameter to the lock for installation of access control device. The center hinge must match center-to-center for transfer installation at the core.
- E. Finishing
1. Field Finished Doors: Seal top and bottom edges of doors with two coats of catalyzed polyurethane or water resistant sealer.
 2. Factory Transparent Finish: Factory finish flush wood doors.
 - 1 ANSI/WDMA I.S. 1A Section F-3 Finish System Descriptions for System 5, Conversion Varnish or System 7, Catalyzed Vinyl.
 3. Use stain when required to produce a stained finish.

2.3 FINISH (DOOR) HARDWARE

A. Submittals

1. Hardware Schedule: Submit a final hardware schedule in the manner indicated below. Coordinate hardware with the doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware. Based on finish hardware indicated, organize the hardware schedule into sets indicating complete designations of every item of hardware required for each door or opening. Include the following information:
 - a. Type, Style, Function, Size and Finish of the item of hardware.
 - b. Name and Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of hardware set, cross-referenced to the door number on the drawings and the hardware group in the specifications.
 - e. Explanations of all abbreviations symbol and codes on the schedule.
 - f. Door and Frame sizes and materials.
 - g. Mounting information: Location on door, degree of opening and co-ordination with other items.
 - h. Keying
 - i. Wiring Diagrams for all openings using electrically operated hardware.
 - j. Miami-Dade County NOA and pressure ratings.
2. Submit hardware schedule at the earliest possible date, as hardware schedule acceptance must precede fabrication of other work (i.e.: hollow metal frames), which are critical in the project construction schedule.

B. Minimum Warranties

1. Industry standard Life of Building Warranty for all hinges. Full replacement shall be made for failure of mechanical operation or finish.
2. Locksets: Written 5-year warranty issued by the manufacturer.
3. Exit Devices: Written 10-year warranty issued by the manufacturer.
4. Closers: Written 25-year warranty issued by the manufacturer.

C. Manufacturers:

1. Unless specifically noted otherwise in the Hardware Groups below, the following requirements shall apply.
2. All numbers and symbols used herein have been taken from catalogs of the following manufacturers.
3. *Some of the following items below are County standardized and may not allow for substitutions.*

PRODUCT	BASIS OF DESIGN	APPROVED EQUALS
a. Hinges	Hager	Stanley, Mont Hard
b. Locks & Latches	Marshall Best	Schlage
c. Cylinders, Keys	Marshall Best	Schlage Everest "C"
d. Exit Devices (Panic Bar)	Von Duprin	Marshall Best
e. Door Closers	LCN	American Eagle
f. OH Stops/Holders	Glynn Johnson	Sargent
g. Wall Stops/Floor Stops, Flushbolts	Glynn Johnson	Rockwood, Ives
h. Thresholds, Weatherstrip	National Guard	Pemko, Zero, Reese
i. Silencers	Glynn Johnson	Rockwood, Ives

4. If material manufactured by other than that specified or listed herewith as an equal, refer to the substitution and approved equal sections for submittal.
5. **If Contractor offers any of the approved equals above or a substitution, Contractor shall provide written evidence from the manufacturers that the substitution requested is fully compatible with the entire hardware system to be provided.**

D. Finishes:

1. General: Match finish of every hardware unit at each door opening except as noted or as otherwise indicated in the attached hardware groups. In general, match all items to the manufacturer's standard finish for the latch or lockset (or push and pull units) for the color and texture. All door hardware to be Brushed Stainless Steel, US32D, 630 except as noted in the schedule attached. Contractors will coordinate finish of hardware to be applied to aluminum doors with the storefront contractor.
2. At locations where tactile warnings are needed to meet the requirements of ADA, ANSI 117 or state and local codes; knobs, levers or crossbars will be "knurled" at the factory before finishing is applied to the base metal. Liquid abrasive or other field applied substances are NOT acceptable.
3. Satin Stainless Steel: US32D, BHMA 630: Exterior Hinges
4. Satin Chrome: US26D, BHMA 626: Lock, Latch, Cylinder, Exit Device trim; Overhead Stops and holders; Push, Pull and Kickplates; Wall and Floor Stops.
5. Satin Chrome: US26D, BHMA 652: Interior Hinges, Door Closers.
6. Aluminum: US27, BHMA 719: Thresholds; Weather-stripping; Astragals.

E. Keying:

1. All locks and cylinders shall be equip with patent protected and restricted key section, small format Interchangeable Core (SFIC) cylinders (by Marshall Best or Schlage "Everest C") with nickel silver blocking pin to check for patented feature on keys. Provide a minimum of 6 pins with nickel silver bottom pins. All permanent keys to be shipped directly from the factory to: Broward County Parks and Recreation Facilities Department, the name and location will be provided at a later date.
2. Contractor shall obtain written approval of keying schedule from the County before placing an order with the factory.
3. All locks and cylinders to be construction master keyed in a manner that does not require the cylinders to be removed.
4. Provide three (3) each change keys per lock and four (4) each grand master and master keys, and ten (10) construction master keys. All Keys to be patented.
5. All keys shall be stamped "DO NOT DUPLICATE".
6. All keys and cylinders will be stamped with the keying symbol (e.g. AA1, AC27) for Visual Key Control.

F. Locksets and Latches:

1. Locksets shall be "D" Series Cylindrical type, unless specified otherwise, in Rhodes Design as manufactured by the Schlage Lock Company.
2. Provide ANSI Grade 1 Extra Heavy Duty locksets at exterior locations and ANSI Grade 2 Heavy Duty locksets at interior locations.
3. Provide standard wrought box strike for each latch or lock; with a curved lip, extended to protect the frame without interfering with the opening. On pairs of doors, adjust LTC dimensions to clear the astragals.
4. Provide a 3/4 inch minimum throw latchbolt when used on pairs of doors. Provide the manufacturer's standard latchbolt on all other units.
5. Provide a knurled lever on the public side of all openings to mechanical and electrical rooms, stairwells or other areas that are a danger to persons with limited visual ability. Refer to ANSI. 117 and current ADA standards for requirements.

G. Exit Devices:

1. Exit devices shall be Von Duprin 98 or 55 Series in types and functions specified. All devices must be listed under "Panic Hardware" in accident equipment list of Underwriters Laboratories. All labeled doors with "Fire Exit Hardware" must have labels attached and be in strict accordance with Underwriters Laboratories.
2. All exit devices shall be tested to ANSI/BHMA A156.3 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 1,000,000 cycles must be provided.
3. All surface strikes shall be roller type and come complete with a plate underneath to prevent movement. And shall be provided with a dead-latching feature to prevent latchbolt tampering.
 - a. Except on fire rated openings, wherever closers are used with exit devices; equip units with a Cylinder operated dogging device to hold the push bar depressed and the latchbolt in a retracted position.
4. All exit devices, delayed egress units and electronically controlled exit operators are to be by one manufacturer. Electronically operated units to be applied to fire rated openings cannot be modified in the field or shop after the manufacturer has applied label.
5. All exit devices on exterior openings will have a deadlocking latchbolt feature, preventing manipulation of the latchbolt when the door is closed.
6. All exit devices will have a *stainless steel* push bar. Chassis and baseplate will be extra heavy-duty double walled stainless steel.
7. Contractor will provide factory prepared spacers to allow exit devices to clear applied moldings, window trims and decorative appliqué on doors. Spacers will be from the exit device manufacturer and finished to match devices.

H. Hinges and Pivots:

1. Exterior hinges shall be Stainless Steel. Hinges on all out swinging doors shall be furnished with non-removable pins (NRP).
2. All hinges will be manufactured to the standard template (ANSI 156.1) and supplied with Phillips flat head machine or wood screws as appropriate. Finish screw head to match exposed surface of hinges.
3. Except as otherwise indicated; provide hinge pins as follows:
 - a. Steel Hinges: Steel hinge pins.
 - b. Non-ferrous hinges: Stainless Steel hinge pins.
 - c. Exterior and locking outswing doors: Non-removable pins.
 - d. Interior doors: Non-rising pins.
 - i. Tips: Flush button and plugs, finished to match the leaf except where HT (hospital tip) is indicated.
 - ii. Three knuckle concealed bearing type hinges.
4. Number of Hinges: Provide the number of hinges indicated but not less than 3 hinges for each door leaf up to 90 inches in height and one additional hinge for each 30 inches of height. One Center Pivot will be supplied on all door leaves up to 86 inches in height. Additional Center pivot will be provided for each 30 inches of height. Doors that are oversized will be supplied with additional hinges or pivots as indicated in the schedule.

5. Hinges will be a minimum of 4-1/2 inches in height and 0.134 thick. Width of hinge shall be sufficient to provide clearance for trim, applied door panels, frame moldings and door thickness.

I. Door Closers:

1. All closers shall be LCN 4041 Series having non-ferrous covers, forged steel arms separate valves for adjusting backcheck, closing and latching cycles and adjustable spring to provide up to 50% increase in spring power. Closers shall be furnished with parallel arm mounted on all doors opening into corridors or other public spaces and shall be mounted to permit 180 degrees door swing wherever wall conditions permit. Furnish with non-hold open arms unless otherwise indicated.
2. Door closer cylinders shall be of high strength cast iron construction to provide low wear operating capabilities of internal parts throughout the life of the installation. All door closers shall be tested to ANSI/BHMA A156.4 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 10,000,000 cycles must be provided.
3. Door closers shall utilize temperature stable fluid capable of withstanding temperature ranges of 120 degrees Fahrenheit to -30 degrees Fahrenheit, without requiring seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with the standards UBC 7-2 (1997) and UL 10C.
4. Door closers shall incorporate tamper resistant non-critical screw valves of V-slot design to reduce possible clogging from particles within the closer. Closers shall have separate and independent screw valve adjustments for latch speed, general speed, and hydraulic backcheck. Backcheck shall be properly located so as to effectively slow the swing of the door at a minimum of 10 degrees in advance of the dead stop location to protect the door frame and hardware from damage. Pressure relief valves (PRV) are not acceptable.
5. Unless otherwise specified, comply with the manufacturer's recommendations for the size of the closers and door control devices, depending on the size of the door, exposure to the weather and the anticipated frequency of use.
6. The opening force required to operate a door must be in compliance with the current ADA guidelines for the interior and exterior openings.
7. Use the regular arm, parallel arm or top jamb mounted position to locate the closer for the maximum degree of efficiency and to place the closer out of sight wherever possible. Closers will be located on the interior side of the opening where possible.

J. Door Silencers:

1. Furnish rubber door silencers equal to Glynn Johnson GJ64 for all new interior hollow metal frames, (2) per pair and (3) per single door frame.

K. Door Stops:

1. Doorstops shall be furnished for all doors to prevent damage to doors or hardware from striking adjacent walls or fixtures. Wall bumpers equal to Glynn Johnson 60W Series are preferred. Floor type stops are not to be used. Where conditions prohibit the use of wall stops, furnish surface mounted overhead stops equal to Glynn Johnson, 450 Series.

L. Trim and Plates:

1. Push, Pull, Kick, Mop, and Armor plates:
2. For exterior locations, these shall be Stainless Steel Type 304 or better
3. For interior locations, provide .050 gauge.
4. Kick plates to be 8 inches high.
5. All plates shall be two (2) inches less full width of door.

M. Thresholds and Weatherstrip:

1. Set all thresholds in a full bed of caulk.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine openings scheduled to receive hardware. Repair openings requiring corrective work prior to installation of hardware.

3.2 INSTALLATION

- A. Prior to installing any hardware or locksets, the Consultant or County Project Manager shall arrange a meeting with the Contractor, the hardware/door/frame supplier, County staff, the lockset manufacturer's representatives and the hardware installer to review installers' qualifications, installation, any special requirements, etc. Installer shall have experience in commercial/institutional hardware installations.
- B. Apply and install all hardware under provisions of the Finish Hardware Schedule. Exercise care not to mar or damage adjacent Work.
- C. Install hardware under provisions of manufacturer's installation instructions; unless otherwise indicated.
- D. Provide a secure lock-up for hardware delivered to the project but not yet installed.
- E. Control the handling and installation of hardware items that are not immediately replaceable, so that the completion of the Work will not be delayed by hardware losses both before and after installation.
- F. Placement of Hardware: Install hardware at following heights and locations (unless otherwise indicated, heights are shown from finish floor to center line of item).
 - 1. Hinges:
 - (a) Top: 5 inches from top of door to top of hinge.
 - (b) Bottom: 10 inches from finished floor to bottom of hinge.
 - (c) Intermediate: Center between top and bottom hinges.
 - (d) On Dutch Doors: 5 inches from top of door to top of hinge; 10 inches from finished floor to bottom of bottom hinge; 5 inches from split line to top and bottom respectively of lower and upper intermediate hinges.
 - 2. Cylindrical Lockset: 36 inches
 - 3. Deadlock/Dead latch 48 inches maximum
 - 4. Push Plate: 48 inches
 - 5. Pull Plate: 42 inches
 - 6. Panic Bar: 38 inches
 - 7. Kick Plate: 1/4 inch from door bottom
 - 8. Closer: Per manufacturer's template to give maximum degree of opening. Mount closers on room side of door.
- G. Stops and Holders:
 - 1. Wall: On block wall or stud wall where knob or pull hits. Provide wood blocking
 - 2. Overhead Door Holder: Per template.
 - 3. Door Holder: 2 inches from lead edge of door.

3.3 ADJUSTING AND CLEANING

- A. Adjust all hardware under strict provisions of manufacturer's instructions. Prior to turning project over to County, clean and make final adjustments to the finish hardware.

3.4 PROTECTION

- A. Protect all hardware, as it is stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase.

END OF SECTION

SECTION 08 91 19 FIXED LOUVERS

PART 1 GENERAL

1.1 SUMMARY

- A. Provide extruded aluminum, stationary, rain-resistant wall louvers for the purpose of providing fresh air intake.

1.2 ADDITIONAL REFERENCES

- A. American Architectural Manufacturers Association (AAMA) 2604 – High Performance Organic Coatings on Architectural Extrusions and Panels.
- B. AAMA 2605 - High Performance Organic Coatings on Architectural Extrusions and Panels
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
- D. Air Movement and Control Association (AMCA) 500 - Test Methods for Louvers, Dampers and Shutters.
- E. AMCA 511 - Certified Ratings Program for Air Control Devices.
- F. AMCA 540 - Test Method for Louvers Impacted by Windborne Debris – Enhanced Protection.
- G. AMCA 550 - Test Method for High Velocity Wind Driven Rain Resistant Louvers (if applicable).
- H. American Society of Civil Engineers (ASCE) - Minimum Design Loads for Buildings and Other Structures.
- I. American Society for Testing of Materials (ASTM) D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
- J. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
- K. ASTM D2244 - Standard Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- L. Miami-Dade County Notice of Acceptance (NOA).
- M. Florida Building Code (FBC): Testing Application Standard (TAS) No. 201 Large and Small Missile Test Standards.
- N. FBC: Testing Application Standard (TAS) No. 202 Uniform Structural Load Standards.
- O. FBC: Testing Application Standard (TAS) No.203 Uniform Cyclic Pressure Test Standards.
- P. USGBC: U.S. Green Building Council LEED® Rating System (if required for LEED certification)

1.3 ADDITIONAL DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.
- C. Vertical Louver: Louver with vertical blades; i.e., the axes of the blades are vertical.
- D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.
- E. Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Product Data: For each product to be used, including:
 - 1. Manufacturer's product data including performance data.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. Sustainable Documentation Submittals: LEED Rating System (if required for LEED certification)
 - 1. Certificates for Credit EA 1 - Optimize Energy Performance: Design the building envelope and building systems to maximize energy performance.

- a. Provide certificate verifying louver water infiltration and ventilation performance to verify design assumptions and calculations.
- 2. Certificates for Credit MR 4 - Recycled Content: Increase demand for building products that incorporate recycled content materials, therefore reducing impacts resulting from extraction and processing of new virgin materials.
 - a. Percentage of recycled content showing cost and percentage(s) of post-consumer and/or post-industrial content, and the total cost of materials for the louver.
- D. Shop Drawings:
 - 1. Submit shop drawings indicating materials, construction, dimensions, accessories, and installation details in accordance with Division 1.
- E. Samples: Submit sample of louver to show frame, color, blades and insect screen.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Test Reports: For each type of louver, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For manufacturer's warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Refer to Division 1 sections on References and Quality.
- B. Product Qualifications:
 - 1. Louvers licensed to bear AMCA Certified Ratings Seal. Ratings based on tests and procedures performed in accordance with AMCA 511 and comply with AMCA Certified Ratings Program. AMCA Certified Ratings Seal applies to air performance and water penetration ratings.
 - 2. Miami-Dade County approved louvers for use in open structures that have the ability to drain water that may penetrate. Approval based on tests and procedures performed in accordance with test protocols TAS-201, TAS-202 and TAS-203.

1.7 WARRANTY

- A. Manufacturer shall provide a warranty for finish on extruded aluminum substrates.
 - 1. Finish coating shall not peel, blister, chip, crack or check.
 - 2. Chalking, fading or erosion of finish when measured by the following tests:
 - a. Finish coating shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D4214.
 - b. Finish coating shall not change color or fade in excess of 5 Delta-E Hunter units as determined by ASTM D2244 and ASTM D822.
 - c. Finish coating shall not erode at a rate in excess of 10%/ 5 year as determined by Florida test sample.
 - d. Refer to the finish for the minimum warranty period.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Ruskin Company; www.ruskin.com
- B. Or approved equal in accordance with Division 1.

2.2 STATIONARY BLADE LOUVER

- A. Basis of Design: Model ELF6375DXD as manufactured by Ruskin Company UNO.
- B. Fabrication:
 - 1. Design: Extruded aluminum, stationary louvers with horizontally mounted drainable blades.
 - 2. Load Bearing: Not required.
 - 3. Application: Miami-Dade Approved Product (NOA) for use in open structures or installations where the enclosed space is designed to accommodate water infiltration (wet rooms).
 - 4. Miami-Dade County Protocols Compliance/NOA:
 - a. TAS-201 Large and Small Missile Impact Test.
 - b. TAS-202 Uniform Static Air Pressure Test.
 - c. TAS-203 Cyclic Wind Pressure Test
 - 5. Frame:
 - a. Maximum Frame Depth: 8 inches, nominal.
 - b. Material: Extruded aluminum, Alloy 6063-T6.
 - 6. Blades:
 - a. Style: Drainable, horizontally mounted.
 - b. Material: Extruded aluminum, Alloy 6063-T6.
 - 7. Assembly Size: Refer to Drawings.

2.3 ACCESSORIES

- A. Insect Screens:
 - 1. Aluminum: 18-16 mesh, mill finish, approximately 0.011 inch (0.3 mm) wire.
 - 2. Frame: Aluminum.

2.4 FINISHES

- A. Provide one of the following finishes and colors as detailed in the Drawings UNO. If no color is specified, match the roof and gutter color.
 - 1. Color Finish: 70 percent PVDF using Kynar 500, Hylar 5000 or approved equal. Finish shall be applied at approximately 1.2 mils total dry film thickness.
 - a. Coating shall conform to AAMA 2605.
 - b. Apply coating following cleaning and pre-treatment.
 - c. Minimum Finish Warranty: 20 years.
 - 2. Clear Anodized Finish, Class I:
 - a. Clear anodized finish of 215-R1 for corrosion-resistance.
 - b. Apply finish following chemical etching and pre-treatment.

- c. Minimum Thickness: 0.7 mils (0.018 mm).
- d. Minimum Finish Warranty: 5 years.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.
- C. Protect materials and finishes during handling and installation to prevent damage.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

3.2 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.
- B. Do not install products under environmental conditions outside manufacturer's absolute limits.

3.3 EXAMINATION

- A. Inspect delivered product for finish, marring, etc. A time extension will not be provided due to failure to properly inspect and correct any deficiencies at time of delivery.
- B. Inspect areas to receive louvers. Notify the County Project Manager or Consultant of conditions that would adversely affect the installation or subsequent utilization of the louvers. Do not proceed with installation until unsatisfactory conditions are corrected.
- C. If opening preparation is the responsibility of another installer, notify the County Project Manager or Consultant of unsatisfactory preparation before proceeding.

3.4 PREPARATION

- A. Clean opening thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.5 INSTALLATION

- A. Install louvers at locations indicated on the drawings and in accordance with manufacturer's instructions and NOA.
- B. Install louvers plumb, level, in plane of wall, and in alignment with adjacent work.
- C. The supporting structure shall be designed to accommodate the point loads transferred by the louvers when subject to the design wind loads. Louvers shall be secured to a structural substrate in accordance with NOA.
- D. Install joint sealants as specified in Division 7.

3.6 CLEANING

- A. Clean louver surfaces in accordance with manufacturer's instructions.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

09 24 00 CEMENT PLASTERING (STUCCO)

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Portland Cement Plaster (stucco), includes but are not limited to, the following:
 - 1. Exterior and interior Portland cement plaster.
 - 2. Interior skim coat over masonry.
- B. Portland Cement Plaster for installation over metal lath, masonry, concrete, and solid backing.
- C. Accessories.

1.2 REFERENCES

- A. ASTM (American Society for Testing and Materials):
 - 1. A641-Zinc-Coated (Galvanized) Carbon Steel Wire.
 - 2. C91-Masonry Cement.
 - 3. C847-Metal Lath.
 - 4. C897-Aggregate for Job-Mixed Portland Cement-Based Plasters.
 - 5. C926-Application of Portland Cement-Based Plaster.
 - 6. C1063- Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.
 - 7. C1116-Fiber-Reinforced Concrete and Shotcrete.
 - 8. C1328-Plastic (Stucco) Cement.
 - 9. D1784-Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- B. Florida Building Code (FBC).
- C. Portland Cement Association (PCA) Portland Cement Plaster (Stucco) Manual.

1.3 SUBMITTALS

- A. Submit product data and manufacturer's installation instructions for each product, including data showing compliance with requirements.
- B. Provide product data on stucco materials and accessories, including characteristics and limitations of products specified.
- C. Material Certificates: Submit producer's certificate for each kind of plaster aggregate indicating materials comply with requirements.
- D. Test Reports: Provide test reports from an independent laboratory certifying that cement, sand aggregate and other stucco mix components are free from contaminants and low alkalinity.

1.4 QUALITY ASSURANCE

- A. Applicator: Shall be experienced in the services to be provided; refer to Division 1 for more information.
- B. Except as modified herein, apply cement plaster under provisions of the Florida Building Code, PCA Plaster (stucco) Manual, and ASTM C926. Maintain one copy of each standard on site.
- C. Suspension systems exposed to wind shall be designed by a Florida Registered Architect or Professional Engineer. Shop drawings shall be submitted in accordance with the design specified.
- D. All work shall be performed in accordance with referenced standards.

1.5 MOCK-UP

- A. Before installation of plaster Work, fabricate mock-up panels for each type of finish and application required using materials, including lath and support system, indicated for final Work.

- B. Install sample panels 4 feet x 4 feet (minimum) x full thickness in location indicated, or if not otherwise indicated, as directed by Project Consultant. Panels may form a part of the finished work if installed under provisions of the design parameters.
- C. Demonstrate proposed range of color, texture and installation to be expected in completed Work.
- D. Obtain Project Consultant and Owner's acceptance of panel's visual quality before start of Work.
- E. Retain panel during construction as standard for judging completed Work.

1.6 PRE-INSTALLATION MEETING

- A. Shall not occur without Shop Drawings approved by the Contractor and accepted by the Consultant or County Project Manager. Shall convene a minimum of two weeks before starting work of this section.
- B. Required Attendees:
 - 1. Contractor's Superintendent.
 - 2. Applicator.
 - 3. Any other subcontractors with associated work.
 - 4. Consultant
 - 5. County Project Manager.
- C. The Contractor shall make arrangements for the meeting and notify the parties required to attend.
- D. Agenda shall include:
 - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - 2. Review plastering requirements (drawings, specifications, and other contract documents).
 - 3. Review Shop Drawings and associated submittals.
 - 4. Review manufacturer's technical materials.
 - 5. Review and finalize construction schedule related to plastering work and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays.
 - 6. Review required inspection, testing, certifying and material usage accounting procedures.
 - 7. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including temporary coverings or enclosures.
 - 8. Tour representative areas receiving plastering, inspect and discuss condition of the substrate, and other preparatory work performed by other trades.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver all products in original packages or containers bearing brand name and identification of manufacturer.
- B. Store all bag materials inside, under cover and in a manner to keep them dry and protected from contamination and deterioration.
- C. Note: Place sand under cover and in a manner to keep it lightly damp and prevent intrusion of foreign materials.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply stucco when substrate or ambient air temperature is less than 45 degrees Fahrenheit nor no more than 90 degrees Fahrenheit, with a humidity index of less 75, or up to 95 degrees Fahrenheit with a humidity index is in excess of 75.
- B. Maintain minimum ambient temperature of 45 degrees Fahrenheit during and after installation of plaster for not less than 48 hours.
- C. Protect stucco against uneven and excessive evaporation and from blasts of dry air. Apply and cure stucco as required by climatic and job conditions to prevent rapid dryout. Provide suitable coverings, moist curing, and barriers to deflect direct sunlight and wind, or combination thereof.

1.9 MINIMUM WARRANTY

- A. Provide a minimum 5-year unconditional written Guarantee or Warranty covering all quality (a/k/a workmanship) and materials. Said Guarantee: Under provisions of all stipulations and requirements stated in the General Conditions. All such Guarantees: commence at the date of Substantial Completion and/or date of acceptance of

project by Owner, and must include labor and materials to provide repair or replacement of stucco and all finishes including painting, sealants, signage and other components.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Masonry Cement Type S (ASTM C91) or Plastic (Stucco) Cement Type S (ASTM C1328).
- B. Approved Manufacturers of a Portland Stucco System, which contains an integral water-retarding agent, conforming to ASTM C926.
1. Vulcan Material; Product: Florida Super Stucco Cement.
 2. Cemex; Product: CEMEX Broco Stucco Cement or Rinker Stucco Cement.
 3. Titan America; Product: Stucco Cement.
- C. Aggregate (Conforming to ASTM C897):
1. Sand:
 - (a) Clean, hard, natural sand.
 - (b) Manufactured within the following limits:

Sieve Size	Percent Retained	
No. 4	Min 0	Max 0
No. 8	Min 0	Max 10
No. 16	Min 10	Max 40
No. 30	Min 30	Max 65
No. 50	Min 60	Max 80
No. 100	Min 75	Max 100
No. 200	Min 90	Max 100
- D. Water for mixing and curing Portland cement plaster: Potable, clean, free of contaminants such as; oil, acids, alkali, vegetable matter, salts or other deleterious materials.

2.2 ADMIXTURES

- A. Bonding Agent:
1. A non-re-emulsifiable acrylic emulsion. To be used as integrally mixed product when recommended by the Portland Cement-based Stucco manufacturer.
 - (a) Approved Products:
 - (1) BASF; Product: Thoroseal/Acryl 60.
 - (2) Dana Marine Lab, Inc.; Tuf-Link.
 - (3) Lambert, Inc.; Product: Acrylbond.
 2. Deliver products to job site premixed in the water at specified ratios.
- B. Glass Fibers: Alkali resistant glass fibers conforming to ASTM C1116 (100 percent virgin polypropylene in microfilament form): Micro fiber by Grace Construction Products or approved equal.

2.3 LATH

- A. Manufacturer: Tilath, as manufactured by Alabama Metal Industries Corporation (AMICO), United States Gypsum Company (USG) or approved equal. Comply with ASTM C847.
1. Metal Lath: Galvanized
 2. For Overhead Installation: 3/8-inch rib lath, 3.4 pounds per square yard.
 3. For Vertical Stucco Installation: Diamond Mesh, 3.4 pounds per square yard.

- B. Paper-backed Wire Fabric Lath: FS-UU-B-690a, Type I, Grade D, Style 2, Asphalt impregnated paper factory-bonded to back; USG Paper backed Metal Lath or approved equal.
- C. Fasteners: Clips, screws, nails, staples, wire ties, loops, power actuated fasteners, and as recommended by the manufacturer of the lath system. Comply with ASTM C1063.

2.4 FRAMING

- A. Channels: Cold Rolled Steel, 16 gage, galvanized.
 - 1. Main Runner: 1-1/2 inch, 475 pounds/1000 feet.
 - 2. Cross Furring Channels: 3/4 inch, 300 pounds/1000 feet.

2.5 HANGERS

- A. Tie Wire: Conform to ASTM A 641 with Class I zinc coated (galvanized), soft tempered steel.
 - 1. Support of main runners: No. 9 gage.
 - 2. Support of cross furring: No. 18 gage.
 - 3. Support of wire lath: No. 18 gage.
- B. Rod: Cold Drawn, Mild Steel, galvanized, 1/4 inch Diameter.
- C. Strap: Flat Mild Steel, galvanized, 3/16 inch x 1 inch.

2.6 ACCESSORIES

- A. Manufacturers
 - 1. Approved Manufacturers: Subject to compliance with the specified requirements, provide products by one of the following approved manufacturers:
 - (a) Plastic Components, Inc. (PCI)
 - (b) Vinyl Corporation
 - (c) Or approved equal
- B. Accessories, Beads, and Moldings (may be used on wire lath and/or interior applications only): Extruded Polyvinylchloride (PVC). Provide in profile and locations shown on drawings.
- C. Slip Joint and Expansion Joint Moldings (may be on exterior masonry, concrete surfaces, wire lath and/or interior applications only):
 - 1. PCI Slip Joint/Expansion Joint #'s 2079 through 2082, #'s 500-38 through 501-78 and Inside Corner Slip Joint #'s 511-38 through 511-78.
 - 2. Conform to ASTM D1784, Type II, C1063 and D4216
 - 3. 0.050-inch thick polyvinylchloride (PVC).
 - 4. Color: off-white.
 - 5. Size: 10 foot lengths.
 - 6. Provide with the following accessories:
 - (a) Connector clips: Polyvinylchloride (PVC) plastic clips for aligning continuous lengths of molding.
 - (b) Notch-Lok Connections: Polyvinylchloride back plates for aligning intersecting lengths of moldings.
 - (c) "+" and "T" Intersections: Factory fabricated intersections used to connect horizontal and vertical joints of moldings.
- D. Reveal Moldings (may be on exterior masonry, concrete surfaces, wire lath and/or interior applications only):
 - 1. PCI "F" Plaster Reveal #'s F707-38 through F714-78.
 - 2. Conform to ASTM D1784, Type II, C1063 and D4216.
 - 3. 0.050-inch thick polyvinylchloride (PVC).

4. Color: Off-white.
 5. Size: 10 foot lengths.
- E. Exterior Building Structural Joints over masonry and concrete:
1. PCI Standard Flange Casing Beads #'s 1025 through 1078, "T" Bar Casing Beads #'s 1100 through 1200+ and Plaster Stops #'s 6625 through 66100B.
 2. Conform to ASTM D1784, Type II, C1063 and D4216
 3. 0.050 inch thick Polyvinylchloride (PVC).
 4. Color: Off-white.
 5. Size: 10 foot lengths.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive Work.
- B. Verify all surfaces to receive plaster are true and plumb within their allowable tolerance. Notify Consultant and County Project Manager if deficiencies exist and submit proposed remedy of deficiencies. Do not proceed with work of this section without acceptance of proposed remedy by the Consultant or County Project Manager.
- C. Concealed Supports and Blocking: Verify items have been installed in proper locations.
- D. Mechanical and Electrical: Verify services within walls and soffits have been installed, tested and approved.

3.2 PREPARATION

- A. Protect other work and building surfaces from splattered stucco.
- B. Clean all exterior block surfaces with a acid based masonry cleaner and wash masonry cleaner off by pressure washing all exterior block surfaces with a machine providing 2,500 p.s.i. at 45 degree angle to remove all foreign matter and form oil from masonry and concrete surfaces. All concrete surfaces shall be prepared to receive plaster to comply with ASTM C926.
- C. Notify the Consultant or County Project Manager, in writing, of deficiencies in the plane to receive plaster. Tuckpoint bee-holes in all masonry joints and tuckpoint honeycombing in cast-in-place concrete with an ASTM C270 tuckpoint mortar to provide flush, true surfaces to receive plaster.
- D. On exterior masonry and concrete surfaces install temporary grounds and screeds as necessary to strike off plaster to true surfaces (strip-forming). The use of permanent corner beads, fabricated control joints, grounds screeds, recesses, etc. on exterior masonry and cast-in-place concrete surfaces are not allowed, except at building structural expansion joints.
- E. On wire lath and/or interior applications:
 1. Install corner beads, control joints, expansion joints and accessories indicated on drawings and noted within this section true and plumb, using maximum lengths available. At intersections of such joints or accessories, the vertical element shall remain continuous and the horizontal element interrupted at such intersection.
 2. Anchor corner and casing beads securely to substrate.
 3. Expansion and control joints: Tied to the wire lath and not to substrate.
 4. Wire lath: Do not extend through expansion or control joints.
- F. Do not apply plaster until electrician has protected all boxes.
- G. Conceal all piping, conduit, etc. which cannot be concealed in walls, columns, or soffits with wire lath and plaster.
- H. Application of Applied Bonding Agent.
 1. Exterior Surfaces:
 - (a) **DO NOT APPLY BONDING AGENT OF ANY KIND.**
 - (b) Dampen exterior surfaces prior to the application of plaster.
 - (c) Verify the surface is free of visible standing water prior to installing plaster.

2. Interior Surfaces: Note: Only on surfaces not subjected to water immersion or high humidity.
 - (a) Clean concrete surfaces of foreign matter. Thoroughly dampen surfaces before using acid solutions, solvent, or detergents to perform cleaning. Wash surfaces with clean water.
 - (b) Apply specified bonding agent with a brush or roller on cast-in-place concrete.
 - (c) Dampen concrete and masonry surfaces prior to the application of plaster and maintain in a moist condition throughout the course of application.
 - (d) Verify the surface is free of visible standing water prior to installing plaster.

3.3 INSTALLATION-LATHING MATERIALS and ACCESSORIES

- A. Installation to conform to ASTM C1063; except as modified herein.
- B. Install main runners at 48 inches on center (maximum) with their supports at 36 inches on center or install main runners at 36 inches on center (maximum) with their supports at 48 inches on center. Install main runners within 6 inches of walls paralleling, to support ends of cross furring. Where system is exposed to wind up-lift, provide vertical stiff legs equal to main runners or better at 8 feet on center (maximum) each way, or closer if required due to uplift loading.
- C. Install cross furring for overhead applications at 16 inches on center (maximum) and for vertical application at 24 inches on center (maximum). Saddle tie furring channels to each main runners with doubled No. 18 tie wire. The span of cross furring: 48 inches on center (maximum).
- D. Apply lath taut, with long dimension perpendicular to supports. Tie lath to supports with No. 18 wire at 6 inches on center for horizontal installation and 9 inches on center for vertical installation.
- E. Lap ends of lath a minimum 1 inch to 1-1/4 inch (maximum). Nest ribs of rib lath at end laps. Secure end laps with tie wire. End laps: shall occur over supports.
- F. Lap sides of diamond mesh lath together a minimum 1/2 inch to a maximum of 1 inch. Nest outside ribs of rib lath together and secure with wire.
- G. Place strip mesh diagonally at corners of lathed openings. Secure rigidly in place.
- H. Where dissimilar materials abut, provide a continuous expansion joint and joint molding. Wire lath and supports: Do not extend through the joint. At frame conditions, double stud each side of expansion joints.
- I. Place expanded casing beads (Stucco Stop) at termination of stucco finishes and finishes between concrete and framing. Butt and align ends. Secure rigidly in place.
- J. Independently support light fixtures, air-conditioning vents, etc.
- K. Install accessories to required lines and levels.
- L. Stucco shall be cut back 1/4 inch from all penetrations through the plaster coat to allow for expansion and contraction of dissimilar materials. A backer rod and sealants shall be placed in separation created.

3.4 CEMENT PLASTER MIXES

- A. Applications-Masonry, concrete and Wire Lath:
 1. Dash-bond Coat (Apply on concrete surfaces):
 - (a) One bag (1 cubic feet) of Stucco cement.
 - (b) Not more than 2 cubic feet of damp aggregate.
 - (c) Water: Mixed with bonding agent at a rate of one (1) part-bonding agent to 2 parts water.
 2. Scratch Coat:
 - (a) One bag of Stucco cement.
 - (b) 2.5 to 4 cubic feet * of damp aggregate.
 - (c) Water [mixed with bonding agent at a rate of 1 part bonding agent to 2 parts water]. ** (Approximately 7 percent solids content).
*The number of shovels of sand equaling one cubic foot shall be calibrated using a cubic foot box and re-calibrated several times a day.
** Verify the mixing of the integral bonding agent with Portland Stucco System manufacturer.

3. Brown Coat:
 - (a) One bag of Stucco cement.
 - (b) 3 to 5 cubic feet of damp aggregate.
 - (c) 1/2 pound of fiberglass fibers.
 - (d) Water: Potable.
4. Finish Coat:
 - (a) One bag of Stucco cement.
 - (b) 1.5 to 3 cubic feet of aggregate.
 - (c) Water: Potable.

B. Mixing:

1. Mechanical Mixer:
 - (a) Provide sufficient horsepower to agitate the stiff stucco mix.
 - (b) Mixer blades: Clean and free of foreign materials.
 - (c) Thoroughly clean mixer after each mix.
2. Load materials into the stucco mixer in the following order:
 - (a) 2/3 of the water.
 - (b) 1/2 of the aggregate.
 - (c) All of the Stucco cement.
 - (d) 1/2 of the aggregate (allow to mix 2 minutes).
 - (e) Remaining water.
3. Mechanically mix cementitious and aggregate materials for plasters to comply with applicable referenced application standard and with recommendations of plaster manufacturer. Turn each finished mix for at least 5 minutes.
4. Do not retemper mixes after the initial set has occurred, or if mix has been prepared more than 60 minutes earlier.
5. Do not add admixtures other than those specified herein on the job site.

3.5 STRESS RELIEF

A. Masonry and concrete surfaces:

1. Install control joints and expansion joints in stucco where these joints occur in the wall substrate.

B. Installed Wire Lath:

1. Provide control and expansion joints in locations indicated on drawings and spaced as follows:
 - (a) In any direction not to exceed 18 feet on center.
 - (b) Limit wall area to 144 square feet and ceiling area to 100 square feet.
 - (c) The length to width ratio: Not to exceed 2-1/2 to 1.
 - (d) Provide an expansion joint where stucco support on wire lath abuts dissimilar material.
 - (e) Metal lath shall be discontinuous behind control and expansion joint accessories.

3.6 PLASTER APPLICATION

- A. Apply cement plaster under provisions of ASTM C926 and as herein modified.
- B. Sequence the work to allow for the continuous application of plaster over all surfaces, and including window and door returns, louvers and other features to provide uniform thickness and finishes.

C. Plaster:

1. Provide Portland cement plaster (stucco), of the composition indicated, to comply with the following requirements:
 - (a) Dampen masonry and concrete surfaces by fog spraying prior to installation of dash-bond coat or scratch coat. Surface: free of visible water before applying dash-bond coat or scratch coats. As far as possible, apply each coat in a continuous operation so as to avoid unsightly jointing.
 - (b) Where applicable apply dash-bond coat over concrete surfaces, allow to set and moist cure before application of a scratch coat. A dash-bond coat is a thick slurry mix that is dashed on and provides a mechanical bond for succeeding plaster. A dash-bond coat shall not replace one of the specified numbers of coats.
 - (c) Scratch, brown, and skim coat by hand trowelling.
 - (d) Back trowel each coat, applying with heavy pressure to fill voids, eliminate air bubbles, and promote mechanical bond.
 - (e) When the scratch coat becomes firm, score the entire surface with scarifier tool before initial set. On vertical surfaces score horizontally. The tool's purpose is to create a score of sufficient width to permit intrusion of the brown coat. Note: The use of wire combs or brushes for scoring the scratch coat is not allowed.
 - (f) Strip form all exterior corners.
 - (g) Required nominal thickness: With a tolerance of zero to plus 1/8 inch per coat.

(1) Three-coat work on metal plaster base:

	<u>Vertical Surfaces</u>	<u>Horizontal Surfaces</u>
(a) Scratch coat	3/8 inch	1/4 inch
(b) Brown coat	3/8 inch	1/4 inch
(c) Finish coat	1/8 inch*	1/8 inch*
(d) Total	7/8 inch	5/8 inch

* Plus any raised texture finishes. Note: On wire lath, the scratch coat shall extend 1/4 inch beyond the lath.

(2) Three-coat work on masonry and poured concrete:

	<u>Vertical Surfaces</u>	<u>Horizontal Surfaces</u>
(a) Scratch coat	1/4 inch	-
(b) Brown coat	1/4 inch	-
(c) Finish coat	1/8 inch*	-
(d) Total	5/8 inch	3/8 inch*

* Plus any raised texture finishes.

(3) Three-coat work on metal plaster base on solid base:

	<u>Vertical Surfaces</u>	<u>Horizontal Surfaces</u>
(a) Scratch coat	1/2 inch	1/2 inch
(b) Brown coat	1/4 inch	1/4 inch
(c) Finish coat	1/8 inch*	1/8 inch*
(d) Total	7/8 inch	7/8 inch

* Plus any raised texture finishes. Note: On wire lath, the scratch coat shall extend 1/4 inch beyond the lath.

(4) Two-coat work on masonry: (Interior occupied spaces).

	<u>Vertical Surfaces</u>	<u>Horizontal Surfaces</u>
(a) Scratch coat	3/8 inch	
(b) Finish coat	1/8 inch*	
(c) Total	1/2 inch	3/8 inch*

* Plus any raised texture finishes.

(5) Provide 1/4 skim coat on masonry at interior of Mechanical and Electrical spaces.

2. Stucco finishes: As indicated on drawings.
3. Stucco surfaces to be straight-edged, with jambs and angles straight and true.

D. Miscellaneous:

1. Ensure all surfaces are clean and free of harmful materials before application of stucco.
2. Apply coating continuously without allowing mix to dry at edges.
3. Fully stucco all exterior exposed or projecting concrete unless otherwise indicated.

3.7 CURING

- A. Provide sufficient moisture to all coats to permit continuous hydration of the cementitious materials.
- B. Moist curing of plaster:
 1. Lightly mist the stucco using a nursery-fogging nozzle or with pressure tank nursery sprayer to maintain lightly damp condition. Do not over wet.
 2. The stucco surfaces: Never saturate or directly spray with jetted water.
 3. Ensure there is no visible water on the surface when plaster is applied.
- C. After applying the scratch coat apply each succeeding coat(s) (brown or finish coat) after the coat in place has become sufficiently rigid to resist cracking, the pressures of the new coat being applied and the leveling process, and firm to the touch. Moist cure each coat until the next coat is ready to be applied. Do not saturate the stucco.
- D. After applying finish coat, moist cure a minimum of 3 times a day for a minimum of 3 days as dictated by weather or as necessary to reach the required pH level to receive paint. Maintain finished work in a continuously moist condition by pH testing until test reading is 8-10. Maintain a written and photographic record of each such test.
- E. Moist curing of plaster must be done by the plaster/stucco applicator (a.k.a. the plasterer).
- F. Comply with ASTM C926.

3.8 REPAIRING

- A. Sounding Surfaces:
 1. Sound out all stucco on masonry and poured concrete by dragging a small hammer (4 oz ball peen) over the surface.
 2. Mark all hollow sounding surfaces that indicate a non-bonding of substrate.
- B. Cutting and patching:
 1. Cut, patch, point-up, and repair removed plaster as necessary to accommodate other Work and to restore cracks, dents, and imperfections.
 2. Remove plaster to eliminate blisters, buckles, excessive crazing, and check cracking, dry out, efflorescence, sweat-out and similar defects, and where bond to substrate has failed, Replace plaster matching adjacent surfaces.

3.9 PAINTING

- A. Prior to painting plaster, ensure the moisture content of the plaster is less than that recommended by the paint manufacturer and the pH of the plaster is less than 10. Verify the moisture content using an electronic moisture meter and the pH using a pH pencil. Test every 1,000 square feet.
- B. Refer to the Painting section of the Project Manual.

3.10 CLEANING

- A. Remove temporary protection and enclosure of other Work.
- B. Promptly remove plaster from doorframes, windows, and other surfaces, which are not to be plastered.
- C. Repair floors, walls and other surfaces, which have been stained, marred, or otherwise damaged during plastering Work.
- D. When plastering Work is completed, remove unused materials, containers and equipment, and clean floors of plaster debris.

3.11 PROTECTION

- A. Provide final protection and maintain conditions, which ensures plaster Work being without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 09 29 00 GYPSUM BOARD

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gypsum wallboard.
- B. Cementitious tile backer board.
- C. Metal stud wall framing.
- D. Metal channel ceiling framing.
- E. Joint treatment and accessories.
- F. Drywall Accessories.
- G. Textured finish system.

1.2 REFERENCES

- A. ANSI (American National Standards Institute)
 - 1. A118.9-Test Methods and Specifications for Cementitious Backer Unit (CBU).
 - 2. 108.11Interior Installation of Cementitious Backer Unit (CBU).
- B. ASTM (American Society for Testing and Materials):
 - 1. A641/A641M-Zinc-Coated (Galvanized) Carbon Steel Wire.
 - 2. C442-Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board.
 - 3. C475-Joint Compound and Joint Tape for Finishing Gypsum Board.
 - 4. C645-Nonstructural Steel Framing Members.
 - 5. C840-Nonstructural Steel Framing Members.
 - 6. C931-Exterior Gypsum Soffit Board.
 - 7. C954-Steel Drill Screws for Application of Gypsum Board or Metal Plaster Bases to Steel Studs.
 - 8. C1002-Steel Drill Screws for Application of Gypsum Board.
 - 9. C1047-Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - 10. C1147-Determining the Short Term Tensile Weld Strength of Chemical-Resistant Thermoplastics.
 - 11. C1178-Glass Mat Water-Resistant Gypsum Backing Panel.
 - 12. C1278-Fiber-Reinforced Gypsum Panel.
 - 13. C1325-Non-Asbestos Fiber-Mat Reinforced Cement Interior Substrate Sheets.
 - 14. C1396-Gypsum Wallboard.
 - 15. C1629- Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.
 - 16. E119-Fire Tests of Building Construction and Materials.
- C. GREENGUARD Product Emission Standard for Children & Schools.
- D. Gypsum Association (GA):
 - 1. GA-214-Recommended Levels of Gypsum Board Finish.
 - 2. GA-216-Recommended Specification for the Application and Finishing of Gypsum Board.
 - 3. GA-600-Fire Resistance Design Manual (for fire protection and sound control).
- E. Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
- F. Steel Stud Manufacturer's Association (SSMA)
- G. Underwriters Laboratory (UL)-Fire Resistance Directory.

1.3 SUBMITTALS

- A. Submit manufacturer's product data for each type of product specified.

1. Product Recycled Content:

- (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
- (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
- (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
- (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

2. Regional Materials:

- (a) Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
- (b) Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
- (c) Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
- (d) Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

3. Low Emitting Materials:

- (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
- (b) Submit manufacturer's certification that all products comply with the Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including latest addenda.

B. Indoor Air Quality (IAQ) Management Plan:

- 1. Include onsite moisture protection plan of all gypsum board materials in storage during construction.

1.4 QUALITY ASSURANCE

- A. Fire Resistance Rating: Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

- 1. By reference to Gypsum Association-Fire Resistance Design Manual GA-600 or to design designations in U.L. Fire Resistance Directory as testing agencies acceptable to jurisdictional authorities.

- B. Single Source Responsibility: Obtain each type of gypsum-board and related joint treatment materials from a single manufacturer.
- C. Finish Work shall be subject to inspection using a lighting level of not less than 50 foot candles at the surface of the gypsum board. Surfaces judged to be unsuitable for finishing, even if finish has been applied, will be rejected.
- D. The Consultant or County Project Manager will direct repair or replacement of rejected work.

1.5 PROJECT CONDITIONS

- A. Environmental Requirements: Proceed with installation of gypsum board materials only after building is weathertight. Any weather/water-damaged drywall will be replaced, full height, at the Contractor's expense to the sole satisfaction of the Owner. No weather damaged wallboard will be accepted.
- B. Maintain temperature in areas receiving gypsum board materials between 55 Degrees Fahrenheit and 90 Degrees Fahrenheit during and after installation and provide adequate ventilation.

PART 2 PRODUCTS

2.1 ACPPROVED MANUFACTURERS

- A. Gypsum Board: Subject to compliance with specified requirements, provide products and materials by one of the following approved manufacturers:
1. Georgia-Pacific
 2. National Gypsum Company
 3. U.S. Gypsum Co. (USG)
 4. Or approved equal

2.2 MATERIALS

- A. Toxicity/IEQ: All gypsum board products, joint compound, adhesive, and texture coating materials are to comply with Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including latest Addenda.
- B. Gypsum Board products shall contain recycled content to contribute to the overall project recycling goal.
- C. Fire-rated Gypsum Board: 5/8 inch thick, Type “C” or Type “X”, ASTM C1396, tapered edge, 5/8 inch thick x 48 inches wide x longest stock length to fit available dimensions.
1. Type “X” board shall carry the U.L. classification mark for 15, 15, 0 surface burning characteristics.
- D. Moisture/Mold Resistant Wallboard (formerly Moisture Resistant M.R. Gypsum Board): Type “X”, 5/8 thick
1. National Gypsum “XP Wallboard”.
 2. Georgia-Pacific “DensArmor Plus”.
 3. USG “Mold Tough”.
- E. Impact Gypsum Panels, comply with ASTM C1629:
1. Type: Type “X”.
 2. Thickness: 5/8 inch
 3. Mold and mildew resistant
 - (a) Georgia-Pacific “DensArmor Plus” which is paperless.
 - (b) USG “Sheetrock Mold Tough VHI Firecode X” (formerly called “Fiberoak VHI”) or ASTM C1278, high-density paperless gypsum and cellulose wall panels.
 - (c) National Gypsum “Hi-Impact XP”, ASTM C1396, gypsum core wall panel with additives to enhance fire resistance, fiber mesh surface indentation resistance and impact resistance of core and surfaced with abrasion, moisture/mold/mildew resistant paper on front, back and long edges.
- F. Abuse Gypsum Panels:
1. Type: Type “X”.
 2. Thickness: 5/8 inch.
 3. Mold and mildew resistant.
 - (a) Georgia-Pacific “DensArmor Plus Abuse Guard”, ASTM C1396, fire-resistant, noncombustible dense gypsum core with abuse resistant coated glass mat facings.
 - (b) National Gypsum “Hi-Abuse XP”, ASTM C1396, gypsum core wall panel with additives to enhance fire resistance, surface indentation resistance and impact resistance of core and surfaced with abrasion, moisture/mold/mildew resistant paper on front, back and long edges.
 - (c) USG “Sheetrock Mold Tough AR Firecode X”, ASTM C1396, recycled face and back paper.

G. Tile Backer Boards:

1. High Moisture Areas (such as Park restrooms): Glass mat water resistant treated gypsum core.
 - (a) Approved Products:
 - (1) Georgia-Pacific “DensShield”, conforming to ASTM C1178.
 - (2) National Gypsum “XP Wallboard”.
 - (3) USG Fiberock Interior Aqua Tough, conforming to ASTM C1396
2. Wet Areas: Glass mesh water-durable cement core.
 - (a) Approved Products:
 - (1) Georgia-Pacific “DensShield”, conforming to ASTM C1178.
 - (2) National Gypsum “PermaBase”, conforming to ASTM C1325 product standard and ANSI A118.9/A108.11 installation standard.
 - (3) USG “Durock”, conforming to ASTM C1325 product standard and ANSI A118.9/108.11 installation standard.
3. Note: When tile backer boards are not full height and other gypsum panels are used in the same wall, 5/8 inch thick tile backer board must be used when in the same plane as 5/8 inch thick gypsum panel.

H. Gypsum Shaftwall or Coreboard: ASTM C442; sizes to minimize joints in place; 1 inch thick; square edges, ends square cut.

I. Drywall Framing Members: Studs, furring channels, floor and ceiling tracks, connecting accessories and clips as required for a complete framing system. Comply with SSMA and ASTM C 465, galvanized steel, of size and properties necessary to comply with ASTM C754. Members designed for screw-on application of board, fabricated by 1 manufacturer, and meeting or exceeding the following requirements:

1. Stud: 20 gage/30 mils roll formed, channels in required widths, having not less than 1-1/4 inch wide flanges, pierced webs and section properties equal to or exceeding Clark Steel Framing.
 - (a) If stud height exceeds manufacturer’s recommendations for indicated size, spacing or surface material, provide heavier gage studs in conformance with the manufacturer’s published recommendations.
 - (b) Provide 20 gage/30 mils studs at partitions receiving abuse and impact resistant gypsum board, cementitious board, and walls receiving a tile finish. Provide double studs, 20 gage/30 mils each, at each side of door openings, and at each side of partition openings exceeding 32 inches in width. Screw fasten studs together with 6 inch long pieces of channel runners at 1/4 points of floor to ceiling height. Four screws minimum.
 - (c) All studs shall be placed at 16 inches o.c., maximum.
 - (d) Runner Track for Metal Studs: U-shaped 25 gage/18 mils minimum, sized to receive the studs, in not less than 10 foot lengths. Ensure track gage match stud gage.
2. Refer to Substitutions section for submittal requirements.
3. Z-Furring Channels: 25 gage/18 mils galvanized “Z” channels in 8 feet 6 inch lengths, 1 inch, 1-1/2 inch furring depth.
4. Metal Furring Channels: 25 gage/18 mils, hat-shaped channels in 12 feet lengths, 7/8 inch depth.
5. Resilient Channels: 12 feet lengths, 2-1/2 inches width, 1/2 inches depth.
6. 1-5/8 inch studs: 20 gage/30 mils.

J. Fasteners:

1. For gypsum panels to steel framing:

- (a) One inch long type S screw for 1/2 inches and 5/8 inches thick single layer panels to steel studs, power channels.
 - (b) 1-5/8 inch type S screws for 1/2 inches and 5/8 inches thick double layer panels to steel studs, runners, channels.
- 2. For gypsum panels to steel framing (20 gage/30 mils and heavier):
 - (a) One inch long type S-12 screw for 1/2 inch and 5/8 inches thick single layer panels to steel studs, runners up to 14 gage.
 - (b) 1-5/8 inch type S screws and longer for multilayer gypsum board applications.
- 3. For steel studs to runners and door frames:
 - (a) 7/16 type S pan head screws for steel studs to runners, furring, resilient channels.
 - (b) 7/16 inch type S-12 pan head for steel studs to door frame jamb anchor clips; steel studs to runners; other metal to metal attachment up to 14 gage/68 mils.
- 4. For steel floor runner tracks to concrete:
 - (a) Powder actuated ("shot") fasteners, minimum 1 inch length, 24 inches o.c.
- K. Adhesive: Embedding type joint compound or laminating adhesive as recommended by gypsum board manufacturer.
 - 1. All adhesive materials are to comply with Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including latest addenda.
- L. Joint Treatment Material:
 - 1. Ensure materials comply with ASTM C475, ASTM C840 and manufacturer's recommendations.
 - 2. Joint Tape: Paper reinforcing tape; use pressure sensitive with compatible joint compound.
 - 3. Setting-type joint compound, factory pre-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated:
 - (a) Where setting type joint compounds are indicated for use as taping compounds, use formulation which develops greatest bond strength and crack resistance and is compatible with other joint compounds applied over it.
 - (b) For pre-filling gypsum board joints, use formulation recommended by gypsum board manufacturer for this purpose.
 - (c) For filling joints and treating fasteners of water-resistant gypsum backing board behind for tile, use formulation recommended by manufacturer.
 - 4. Drying-type Joint: Factory-prepackaged vinyl based products complying with the following requirements for formulation and intended use:
 - (a) Ready-Mix Formulation: Factory per-mix product.
 - (b) Topping compound formulated for finish (or third) coats.
- M. Gypsum Board Ceiling Components (minimum):
 - 1. Carrying Channels: 1-1/2 inch web, cold rolled steel, having rust-inhibitive coating; or drywall suspension system main tee.
 - 2. Furring Channels: 3/4 inch web, cold rolled steel, rust-inhibitive coating; or drywall suspension system cross tee.
 - 3. Wire: ASTM A641/A641M Class I galvanized steel, soft temper. Minimum 8-gage hanger wire and minimum 18-gage tie wire.

OR

 - 4. Grid Suspension System for Ceilings: Comply with ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.

- N. Drywall Accessories; comply with ASTM C1047, provide the following items fabricated completely of heavy gage galvanized sheet steel and distributed by the gypsum board manufacturer.
1. Corner Bead: Gypsum Association Type CB 114 x 114 having 1-1/4 inch or wider flanges.
 2. Casing: Gypsum Association Type LC in size necessary to receive board and designed for finishing with Joint Treatment.
 3. Casing with vinyl gasket having 1/4 inch vinyl foam tape.
 4. Reveal Casing: Extruded aluminum accessory. Designed to form a 3/4 inch wide reveal. 1/2 inch or 5/8 inch size as required by gypsum board thickness.
 - (a) Fry Reglet Corporation-Type "F" FDM-50-75 or 625-75 Type "W" WDM-625-75 as required by conditions, or approved equal.
 5. Control Joint: "V" shaped with 7/8 inch flanges.
- O. Glass Fiber Tape: Federal Specification HH-C-00466 having 20 x 10 thread count.

2.3 TEXTURED FINISH (IF APPLICABLE)

- A. Approved Manufacturers:
1. TWI Dursystem Products; Product: DS4000.
 2. Litex Finishing Systems, Inc.; Product: Commercial Texture System.
 3. Roman; Product: Armortex.
 4. Texcote; Product: Colortex.
- B. Non-Aggregate Finish: High Solids 100 percent Acrylic Texture Coating, mildew resistant, washable, abrasion resistant coating. Provide 2 coat application consisting of a primer/base coat and texture coat.
- C. Texture: Knock-down.
- D. Minimum Warranty: 5 years.
- E. Minimum Characteristics:
- | | | |
|----|------------------------------------|--------------|
| 1. | Scrub Resistance, ASTM D2486 | 2500 cycles. |
| 2. | Permeability, ASTM D1653, Method A | 16.9. |
| 3. | Burning, ASTM E84 | |
| | (a) Flame Spread | 5 |
| | (b) Smoke Development | 0 |
| 4. | Mildew Resistance, ASTM D3273 | 10 |
- F. Level of Gypsum Board Finish: Level 4.
- G. Preparation and Application: Per manufacturer's written instructions.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS:

- A. Standards: Unless modified or exceeded by the requirements of this Specification, conform to framing system manufacturer's recommendations and then to the following specifications of the Gypsum Association (GA):
1. For Framing: "Installation of Screw-Type Steel Framing Members to Receive Gypsum Board".
- B. For gypsum board application and finishing: Must comply with GA-214-Recommended Levels of Gypsum Board Finish and GA-216-Recommended Specification for the Application and Finishing of Gypsum Board.
- C. Coordination with other Trades:

1. Reinforcing: Reinforce partitions as necessary to accommodate work of other trades that will be attached to bear on drywall construction. Reinforcing shall conform to drywall component manufacturer's recommendations. Provide back-up members to reinforce framing and provide support at surface mounted items. Verify requirements in Sections where surface mounted work is specified. In the absence of specific requirements, provide minimum 2 inch x 4 inch wood ground/nailer in sufficient width to accommodate the required fastenings. Fasten the ground/nailer rigidly to the drywall framing with 2 screws each side to each stud and close against the drywall facing.
 2. Building in other Work: Cut, frame and fit this work around recessed, built into or penetrating work such as fixtures, outlet boxes, fittings, pipes, conduit, etc., and supports.
 3. Finishes: Leave surfaces of this work in acceptable condition to receive applied finishes as scheduled. Review applicable Specification Sections and coordinate with appropriate other trades to determine requirements. Unless specifically scheduled or specified, no textured coat will be used on painted surfaces, therefore the quality of drywall workmanship must be acceptable for application of smooth finishes of the required sheen without evidence of joints, unevenness and surface defects.
 4. Mechanical and Electrical: Cooperate with these trades for location requirements for other work to be installed or located on surfaces provided under this Section. Fit gypsum wall board work close around penetrating work.
- D. Temperature: Maintain continuous controlled interior temperature of at least 55 degrees Fahrenheit 24 hours before and during application of this work and until building is occupied. Provide adequate ventilation to eliminate excessive moisture.
- E. Quality of Work: Test vertical framing with a straight edge both ways to establish that planes are true, plumb and level. If so directed, check the plane of ceiling suspension with a water level and unacceptable areas adjusted until they are satisfactory. Do not cover framing or suspension until it is approved.

3.2 FRAMING FOR FURRED CEILINGS, SOFFITS

- A. Provide Runner Channels to support furred ceilings and soffits. Unless otherwise required by time-design of referenced authority for fire-rated assemblies, space runners at 16 inches on center and within 6 inches of abutting vertical surfaces or other interruption of runners. Tie runners to bar joists or beams with wire.

3.3 PARTITION FRAMING

- A. General: Where drywall studs are required, provide system of type, width and spacing necessary to form partition of required construction and thickness.
1. Special Requirement: Where one side of a partition is drywall, provide metal framing required for the partition regardless of the material required on the opposite side.
- B. Tracks: Accurately align tracks under provisions of partition layout. Fasten tracks at 24 inches on center but not less than two fasteners per section. Conform to details for sound seal where partitions abut each other and dissimilar surfaces. Tracks shall be continuous. Stop/start type of installation at floor piping penetrations shall not be allowed. Punch tracks around floor pipes.
- C. Studs
1. Screw studs to tracks through both flanges at jambs of openings, partition intersections and corners.
 2. Provide an additional stud within 2 inches of end stud where partition abuts a dissimilar surface.
 3. At control joints provide double studs spaced 1/2 inch between and fasten board on each side of joint to a separate support.
 4. Provide horizontal members behind for work of other trades.
 5. Place the studs web-to-web.
 6. Locate the short stud over the head member of the opening.
 7. Where control joint is required above opening and aligned with jamb, space studs with 1/2 inch between them.
 8. Provide a track across head of opening to receive the short studs.

9. Fasten 20 gage jamb stud to each opening frame anchor with 2 fasteners.
 10. In addition, provide a full length 20 gage stud with 2 inches of each jamb stud.
 11. Construct framing above opening as directed by gypsum board manufacturer.
 12. Studs shall extend full height from floor to underside of floor or roof.
 13. Studs shall be one-piece; no splices shall be accepted.
- D. Ground/Nailer: Where top track is located more than 1 foot above the finish ceiling line, provide ground/nailer in the space between studs at the ceiling line for solid backing for gypsum board facing. Use length of track cut and coped tight between stud webs. Fasten track to each stud each side. Provide similar ground/nailer behind horizontal joints in the first layer of gypsum board applied to the studs vertically.
- E. Bracing: Where partitions are not braced from both sides by abutting or continuous completed ceiling systems, brace partition framing as necessary to align and hold it for application of the finish and provide rigidity. Completed ceilings that do not provide bracing for partitions include direct suspension acoustic systems, and any other system that is discontinuous, ceiling-to-ceiling across the partition or discontinuous from ceiling to wall at the partition. Conform to the following minimum requirements:
1. Partition that extends above ceiling: When partition is not tied to framing for abutting ceilings, provide bracing.
 2. Partition between ceilings of two different heights: When the distance to the lower abutting ceiling measured from the top of the partition is more than 1/3 the maximum partition height, provide bracing.
 3. Method: For braces use lengths of studs, single or boxed as required by their length. Locate the diagonal braces 4 feet on center. For partitions short of structure high, fasten braces to the top track. For structure high partitions, fasten braces to a rack fastened across the face of the studs over the facing material and close above abutting ceiling. Extend braces diagonally and fasten them to the structure above. Unless continuous obstructions interfere, ensure braces for partitions having ceilings on both sides extend alternately from opposite sides of the partition. Other methods of bracing may be submitted for approval prior to use.

3.4 VERTICAL FURRING

- A. General: Vertical furring shall consist of galvanized "Hat-shaped" metal furring channels, 7/8 inch deep at locations shown on the drawings and details. Furring shall be installed at 16 inches on centers unless noted otherwise.

3.5 GYPSUM BOARD APPLICATION

- A. Installation: Use wall boards of maximum practical length to reduce end joints. Ensure edges and ends of boards are in contact but not forced into place. Stagger end joints, ensure joints on opposite sides of a partition do not occur on the same stud, unless fire test states otherwise.
- B. Erect single-layer standard and fire rated gypsum boards in parallel application with vertical edges located over framing members.
- C. Double Layer Application: Use gypsum backing board for first layer, placed parallel to framing or furring members. Place second layer perpendicular to first layer. Ensure that joints of first layer do not occur over joints of first.
- D. Screws: Spaced not less than 3/8 inch from ends and edges of wallboard. Spaced not over 12 inches apart on sidewalls. Ensure wallboard is held in from contact with the member while the screws are being driven. Recess the heads slightly below the surface of the wallboard with the final drive. Care must be taken not to break the paper face.
- E. Gypsum panel products applied to walls shall be applied with bottom edge spaced above the floor and seal for fire protection and sound control. Refer to GA-216, applicable fire protection requirements and sound control requirements for amount of space above the floor

3.6 DRYWALL ACCESSORIES

- A. Corner Beads: Required at external corners of face board, continuous in 1 piece from floor to ceiling.
- B. Casings: Required at visible edges of boards and where face board abuts a dissimilar material. Use casing in long lengths with tight butt joints and mitered corners.
- C. Control Joints: Unless noted otherwise on the drawings, provide control joints where a wall or partition runs in an uninterrupted straight plane exceeding 30 feet, provide at 30 feet on center maximum spacing.
- D. Edge Trim: Shapes as required under provisions of ASTM C1047.
- E. Material: Formed metal complying with sheet steel zinc-coated by hot-dipped process.

3.7

GYPSUM BOARD FINISHING

- A. Standards: Finish visible drywall work smooth. Flush and even to a level consistent with Level 4 work as described by Gypsum Associations "GA-214" Recommended Levels of Gypsum Board Finish". Any work not conforming to this standard shall be made acceptable as directed by Consultant or County Project Manager at no additional cost to the Owner.
- B. General:
 - 1. Pre-fill open joints with setting-type joint compound. Allow joint compound to completely harden.
 - 2. Treat joints and fastener heads at all board surfaces. Where board is required to extend above finish ceiling or is concealed by permanent construction (or equipment), treat joints and fastener heads using full number of joint compound coats, final sanding may be omitted.
- C. Embedded Tape: Apply a uniformly thin 4 inches wide layer of joint compound over each joint. Center joint tape over the joint and embed it into the compound leaving sufficient material under the tape to provide a proper bond. While embedding, apply a thin coat of joint compound over the tape. At inside corners reinforce inside corner angles with the tape folded to conform to the angle and embed into compound. Allow to dry completely.
- D. Full Coat Application (Floating): Cover the tape with a coat of joint compound extending approximately 3 inches on each side of the tape and feathered out at the edges. Allow to dry completely. Apply a second coat of all purpose compound fill coat 10 inches wide over taped joints, bead and trim feather edge of second coat approximately 2 inches beyond edge of first coat. Spot fasteners with second coat allow to dry completely.
- E. Finish Coat Application: After second coat is dry smooth tool marks and other protrusions with a finishing knife. Apply a thin finish (third) coat of ready-mixed topping or all-purpose compound over joints, fasteners, beads and trim. Feather edges of third coat at least 2 inches wider than second coat.
- F. Dry Sanding: Sand joint compounds to prepare gypsum drywall surfaces for painting. Sand as necessary to remove excess joint compound from tool marks, lap marks and high crowned joints. Scratches and craters and nicks shall be filled with joint compound, then sanded. Do not remove these depressions by sanding only.

END OF SECTION

SECTION 09 30 00 TILING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Types of work in this section include, but are not limited to the following:
 - 1. Commercial grade floor and wall tile
 - 2. Trim and special shapes
 - 3. Setting and Grouting materials
 - 4. Thresholds and marble
 - 5. Sealing of expansion and other joints in tile work with elastomeric joint sealants

1.2 REFERENCES

- A. American National Standard Specifications for Ceramic Tile (ANSI), latest editions
 - 1. A108.4 Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy.
 - 2. A108.5 Installation of Ceramic Tile with Dry-Set Portland Cement Mortar.
 - 3. A108.10 Installation of Grout in Tilework.
 - 4. A118.1 Standard Specification for Dry-Set Portland Cement Mortar.
 - 5. A118.3 Standard Specifications for Chemical Resistant, Water Cleanable Tile- Setting and Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive
 - 6. A118.4 Standard Specification for Latex-Portland Cement Mortar.
 - 7. A118.5 Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation
 - 8. A118.6 Specifications for Standard Cement Grouts for Tile Installation
 - 9. A118.7 Specifications for High Performance Cement Grouts for Tile Installation
 - 10. A118.8 Specifications for Modified Epoxy Emulsion Mortar/Grout
 - 11. A118.10 Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-set Ceramic Tile and Dimension Stone Installation
 - 12. A137.1 Standard Specification for Ceramic Tile.
 - 13. C1028 Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
- B. American Society for Materials and Testing (ASTM), latest editions
 - 1. C503 Marble Dimension Stone (Exterior).
 - 2. C920 Elastomeric Joint Sealants.
 - 3. C373 Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products
 - 4. C648 Standard Test Method for Breaking Strength of Ceramic Tile.
 - 5. Standard Test Method for Resistance of Ceramic Tile to Chemical Substances.
 - 6. C1027 Standard Test Method for Determining Visible Abrasion Resistance of Glazed Ceramic Tile.
- C. GREENGUARD Product Emission Standard, if applicable.
- D. ISO 14021 Environmental Labels and Declarations, as amended.
- E. Resilient Floor Covering Institute (RFCI) FloorScore Program.
- F. Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including latest addenda.
- G. TCNA Handbook for Ceramic Tile Installation.

1.3 ADDITIONAL DEFINITIONS

- A. Ceramic tile: includes ceramic surfacing units made from clay or other ceramic materials.
- B. DCOF: Dynamic coefficient of friction used for floor slip resistance testing.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information and installation instructions for materials required, except bulk materials. Include complete maintenance recommendations.
 - 1. Low Emitting Materials
 - (a) Submit manufacturer's Material Safety Data Sheet Indicating VOC limits of all products.
 - (b) Submit manufacturer's certification that all products comply with GREENGUARD Product Emission Standard, RFCI FloorScore Program, or the Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. California Department of Health Services.
 - 2. Recycled Content:
 - (a) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - (b) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - (c) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
 - (d) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of the assembly.
- B. Samples for Initial Selection Purposes: Submit manufacturer's sample boards consisting of actual tiles or sections of tile showing full range of colors, textures and patterns available for each type of tile indicated. Include samples of grout and accessories involving color selection.
- C. Samples for verification purposes: Submit the following:
 - 1. Samples for each type of tile and for each color and texture required, not less than 12 inches square, on plywood or hardboard backing and grouted. Provide larger sample board when necessary to show field and accent tiles.
 - 2. Full size samples for each type of trim, accessory and for each color.
 - 3. Six inches long samples of marble, granite or stone thresholds and window sills.
- D. Master Grade Certificates: Submit for each shipment and tile type, signed by tile manufacturer and installer.
- E. Qualification Data: Submit certification, as specified under Quality Assurance article, substantiating capabilities and experience of installing firms and installing workers doing similar work.

1.5 QUALITY ASSURANCE

- A. Maintain one copy of TCA Handbook and ANSI A108 Series/A118 Series on site.
- B. Source of Materials: Provide materials obtained from one source for all tile of same type. Provide grout and setting materials from one source.
- C. Tile shall conform to requirements of ANSI 137.1, standard grade.
- D. Tile installation shall conform to Tile Council of North America (TCA)-Handbook for Ceramic Tile Installation.

- E. Installer: Company experienced in the installation of the proposed tile systems.

1.6 PRE-INSTALLATION MEETING

- A. Shall not occur without all submittals approved by the Contractor and accepted by the Consultant or County Project Manager. Shall convene a minimum of seven calendar days before starting work of this section.
- B. Required Attendees:
 - 1. Contractor and its Superintendent
 - 2. Tile Installer
 - 3. Tile System Manufacturer or Distributor
 - 4. Installers of floor slab construction to receive tile work.
 - 5. Any other subcontractors associated with tile work.
 - 6. Consultant and/or County Project Manager.
- C. The Contractor shall make arrangements for the meeting and notify the parties required to attend.
- D. Agenda shall include:
 - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - 2. Review tile system requirements (drawings, specifications, and other contract documents).
 - 3. Review Shop Drawings and associated submittals.
 - 4. Review manufacturer's technical materials.
 - 5. Review and finalize construction schedule related to tile work and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays.
 - 6. Review required inspection, testing, certifying and material usage accounting procedures.
 - 7. Tour representative areas of tile floor slabs, inspect and discuss condition of the substrate, floor slopes to drains, outlets, penetrations and other preparatory work performed by other trades.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store packaged tile, setting, and grouting materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements of ANSI A137.1 for labeling sealed tile packages. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store liquid latexes and emulsive adhesives in unopened containers and protect from freezing and extreme heat.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations
- B. Maintain temperatures in tiled areas during installation and for seven calendar days after completion comply with ANSI and published manufacturer's instructions.

1.9 EXTRA STOCK

- A. Prior to Final Completion, deliver a *minimum* of 3 percent of total square feet (or one box) of each color and pattern of tile material required for project for maintenance use. The extra stock must be from the same batch or die lot as the installed product.
- B. Prior to Final Completion, deliver a *minimum* of 3 percent of total linear feet of each color and pattern of accent or edge strip material required for project for maintenance use. The extra stock must be from the same batch or die lot as the installed product.

- C. Clearly identify each carton with the room name and type of tile being provided (such as “accent wall tile in the Kitchen”).

1.10 WARRANTY

- A. Provide a minimum one-year written labor and material warranty.
- B. Should defects develop, including any loss of adhesion to the subfloor or wall surfaces, completely replace tile to the satisfaction of County, at no additional cost to County.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with specified requirements, provide products by one of the following approved manufacturers:
 - 1. Commercial grade Porcelain Floor and Wall Tile and Glazed Ceramic or Porcelain Wall Tile (semi-gloss or matte finish, with cushioned edges):
 - (a) American Olean
 - (b) Atlas Concorde
 - (c) Crossville, Inc.
 - (d) Daltile Corp.
 - (e) Florida Tile Industries
 - (f) Interceramic
 - (g) Metropolitan Ceramics
 - (h) Shaw Industries
 - (i) Or as detailed in the Drawings
 - 2. Setting Materials:
 - (a) Custom Building Products
 - (b) Laticrete International, Inc.
 - (c) Mapei Corporation
 - (d) Or approved equal
 - 3. Latex Portland Cement Grout:
 - (a) Custom Building Products
 - (b) Laticrete International, Inc.
 - (c) Mapei Corporation
 - (d) Or approved equal
 - 4. Epoxy Grout:
 - (a) Custom Building Products
 - (b) Laticrete International, Inc.
 - (c) Mapei Corporation
 - (d) Or approved equal

2.2 MATERIAL REQUIREMENTS

- A. Toxicity/IEQ: All tile products, threshold, setting, grouting, and waterproofing/crack-suppression membrane materials are to comply with GREENGUARD Product Emission Standard.
- B. RFCI FloorScore Program or the Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including latest addenda.

2.3 PERFORMANCE REQUIREMENTS

- A. DCOF rating required per ANSI A137.1:
 - 1. For wet areas such as restrooms and showers for a light commercial application, a DCOF rating of 0.42 or greater is required.
 - 2. For ramps, stair treads and inclines, a DCOF rating of 0.65 or greater is required.
 - 3. For exterior applications such as entrances, pool decks, and other wet areas with minimal footwear, a DCOF rating of 0.60 or greater is required.
- B. Scratch Hardness (MOHS):
 - 1. For flooring, a MOHS rating of 7.0 or greater is required.
- C. Porcelain Enamel Institute (PEI) Ratings:
 - 1. For wall tiles, a PEI of 1 or greater is required.
 - 2. For light to moderate traffic, a PEI rating of 3 or greater is required.
 - 3. For moderate to heavy traffic, a PEI rating of 4 is required.
 - 4. For heavy to extra heavy traffic, a PEI rating of 5 is required.
 - 5. **For public restrooms, provide floor tile with a PEI rating of 4 or 5.**

2.4 GENERAL

- A. ANSI Ceramic Tile Standard: Comply with ANSI A137.1 - American National Standard Specifications for Ceramic Tile for types and grades of tile indicated.
 - 1. Furnish tile complying with “Master Grade” requirements for standard grade materials unless otherwise indicated.
- B. ANSI Standard for Tile Installation Materials: Comply with ANSI A108, A118, and A136.1 for installation products and materials indicated.
- C. Colors, Textures and Patterns: For tile and other products requiring selection of colors, surfaces textures or other appearance characteristics, provide products to match characteristics indicated or, if not otherwise indicated, as selected by Consultant or County Project Manager from manufacturer’s standard chart.
 - 1. Provide tile trim and accessories that match color and finish of adjoining flat tile.
- D. Mounting: Where factory-mounted tile is required, provide back or edge-mounted tile assemblies as standard with manufacturer unless another mounting method is indicated.

2.5 TILE PRODUCTS

- A. Unglazed Porcelain Floor Tile: Commercial grade, through color body, refer to Drawings for size, floor pattern and requested product; thickness of 7/16 to 1/2 inches. If sizing is not specified on the Drawings, provide **rectangular** tiles of 3 x 12 inches, 3 x 15 inches, 6 x 36 inches or 12 x 24 inches.
- B. Glazed Ceramic or Porcelain Wall Tile: Refer to Drawings for size, floor pattern and requested product; minimum of 5/16 inch thick with cushioned edges. If sizing is not specified on the Drawings, provide flooring similar in size and shape to what is provided for the floor tile.
- C. Unglazed or Glazed Mosaic Tile: Refer to Drawings for size, floor pattern and requested product; minimum of 1/4 inch thick with cushioned edges. If sizing is not specified on the Drawings, provide tiles of 1-1/4 x 1-1/4 inches to 3 x 3 inches, as selected by County.
- D. Colors and sizes as selected by the Consultant or County Project Manager from full range of manufacturer’s standard color chart.

- E. Trim Units and Special Shapes: Provide tile trim units and special shapes to match characteristics of adjoining flat tile and to comply with the following requirements:
1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile, where applicable.
 2. Base: Cove base units, width and height to match wall tile.
 3. External Corners: Bullnose shapes with round out base and top trim special shapes.
 4. Internal Corners: Field-butt square with square in-corner base and top trim special shapes.

2.6 THRESHOLDS AND MODULAR RAMPS

- A. General: Unless otherwise noted on the Drawings, provide threshold to provide transition between adjacent floor finishes.
- B. Bevel edges at 1:2 slope with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor finish for accessibility.
- C. Aluminum Thresholds and Barrier-free Ramp Thresholds: Provide aluminum thresholds (or barrier-free modular ramp if needed) at restrooms with entrances from outdoors. Pemko with Pemkote finish by Assa Abloy or approved equal.
- D. Thresholds of natural stone, marble or granite: Provide marble thresholds complying with ASTM C 503 and minimum abrasion resistance of 10 or 12 per ASTM C 1353 or ASTM C 241 and with honed finish.
- E. Thresholds of granite: Provide marble thresholds complying with ASTM C 615 requirements for exterior use and abrasion resistance for uses subject to heavy foot traffic.

2.7 SETTING MATERIALS

- A. Organic Adhesive (thin-set): ANSI A136.1; Type II. Provide primer-sealer where recommended by manufacturer.
- B. Latex/Portland Cement Mortar (thick-set): Provide materials to comply with ANSI A118.4 as required for installation method designated, unless otherwise indicated.
- C. Dry-Set Portland Cement Mortar (thin-set): Pre-sanded product in accordance with ANSI A118.1 and by manufacturer.
- D. Latex/Polymer Modified Portland Cement Mortar (thin-set): Use one of the following complying with ANSI A118.4 unless otherwise required.
1. Dry-set mortar made of factory-blended cement and aggregates requiring only the addition of water at job site.
 2. Dry-set mortar made of factory-blended cement and aggregates requiring only the addition of latex mortar additive such as Laticrete 4237 or approved equal.

2.8 GROUTING MATERIALS

- A. Polymer-Modified Cement Grout (formerly called latex-Portland cement grout): Proprietary pre-blended compound of Portland cement selected and graded aggregates, color pigments and chemical additives gaged with latex additives to comply with manufacturer's directions and ANSI A118.7.
1. Sanded/Unsanded Grout:
 - (a) 1/8 inch wide or less: Unsanded.
 - (b) 1/8 inch wide or greater: Sanded.
 2. Color: As selected by Consultant or County Project Manager. Provide selection of manufacturer's full range of colors.

- B. Epoxy Grout (use at following spaces: kitchens, locker rooms, shower rooms, janitor closets, extractor and grinder rooms, and restrooms):
 - 1. Comply with ANSI A118.3: 100 percent solid, stain resistant, chemical resistant. Complying with ANSI A118.8. Certified by manufacturer for intended use.
 - 2. Color: As selected by Consultant or County Project Manager. Provide selection of manufacturer's full range of colors.

2.9 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANES FOR THIN-SET SHOWER TILE INSTALLATIONS

- A. General: Manufacturer's standard product that complies with ANSI A118.10.
- B. Waterproofing (Shower Liner) Approved Products:
 - 1. Chlorinated-Polyethylene-Sheet Product: Non-plasticized, chlorinated polyethylene faced on both sides with high-strength, nonwoven polyester fabric, for adhering to latex-Portland cement mortar. Chloraloy by Nobleseal Company or approved equal.
 - 2. Polyethylene-Sheet Product: Polyethylene faced on both sides with fleece webbing for adhering to latex-Portland cement mortar. KERDI by Schluter Systems LP or approved equal.
- C. Crack-Suppression:
 - 1. Chlorinated-Polyethylene-Sheet Product: Nonplasticized, chlorinated polyethylene faced on both sides with high-strength, nonwoven polyester fabric, for adhering to latex-Portland cement mortar. CIS by Nobleseal Company or approved equal.

2.10 ACCESSORIES AND MISCELLANEOUS MATERIALS

- A. Thresholds and Metal Edge Strips: As selected by Consultant or County Project Manager.
- B. Movement and Control Joint Profiles:
 - 1. Schluter Dilex-EDP Stainless Steel Movement Joint.
 - 2. Or approved equal.
- C. Sealant: Provide sealant for joints as specified in the Joint Sealants section for required use, Type, Grade and Class.
- C. Tile Cleaner: Neutral cleaner specifically acceptable to tile manufacturer and grout manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrate that will receive setting materials and quarry tile, before installation begins. With the Installers present, review for compliance with requirements for installation tolerances and other conditions that will affect performance of tile installation.
- B. Acceptable Tolerance: Comply with tolerances as listed in ANSI A108 Series "Specifications for Installation of Ceramic Tile" for installation condition and method.
 - 1. Slope finished tile to drains 1/4 inch per foot.
- C. Verify conditions and surfaces to receive tile to ensure:
 - 1. Surfaces are firm, dry, clean and free of dust and oily or waxy films.

2. Grounds, anchors, plugs, hangers, recess frames, waterproofing, membrane, electrical and mechanical work in or behind tile have been installed prior to start of tile work.
- D. Do not proceed with work until defects or conditions adversely affecting quality and execution of quarry tile work are corrected.
- E. Verify that concrete slab surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
 1. Moisture Emission Rate: Not greater than 3 lbs. per 1,000 square feet per 24 hours when tested using calcium chloride moisture kit for 72 hours.
 2. Alkalinity: pH range of 5 - 9.

3.2 PREPARATION

- A. Do not use liquid curing compounds or other coatings that may prevent bonding of tile materials to slabs. Slab shall be dry at times of tile installation.
- B. Layout: Prepare layout of tile work so as to align joints of floor, base, wall tile, and trim when pieces are of the same size. Lay out so as to center tile fields in both directions in each space or area, to minimize tile cutting, and provide lay out so as to minimize use of tile that are less than one-half tile in size.
 1. Locate expansion joints and other joint types to be sealant filled during installation of setting material. Do not saw cut joints after tile has been installed.
 2. Locate joints in tile surfaces directly over joints that occur in concrete or other substrate material.
 3. Refer to Drawings for tile pattern.
- C. Preparation of Concrete Floors for Setting Beds:
 1. Bondability:
 - (a) Where tile is to be installed, concrete slabs should not have air entrainment or other additives in the mix, nor sealers or curing compounds applied without specific approval of mortar and grout manufacturer.
 - (b) Slabs should have steel trowel and fine broom finish and be free of laitance.
 - (c) In case of any question on condition of slab, it should be tested for bondability with a Dillon Dynamometer, and show a tensile bond of not less than 300 psi.
 2. Levelness:
 - (a) Before tile is applied, test structural floor for levelness or uniformity of slope by water. Fill, level, and retest areas as required to meet tolerances specified in Section A-3 of ANSI A108.1 and retest.
 - (b) When specified levelness or uniformity of slope is obtained, prepare floors for setting bed in accordance with ANSI A108.1.

3.3 INSTALLATION

- A. Install tile, setting materials, and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.
- B. Refer to the Gypsum Board section for Tile Backer Boards.
- C. Setting Methods:
 1. Wall Tile:
 - (a) On Gypsum Board in Dry Areas: ANSI A108.4 (Referenced TCA Method Number W242 Organic Adhesive) with Latex-Portland Cement Grout.

- (b) On Tile Backer Board in High Moisture or Wet Areas: ANSI A108.5 (Referenced TCA Method Number W244, W245, B415, or B420 Dry-Set, Latex-Portland Cement Mortar, or Latex/Polymer Modified Portland Cement Mortar) with Latex-Portland Cement Grout; provide expansion joints under provisions of TCA Method EJ171.
- 2. Floor Tile:
 - (a) Concrete Slab: ANSI A108.5 (referenced TCNA Method Number F113) with latex Portland cement grout or epoxy grout ANSI 108.6 Epoxy Mortar and Grout and (referenced TCNA Method Number F114).
- D. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignment.
- E. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars, or covers overlap tile.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Where acoustic tile ceilings occur, install ceramic wall tile to a line 2 to 4 inches above plane of exposed surface of ceiling.
- H. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated, or if not indicated, at spacing and locations recommended in TCA "Handbook for Ceramic Tile Installation", and approved by Consultant or County Project Manager.
 - 1. Prepare joints and apply sealant to comply with requirements of referenced standards and sealant manufacturer.
- I. Grout tile to comply with referenced installation standards, using grout materials indicated.
- J. Mix and install proprietary components to comply with grout manufacturer's directions.
- K. Joints:
 - 1. General: Place tile joints in uniform width, subject to variance in tolerance allowed by tile size. Make points watertight, without voids, cracks, excess setting material, or excess grout.
 - 2. Joint widths: Shall be per manufacturer's published recommendations.
 - 3. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor; base, walls and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting and to avoid cut tiles less than one-half the tile size. Provide uniform joint widths, unless otherwise shown.
 - (a) Lay out tile work on floors so that wherever possible no tiles less than half full size occur.
 - (b) Tile mounted in sheets: Make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.
- L. Sound tile after setting. Replace hollow sounding units.
- M. Keep expansion and control joints free of setting material or grout. Apply sealant to control joints.
- N. Allow tile to set for a minimum of 48 hours prior to grouting.
- O. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes, including perimeter of room.

3.4 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANE INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
- B. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.
- C. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 GROUTING

- A. Installation to comply with ANSI A108.10.
- B. Force grout into joints to fill solid. Remove and re-grout discolored joints. Fill voids in joint grout.

3.6 TOLERANCES

- A. Finished installation shall be true to a tolerance of + 1/8 inch in 10 feet, and + 1/16 inch within any given running foot.

3.7 CLEANING AND PROTECTION

- A. Upon completion of grouting, and before grout is completely dry, clean all tile surfaces to ensure they are free of all foreign matter. Remove haze (residue) on tile resulting from grouting as soon as possible.
- B. Do not clean tile with acid solutions or chemical cleaners unless in accordance with both tile and grout manufacturer's written recommendations.
- C. Leave installations finished, clean, and free of chipped, broken, cracked, loose or other defective tile work.
- D. Protect final tile installation in a manner, and so as to maintain conditions, to ensure tile work will not deteriorate or be damaged at time of Substantial Completion.
- E. Protect the entire tile surface area with a heavy-duty non-staining kraft paper and tape in place.
- F. Prohibit foot and wheeled traffic from newly tiled floors for a minimum of seven calendar days after grouting is completed.
- G. Just prior to acceptance remove protective paper and rinse neutral cleaner from surfaces of tile. Dry and lightly buff.
- H. Refer to manufacturer's literature for additional details.

END OF SECTION

SECTION 09 91 00 PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of primers, paints, ~~stains~~, and other coatings for exterior and interior items and surfaces.

1.2 REFERENCES

- A. American Society for Materials and Testing (ASTM)
 - 1. D16-Terminology for Paint, Related Coatings, Materials, and Applications.
 - 2. D3960-Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
 - 3. D4262-pH of Chemically Cleaned or Etched Concrete Surfaces.
 - 4. D4263-Indicating Moisture in Concrete by the Plastic Sheet Method.
- B. Environmental Protection Agency (EPA).
- C. Factory Mutual Global (FMG).
- D. NACE International the Corrosion Society.
- E. GREENGUARD Product Emission Standard **from UL Environment**
- F. Green Seal Standard GS-03 (GS-03), Anti-corrosive paints, latest edition.
- G. Green Seal Standard GS-11 (GS-11), Paints, latest edition.
- H. Master Painters Institute (MPI) including the Approved Products List.
- I. National Fire Protection Association (NFPA): NFPA 30-Flammable and Combustible Liquids Code.
- J. Painting and Decorating Contractors Association (PDCA) P4-Responsibility for Inspection and Acceptance of Surfaces Prior to Painting and Decorating.
- K. Society of Protective Coatings (SSPC) SP6-Commercial Abrasion Blast.
- L. Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including latest Addenda.
- M. Steel Structures Painting Council.
- N. Underwriter's Laboratory (UL).

1.3 SYSTEM DESCRIPTION

- A. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Consultant or County Project Manager will select from standard colors and finishes available.
 - 1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
 - 2. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include the following factory-finished components such as:
 - (a) Architectural woodwork.
 - (b) Acoustical wall panels.
 - (c) Toilet enclosures.
 - (d) Metal lockers.
 - (e) Prefinished folding or accordion walls.
 - (f) Elevator entrance doors and frames.

- (g) Elevator equipment.
 - (h) Finished mechanical and electrical equipment.
 - (i) Light fixtures.
2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces such as:
- (a) Foundation spaces.
 - (b) Furred areas.
 - (c) Ceiling plenums.
 - (d) Utility tunnels.
 - (e) Pipe spaces.
 - (f) Duct shafts.
 - (g) Elevator shafts.
3. Finished metal surfaces include the following:
- (a) Anodized aluminum.
 - (b) Stainless steel.
 - (c) Chromium plate.
 - (d) Copper and copper alloys.
 - (e) Bronze and brass.
4. Operating parts include moving parts of operating equipment and the following:
- (a) Valve and damper operators.
 - (b) Linkages.
 - (c) Sensing devices.
 - (d) Motor and fan shafts.
5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.4 ADDITIONAL DEFINITIONS

- A. General: Standard coating terms defined in ASTM D16 apply to this Section.
- 1. Flat: Lusterless or matte finish with a gloss range below 15 when measured at an 85 degree meter.
 - 2. Eggshell or Satin: Low-sheen finish with a gloss range between 20 and 35 when measured at a 60 degree meter.
 - 3. Semi-gloss: Medium-sheen finish with a gloss range between 35 and 70 when measured at a 60 degree meter.
 - 4. Full gloss: High-sheen finish with a gloss range more than 70 when measured at a 60 degree meter.

1.5 SUBMITTALS

- A. Product Data: For each paint system indicated. Include block fillers and primers.
- 1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 - 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
 - 3. Low Emitting Materials:
 - (a) Submit manufacturer's Material Safety Data Sheet (MSDS) Indicating VOC limits of all products.
 - (b) Submit manufacturer's MSDS for all products that comply with GREENGUARD Product Emission Standard.
 - (c) Submit manufacturer's certification for all architectural paint, coating, and primer products applied to interior walls and ceilings that comply with the Green Seal Certification standard GS-11.

- (d) Submit manufacturer's certification for all anti-corrosive and anti-rust paint products applied to interior metal ferrous surfaces that comply with the Green Seal Standard GS-03.
- B. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.
 - 1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
 - 2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
 - 3. Submit Samples on the following substrates for Consultant or County Project Manager's review of color and texture only:
 - (a) Concrete: 4 inches square samples for each color and finish.
 - (b) Concrete Unit Masonry: 4 by 8 inches sample of masonry, with mortar joint in the center, for each finish and color.
 - (c) Painted Wood: 8 inches square samples for each color and material on hardboard.
 - (d) Stained or Natural Wood: 4 by 8 inches sample of natural or stained-wood finish on representative wood surfaces.
 - (e) Ferrous Metal: 3 inches square samples of flat metal and 6-inch long samples of solid metal for each color and finish.
- C. Warranty.

1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: Paint subcontractor/Applicator shall be licensed in the State of Florida or in Broward County for the services to be provided for this Project. Refer to Division 1 References for minimum experience.
- B. ~~Source Limitations~~**Compatibility: Obtain block fillers and primers for each coating system from the same manufacturer as the finish or top coats.**
- C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.
 - 1. Consultant or County Project Manager will select at least one room or surface to represent surfaces and conditions for application of each type of coating and substrate.
 - (a) Wall Surfaces: Provide samples on at least 100 sq. ft.
 - (b) Small Areas and Items: Consultant or County Project Manager will designate items or areas required.
 - 2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
 - (a) After finishes are accepted, Consultant or County Project Manager will use the room or surface to evaluate coating systems of a similar nature.
- D. Final approval of colors will be from benchmark samples.
- E. Conform to ASTM for interpretation of terms used in this Section.
- F. Labels: Do not paint over Underwriter's Laboratories (UL), Factory Mutual (FM) or other code required labels or equipment name, identification, performance rating, or nomenclature plates.
- G. Regulatory Requirements: Conform to applicable code for flame/fuel/smoke rating requirements for finishes.
- H. Single Source Responsibility: Provide primers, paints, stains and other coatings for exterior and interior items and surfaces by the same manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
 - 1. Product name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
 - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 degrees Fahrenheit and a maximum temperature of 90 degrees Fahrenheit. Maintain storage containers in a clean condition, free of foreign materials and residue.
 - 1. Keep storage area neat and orderly. Remove oily rags and waste daily.
- C. Container Labeling: Include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing.
- D. Store and mix materials in one area only.
- E. Comply with health and fire regulations. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.8 PROJECT CONDITIONS

- A. **Allow sufficient time for stucco and plaster to moist cure in accordance with other sections of the Project Manual. The pH factor and moisture level of all areas to receive primer or paint shall be tested and confirmed.**
 - 1. **pH factor shall be below 10.**
 - 2. **Moisture content shall be below 80.**
 - 3. **Provide a written record of each such test.**
 - 4. **"Hot" primer shall not be permitted until the pH is below 10.**
- B. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.
- C. **Do not do any painting if the relative humidity exceeds 90 percent.**
- D. Do not apply finish in areas where dust is being generated.
- E. Cover or otherwise protect finished work of other trades and surfaces not being painted concurrently or not to be painted.
- F. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 degrees Fahrenheit above the dew point; or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.
- G. Provide continuous ventilation to maintain surface and ambient temperatures 24 hours before, during and 48 hours after painting.
- H. Provide lighting levels of 50 foot-candles ~~foot-candles~~ **foot-candles** at mid-height at substrate surface.

1.9 WARRANTY

- A. Provide a written guarantee, co-signed jointly and severally by the Contractor, the painting subcontractor/Applicator, and the paint materials manufacturer, against cracking, peeling flaking, chalking and mildew on interior surfaces, and additionally against erosion and unreasonable fading or exterior surfaces, for at least six years; agreeing to repair and repaint surfaces affected by such defects, at no cost to the ~~Owner~~ **County**, including necessary removal or protection of other work, without limit, within 30 calendar days after notification by the ~~Owner~~ **Consultant or County Project Manager**, and to perform such work based on the provisions of this section, including extension of the guarantee to cover new work.

1.10 EXTRA STOCK

- A. Provide "Home Store" data (where **Contractor** or painting subcontractor purchased the paints used on the project); include all paint records and the following Home Store information:
 - 1. Name of Home Store.
 - 2. Address.
 - 3. Telephone number of the Home Store.
 - 4. Email address.
 - 5. List of paints purchased by name and type.
- B. Provide at least a one-gallon container of each color and surface texture of respective finish paints used on the project.
- C. Label each container with color, texture and room locations, in addition to the manufacturer's label.
- D. Deliver and store extra stock at the time of substantial completion.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Subject to compliance with the specified requirements, provide products by one of the following approved manufacturers:
 - 1. Acrylux Paint Manufacturing Co.
 - 2. Benjamin Moore & Co.
 - 3. Devoe Paints
 - 4. Coronado Paint Co., Inc.
 - 5. Dunn-Edwards
 - 6. Duron, Inc.
 - 7. ICI Paint Stores, Inc.
 - 8. MAB Paints
 - 9. PPG Architectural Finishes, Inc.
 - 10. Sherwin-Williams Company **(SW)** (Basis of Design for most projects, **product numbers listed beside product name if available**)
 - 11. Substitutions may be considered in accordance with the Product Substitution Procedures section in the Project Manual.

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers.
- C. Colors: As selected by Consultant from manufacturer's full range.
- D. Millage noted below is minimum acceptable dry film thickness per coat application.
- E. Toxicity/IEQ: All interior paint and coating products are to comply with the GREENGUARD Product Emission Standard.
 1. All architectural paints, coatings, and primers applied to interior walls and ceilings are to comply with the Green Seal Standard GS-11.
 2. All anti-corrosive and anti-rust paints applied to interior metal ferrous surfaces are to comply with Green Seal Standard GS-03.

2.3 VOC CONTENT

- A. Products are specified must not exceed the following:
 1. Interior Coatings (weight in grams/liter of product):
 - (a) Non-Flat: 150.
 - (b) Flat: 50.
 2. Exterior Coatings weight in grams/liter of product minus water):
 - (a) Non-Flat: 200.
 - (b) Flat: 100.

2.4 CONCRETE UNIT MASONRY BLOCK FILLERS

- A. Concrete Unit Masonry Block Filler: Factory-formulated high-performance latex block fillers.
 1. Sherwin-Williams PrepRite Block Filler (~~B25W25~~**B25W00025**) or approved equal. ~~Applied at a dry film thickness of not less than 8 mils per coat.~~
 - (a) Meets GS-11.
 - (b) MP-33.1 Block Filler, Latex Base, Interior/Exterior Flat, White.

2.5 EXTERIOR PRIMERS

- A. Exterior Concrete and Masonry Primer **for** New Construction: Factory-formulated alkali-resistant acrylic-latex primer for exterior application.
 1. Sherwin-Williams Loxon ~~Acrylic~~ **Concrete & Masonry Primer/Sealer** (~~A24W300~~) or approved equal. Applied at a dry film thickness ~~of not less than 3.2 mils per coat.~~
- B. Exterior Concrete and Masonry Primer for Elastomeric Coatings: Factory-formulated alkali-resistant acrylic-latex primer for exterior application.
 1. Sherwin-Williams Loxon ~~Acrylic~~ **Concrete & Masonry Primer/Sealer** (~~A24W300~~) or approved equal. Applied at a dry film thickness ~~of not less than 3.2 mils per coat.~~
- C. Exterior Concrete and Masonry Primer for Existing Construction: Factory-formulated alkali-resistant acrylic primer for exterior application.

1. Sherwin-Williams ~~Loxan~~ **Loxon** Conditioner (~~A24W100~~**A24W Series**) or approved equal: Applied at a spread rate of 200-300 square feet per gallon as recommended by manufacturer.
- D. Exterior Wood Primer for Acrylic Enamels: Factory-formulated alkyd or latex wood primer for exterior application.
1. **Oil based Primer:** Sherwin-Williams A-100 Exterior Oil ~~Stain-Blocking~~ **Based Wood** Primer (~~Y24W20~~**Y24W8020**) or approved equal; ~~or~~
 2. **Latex Primer: use when stain blocking is not required:** SW Exterior Latex Wood Primer (B42W08141) or approved equal: ~~Applied at a dry film thickness of not less than 2.3 mils per coat, or~~
 3. ~~Sherwin-Williams A-100 Exterior Latex Primer (B42W41/B42W43) or approved equal: Applied at a dry film thickness of not less than 1.4 mils per coat.~~
- E. Exterior Ferrous-Metal Primer: Factory-formulated rust-inhibitive metal primer for exterior application.
1. Sherwin-Williams **Pro Industrial** Pro-Cryl Universal Primer (~~B66-310~~**B66W Series**): ~~Applied at a dry film thickness of not less than 2.0 mils per coat (acrylic-based).~~
 - (a) Meets GS-11.
 - (b) Meets MP-26.3 "Recommended Primer" under Sherwin-Williams DTM Acrylic Gloss Coating (B66 Series), if offering a Sherwin Williams primer.
 - (c) **Or approved equal**
- F. Exterior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer for exterior application.
1. Sherwin-Williams **Pro Industrial** Pro-Cryl Universal Primer (B66-310**B66W Series**): Applied at a dry film thickness of not less than 2.0 mils per coat (acrylic-based).
 - (a) Meets GS-11.
 - (b) Meets MP-26.3 "Recommended Primer" under Sherwin-Williams DTM Acrylic Gloss Coating (B66 Series), if offering a Sherwin Williams primer.
 - (c) **Or approved equal**
- G. Exterior Aluminum Primer under Acrylic Finishes: Factory-formulated acrylic-based metal primer for exterior application.
1. Sherwin-Williams **Pro Industrial** Pro-Cryl Universal Primer (~~B66-310~~**B66W Series**): Applied at a dry film thickness of not less than 2.0 mils per coat (acrylic-based).
 - (a) Meets GS-11.
 - (b) Meets MP-26.3 "Recommended Primer" under Sherwin-Williams DTM Acrylic Gloss Coating (B66 Series), if offering a Sherwin Williams primer.
 - (c) **Or approved equal**
- H. **All primers must be compatible with and recommended by the topcoat or final coat manufacturer.**

2.6 INTERIOR PRIMERS MEETING GS-11

- A. Interior Concrete, Masonry, and Brick Primer: Factory-formulated, alkali-resistant, acrylic-latex interior primer for interior application.
1. Sherwin-Williams ~~ProGreen~~ **ProMar** 200 ~~Low~~ **Zero** VOC Interior Latex Primer (~~B28W600~~**B28W Series**) or approved equal: ~~Applied at a dry film thickness of not less than 1.5 mils per coat.~~
- B. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
1. Sherwin-Williams ~~ProGreen~~ **ProMar** 200 ~~Low~~ **Zero** VOC Interior Latex Primer (~~B28W600~~**B28W Series**) or approved equal: ~~Applied at a dry film thickness of not less than 1.5 mils per coat.~~

- C. Interior Plaster Primer: Factory-formulated latex-based primer for interior application.
1. Sherwin-Williams ~~ProGreen~~ **ProMar** 200 Low **Zero** VOC Interior Latex Primer (~~B28W600~~B28W Series) or approved equal
 2. ~~Applied at a dry film thickness of not less than 1.5 mils per coat.~~ **Not used.**
- D. Interior Wood Primer for Acrylic-Enamel: Factory-formulated acrylic-latex-based interior wood primer.
1. Sherwin-Williams Harmony Interior Latex Primer (B11W900) ~~or approved equal: Applied at a dry film thickness of not less than 1.3 mils per coat.~~
 2. ~~Or~~ Sherwin Williams PrepRite ProBlock **Interior/Exterior** Latex Primer/**Sealer**, B51 Series (~~4 mils wet/1.4 mils dry~~). Does not need to meet GS-11.
 3. **Or approved equal**
- E. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
1. Sherwin-Williams ~~ProCryl~~ **Pro Industrial Pro-Cryl** Universal **Acrylic** Primer (~~B66-310~~**B66W Series**) or approved equal: ~~Applied at a dry film thickness of not less than 2.0 mils per coat.~~ Does not need to meet GS-11.
- F. Interior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer.
1. Sherwin-Williams ~~ProCryl~~ **Pro Industrial Pro-Cryl** Universal **Acrylic** Primer (~~B66-310~~**B66W Series**) or approved equal: ~~Applied at a dry film thickness of not less than 2.0 mils per coat.~~
- G. Interior Unit Masonry, Gypsum Board and Plaster: Factory-formulated primer **compatible with** Epoxy finish **coat being provided.**
1. Sherwin-Williams ~~ProGreen~~ 200 Low VOC Interior Latex **Loxon Concrete & Masonry Primer/Sealer** (B28W600) or approved equal: ~~Applied at a dry film thickness of not less than 1.5 mils per coat.~~
- H. **All primers must be compatible with and recommended by the topcoat or final coat manufacturer.**

2.7 EXTERIOR FINISH COATS

- A. Exterior Low-Luster Acrylic Elastomeric: Factory-formulated low sheen 100% Acrylic Elastomeric coating for exterior application. Note: Use elastomerics only after receiving approval in writing from the ~~Owner.~~ **County Project Manager or Consultant.**
1. SW SherLastic Elastomeric Coating (A5-100**A05W Series**) or approved equal: ~~Applied at a dry film thickness of not less than 6.0 mils per coat.~~
- B. Exterior Low-Luster Acrylic Paint: Factory-formulated low-sheen (eggshell or satin) acrylic-latex paint for exterior application.
1. Sherwin-Williams A-100 Exterior Latex (Satin **or Low Sheen finish**) (A82 Series) or approved equal: ~~Applied at a dry film thickness of not less than 1.3 mils per coat.~~ **not GS-11 approved**
- C. Exterior Semigloss Acrylic Enamel: Factory-formulated semigloss waterborne acrylic-latex enamel for exterior application.
1. Sherwin-Williams **Pro Industrial** DTM Acrylic Coating (~~B66-200 Series-Semi-Gloss~~) or approved equal. ~~Applied at a dry film thickness of not less than 2.5 mils per coat.~~
- D. Exterior Full-Gloss Acrylic Enamel for Ferrous and Other Metals: Factory-formulated full-gloss waterborne acrylic-latex enamel for exterior application.

1. Sherwin-Williams **Pro Industrial** DTM Acrylic Coating (B66-200-Series-Semi-Gloss) or approved equal. ~~Applied at a dry film thickness of not less than 2.5 mils per coat.~~
 - (a) ~~Meets GS-11.~~
 - (b) ~~Meets MP 26.3 Acrylic Base Gloss Enamel, Metal Surfaces, Whites and Tints.~~

2.8 INTERIOR FINISH COATS MEETING GS-11 UNO

- A. Interior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for interior application.
 1. Sherwin-Williams ~~ProGreen~~ **ProMar** 200 ~~Low~~ **Zero** VOC Interior Latex Flat (~~B30-600 Series~~) or approved equal: ~~Applied at a dry film thickness of not less than 1.3 mils per coat.~~
- B. Interior Flat Latex-Emulsion Size: Factory-formulated flat latex-based interior paint.
 1. Sherwin-Williams Harmony Interior Latex Flat (~~B5 Series~~) or approved equal: ~~Applied at a dry film thickness of not less than 1.7 mils per coat.~~
- C. Interior Low Luster Latex Paint: Factory-formulated eggshell latex based interior paint.
 1. Sherwin-Williams Harmony Interior Latex ~~Eggshell (B9 Series)~~ **Eg-Shel** or approved equal: ~~Applied at a dry film thickness of not less than 1.6 mils per coat.~~
- D. Interior Low-Luster Acrylic Enamel:
 1. Sherwin-Williams ~~ProGreen~~ **ProMar** 200 ~~Low~~ **Zero** VOC Interior Latex ~~Eggshell (B20-600 Series)~~ **Low Sheen Eg-shel** or approved equal: ~~Applied at a dry film thickness of not less than 1.7 mils per coat.~~
- E. Interior Semi-gloss Acrylic Enamel: Factory-formulated semi-gloss acrylic-latex enamel for interior application.
 1. Sherwin-Williams ~~ProGreen~~ **ProMar** 200 **Zero VOC** Interior Latex Semi-Gloss (~~B31-600 Series~~) or approved equal: ~~Applied at a dry film thickness not less than 1.6 mils per coat.~~
- F. Interior Full-Gloss Acrylic Enamel:
 1. Sherwin-Williams **Pro Industrial** ~~Zero VOC~~ **Gloss Acrylic** Gloss (~~B66W600~~) coating or approved equal: ~~Applied at a dry film thickness of not less than 2.5 mils per coat.~~ Does not need to meet GS-11.
- G. Interior Waterborne Acrylic Epoxy: Factory-formulated semi-gloss acrylic epoxy coating of interior application.
 1. Sherwin-Williams Water-Based Catalyzed Epoxy (~~Two Component~~) (~~B70W211/B60V15~~): ~~Applied at a dry film thickness of not less than 2.5 mils per coat. Does not need to meet GS-11.~~
 2. Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46W150 Series.
 3. ~~Benjamin Moore IMC Acrylic Epoxy Coating Semi-Gloss (M43/M44-86). Applied at a dry film thickness of not less than 1.5 mils.~~
 4. Or approved equal.
- H. Concrete Water Repellent Curing and Sealing System: Factory-formulated penetrating sealer of concrete floors to increase surface strength, limit concrete dusting, limit penetration of stains and damaging impurities such as oil, gas, and grease, and remain breathable (per ASTM D1653) without altering the surface profile or leaving a topical residue. **Minimum manufacturer's warranty of five years is required.** Finish shall be slip-resistant and approved for wet areas. Finish: flat/clear from one of the following pre-approved manufacturers and products:
 1. Rust-Oleum OKON W-1, Water Repellant Sealer acrylic/silane-siloxane
 - 2.
 3. V-SEAL 101, hybrid solution of catalyzed potassium silicate
 4. Or approved equal

2.9 ~~INTERIOR WOOD STAINS AND VARNISHES~~

- ~~A. Open Grain Wood Filler: Factory formulated paste wood filler applied at spreading rate recommended by manufacturer.~~
- ~~1. Sherwin-Williams Sher Wood Natural Filler (D70T1) or approved equal.~~
- ~~B. Interior Wood Stain: Factory formulated alkyd-based penetrating wood stain for interior application applied at spreading rate recommended by manufacturer.~~
- ~~1. Minwax 250 VOC Wood Stain or approved equal.~~
- ~~C. Interior Waterborne Clear Satin Varnish: Factory formulated clear satin acrylic-based polyurethane varnish applied at spreading rate recommended by manufacturer.~~
- ~~1. Two Coats of Sherwin-Williams Wood Classics Waterborne Polyurethane Varnish Satin (A68 Series) or approved equal: Applied at a dry film thickness of not less than 0.8 mils per coat.~~
- ~~D. Interior Waterborne Stain Full Gloss Varnish:~~
- ~~1. Two Coats of Sherwin-Williams Wood Classics Waterborne Polyurethane Varnish Gloss (A68 Series) or approved equal: Applied at a dry film thickness of not less than 0.8 mils per coat.~~

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.
1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

3.2 PREPARATION

- A. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide pull tests on existing painted surfaces where a different coating will be applied. Verify with the manufacturer that the coatings are compatible.
 2. Provide barrier coats over incompatible primers or remove and re-prime.
 3. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
 - (a) Use abrasive blast-cleaning methods if recommended by paint manufacturer.
 - (b) Determine alkalinity pH and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition by approved curing methods in the stucco section. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
 - (c) Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
 4. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - (a) Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - (b) Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
 - (c) If transparent finish is required, backprime with non-yellowing varnish.
 - (d) Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
 - (e) Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
 5. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's recommendations.
 - (a) Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.
 - (b) Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - (c) Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
 6. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment or "passivators" from galvanized sheet metal fabricated from coil stock by mechanical methods SSPC-SP 7.
- D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment and furniture with prime coat only.
 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
 10. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve **wet or** dry film thickness (**mils**) indicated. Provide total ~~dry~~ film thickness of the entire system as recommended by manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- F. Mechanical items to be painted include, but are not limited to, the following:
1. Uninsulated metal piping.
 2. Uninsulated plastic piping.
 3. Pipe hangers and supports.
 4. Tanks that do not have factory-applied final finishes.
 5. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.

6. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
 7. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
- G. Electrical items to be painted include, but are not limited to, the following:
1. Switchgear.
 2. Panelboards.
 3. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no bleed-through or other defects due to insufficient application of sealer or primer.
- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
1. Provide satin finish for final coats.
- L. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- M. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

- A. ~~Owner reserves~~ **Consultant and County Project Manager reserve** the right to invoke the following test procedure at any time and as often as ~~Owner deems~~ **Consultant and County Project Manager deem** necessary during the period when paint is being applied:
1. ~~Owner will~~ **County may** engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.
 2. Testing agency will perform appropriate tests as required by ~~Owner~~ **Consultant or County Project Manager**.
 3. ~~Owner~~ **Consultant or County Project Manager** may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.
- B. Remove all spilled, splashed or splattered paint from all surfaces. Leave entire project in a clean condition.
- C. Place scrapings, empty cans, consumed brushes, etc. in plastic bags and dispose of in the proper manner by the Contractor. Place used mineral spirits and other hazardous liquids in an appropriate container and is the responsibility of the Contractor to properly dispose of in full compliance of EPA rules and regulations.
- D. Do not mar surface finish by cleaning.
- E. Leave entire project in a clean condition.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Consultant or County Project Manager.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 EXTERIOR PAINT SCHEDULE (provide the following finish systems):

- A. Concrete, Stucco, and Brick: Unless specialty finish is noted:
 - 1. Low-Luster Acrylic Paint:
 - (a) Primer: Exterior concrete and masonry primer.
 - (b) Finish: Two coats Exterior low-luster acrylic paint.
 - 2. Semi-gloss Acrylic-Enamel:
 - (a) Primer: Exterior concrete and masonry primer.
 - (b) Finish: Two coats Exterior semi-gloss acrylic enamel.
 - 3. Low Luster Acrylic Elastomeric:
 - (a) Primer/Sealer: Latex masonry sealer
 - (b) Finish: Two coats Low luster Acrylic elastomeric waterproof coating.
- B. Concrete Masonry Unit (CMU):
 - 1. Low-Luster Acrylic Paint:
 - (a) Block Filler: Concrete unit masonry block filler.
 - (b) Finish: Two coats Exterior low-luster acrylic paint.
 - 2. Semi-gloss Acrylic-Enamel:
 - (a) Block Filler: Concrete unit masonry block filler.
 - (b) Finish: Two coats Exterior semi-gloss acrylic enamel.
 - 3. Low Luster Acrylic Elastomeric:
 - (a) Primer: Alkyd masonry sealer
 - (b) Finish: Two coats Low luster acrylic elastomeric waterproof coating.
- C. CMU, Gypsum Board and Plaster in Wet Areas such as walls in Restrooms and Janitor's Closet:
 - 1. Interior Waterborne Acrylic Epoxy:
 - (a) Primer: Epoxy primer
 - (b) Finish: Two coats waterborne acrylic epoxy coating~~coating~~.
- D. Gypsum Board:
 - 1. Low-Luster Acrylic-Enamel (at ceilings and soffits):
 - (a) Primer: Interior gypsum board primer
 - (b) Finish: Two coats Interior low-luster acrylic enamel
 - 2. Satin Acrylic-Enamel Finish (at walls):
 - (a) Primer: Interior gypsum board primer
 - (b) Finish: Two coats Interior semi-gloss acrylic enamel

- E. Ferrous-Metal: Primer is not required on shop-primed items.
 - 1. Full-Gloss Acrylic-Enamel:
 - (a) Primer: Exterior ferrous-metal primer.
 - (b) Finish: Two coats Exterior full-gloss acrylic enamel for ferrous and other metals.
 - 2. Semi-gloss Acrylic-Enamel:
 - (a) Primer: Exterior ferrous-metal primer
 - (b) Finish: Two coats Exterior semi-gloss acrylic enamel for ferrous and other metals.
- F. Zinc-Coated Metal:
 - 1. Full-Gloss Acrylic-Enamel:
 - (a) Primer: Exterior galvanized metal primer.
 - (b) Finish: Two coats Exterior full-gloss acrylic enamel for ferrous and other metals.
 - 2. Semi-gloss Acrylic-Enamel:
 - (a) Primer: Exterior ferrous-metal primer
 - (b) Finish: Two coats Exterior semi-gloss acrylic enamel for ferrous and other metals.
- G. Aluminum: Provide the following finish systems over exterior aluminum surfaces:
 - 1. Full-Gloss Acrylic-Enamel Finish:
 - (a) Primer: Exterior aluminum primer under acrylic finishes.
 - (b) Finish: Two coats Exterior full-gloss acrylic enamel for ferrous and other metals.
 - 2. Semi-gloss Acrylic-Enamel Finish:
 - (a) Primer: Exterior aluminum primer under acrylic finishes
 - (b) Finish: Two coats Exterior semi-gloss acrylic enamel for ferrous and other metals.
- H. Wood
 - 1. Low-Luster Acrylic Paint:
 - (a) Primer: Exterior concrete and masonry primer.
 - (b) Finish: Two coats Exterior low-luster acrylic paint.
 - 2. Low Luster Acrylic Elastomeric:
 - (a) Primer/Sealer: Latex masonry sealer
 - (b) Finish: Two coats Low luster acrylic elastomeric waterproof coating.

3.8 INTERIOR PAINT SCHEDULE

- A. Concrete and Brick:
 - 1. Low-Luster Acrylic-Enamel ceilings and soffits):
 - (a) Primer: Interior concrete and masonry primer.
 - (b) Finish: Two coats Interior low-luster acrylic enamel.
 - 2. Acrylic-Enamel:
 - (a) Primer: Interior concrete and masonry primer.
 - (b) Finish: Two coats Interior semi-gloss acrylic enamel.
- B. Concrete Unit Masonry, Gypsum Board and Plaster:
 - 1. Semi-gloss Waterborne Acrylic Epoxy:
 - (a) Primer: Epoxy primer.
 - (b) Finish: Two coats Waterborne eggshell or satin finish Acrylic Epoxy Coating.

C. Gypsum Board:

1. Low-Luster Acrylic-Enamel (at ceilings and soffits):
 - (a) Primer: Interior gypsum board primer.
 - (b) Finish: Two coats Interior low-luster acrylic enamel.
2. Acrylic-Enamel Finish:
 - (a) Primer: Interior gypsum board primer.
 - (b) Finish: Two coats Interior eggshell or sating finish acrylic enamel.

D. Plaster:

1. Low-Luster Acrylic-Enamel (at ceilings and soffits):
 - (a) Primer: Interior plaster primer.
 - (b) Finish: Two coats Interior low-luster acrylic enamel.
2. Semi-gloss Acrylic-Enamel Finish:
 - (a) Primer: Interior plaster primer.
 - (b) Finish: Two coats Interior semi-gloss acrylic enamel.

E. Acoustical Plaster:

1. Flat Acrylic-Latex Finish:
 - (a) Finish: Two coats Interior flat acrylic paint.

F. Wood:

1. Semi-gloss Acrylic-Enamel:
 - (a) Primer: Interior wood primer for acrylic-enamel and semi-gloss alkyd-enamel finishes.
 - (b) Finish: Two coats Interior semi-gloss acrylic enamel.
2. Full-Gloss Acrylic-Enamel:
 - (a) Primer: Interior wood primer for acrylic-enamel and semi-gloss alkyd-enamel finishes.
 - (b) Finish: Two coats Interior full-gloss acrylic enamel.

G. Ferrous-Metal:

1. Full-Gloss Acrylic-Enamel:
 - (a) Primer: Interior ferrous-metal primer.
 - (b) Finish: Two coats Interior full-gloss acrylic enamel.
2. Semi-gloss Acrylic-Enamel:
 - (a) Primer: Interior ferrous-metal primer.
 - (b) Finish: Two coats Interior semi-gloss acrylic enamel.

H. Zinc-Coated Metal:

1. Full-Gloss Acrylic-Enamel:
 - (a) Primer: Interior zinc-coated metal primer.
 - (b) Finish: Two coats Interior full-gloss acrylic enamel.
2. Semi-gloss Acrylic-Enamel:
 - (a) Primer: Interior zinc-coated metal primer.
 - (b) Finish: Two coats Interior semi-gloss acrylic enamel.

I. All-Service Jacket over Insulation:

1. Flat Acrylic Finish: Add fungicidal agent to render fabric mildew proof.

- (a) Finish: Two coats Interior flat latex-emulsion size.

3.9 ~~INTERIOR STAIN AND NATURAL FINISH WOODWORK SCHEDULE~~

A. ~~Stained Woodwork:~~

1. ~~Waterborne Clear Satin Varnish: Wipe wood filler before applying stain.~~
(a) ~~Filler: Open grain wood filler.~~
(b) ~~Stain: Interior wood stain.~~
(c) ~~Finish: Two coats Interior waterborne clear satin varnish.~~
2. ~~Waterborne Stain Full Gloss Varnish Finish: Wipe filler before applying stain.~~
(a) ~~Filler: Open grain wood filler.~~
(b) ~~Stain: Interior wood stain.~~
(c) ~~Finish: Two coats Interior waterborne clear gloss varnish.~~

B. ~~Natural Finish Woodwork:~~

1. ~~Waterborne Clear Satin Varnish: Wipe wood filler before applying stain.~~
(a) ~~Filler: Open grain wood filler.~~
(b) ~~Finish: Two coats Interior waterborne clear satin varnish.~~
2. ~~Waterborne Full Gloss Varnish: Wipe filler before applying stain.~~
(a) ~~Filler: Open grain wood filler.~~
(b) ~~Finish: Two coats Interior waterborne clear gloss varnish.~~

END OF SECTION

SECTION 10 14 00 SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. At a minimum, provide the following signage for all new buildings.

1.2 SUBMITTALS

- A. Manufacturer's catalog cuts, product data sheets, and installation instructions for each item specified.
- B. Maintenance data for each item.

PART 2 - PRODUCTS

2.1 MAXIMUM CAPACITY SIGNS

- A. Provide one (1) sign depicting the maximum allowable occupancy for each assembly space. Every room or space that is assembly occupancy shall have the occupant load of the room or space posted in a conspicuous place, near the main exit or exit access doorway from the room or space. Posted signs shall be of an approved legible permanent design and mounted per FBC and ADA requirements.
- B. Size shall be 6 inches x 12 inches with 3/8 inch radius corners.
- C. Color shall be white on a red background.
- D. Material shall be 1/8 inch thick plastic with raised symbol for identification by the blind.
- E. Mounting shall be with non-removable head screws at locations directed by Consultant or County Project Manager.

2.2 RESTROOM SIGNAGE

- A. Provide one (1) sign depicting National Handicapped Symbol (wheelchair) at each restroom equipped with accessible facilities *and* at each individual handicapped stall. Size shall be 6 inches x 6 inch with 3/8 inch radius corners unless noted otherwise on the Drawings.
- B. Typical color is white on a blue background.
- C. Material shall be 1/8 inch thick plastic with raised symbol for identification by the blind.
- D. Mounting shall be with non-removable head screws at locations directed by Consultant or County Project Manager, per FBC and ADA requirements.

2.3 VENTILATION SUCH AS LOUVERED VENTS NEAR THE FLOOR

- A. Provide one (1) small sign stating not to block the ventilation with a waste receptacle or other items.

2.4 STORAGE SIGNS

- A. Provide and install at all Air Conditioning, Electrical and Boiler Rooms a sign mounted on the door to read as follows: "COMBUSTIBLE STORAGE NOT PERMITTED".
- B. Provide and install at Storage Rooms with electrical equipment a sign mounted in the room to read as follows: "STORAGE NOT PERMITTED WITHIN 4'-0" OF ELECTRICAL EQUIPMENT". In front of any water heaters, including those that are tankless, install a sign stating "30 IN. x 30 IN. CLEARANCE TO BE MAINTAINED AT ALL TIMES; NO STORAGE" per FBC Plumbing Chapter 502.5. Signs shall be blade acrylic plastic, red background with white letter 1-1/2 inches high x width necessary for copy, with 3/8 inch radius corners.
- D. Mount on door with non-removable oval-head screws. Verify number of signs required.

2.5 WARNING SIGNS

- A. Provide at mechanical and electrical yards sign to read as follows: "WARNING – HAZARDOUS EQUIPMENT AREA – KEEP OUT". Mount on wall beside yard entrance gates.
- B. Warning signs must have an orange body with a black panel at the top. Warning is written in orange on the black panel. Additional wording and pictograms must be printed in black on the lower portion of the sign.
- C. Provide additional warning signs for all equipment as recommended by the equipment manufacturer. Coordinate exact warning on equipment with manufacturer's written recommendations.

- D. Size warning signs and labels as is appropriate for the sign to be noticed and easily read from a safe distance. Communicate the warning information before someone is in a dangerous area or performs a dangerous action.
- E. Signage shall comply with NFPA and OSHA safety regulation requirements.
- F. Post Danger signs for specific danger conditions, such as no smoking, loud noises, etc. The word "DANGER" should be printed in white letters on a red oval over a rectangular black field. The body of the sign should be white and the message in black. Additional pictograms may be included in the message area on the sign. Mount Danger signs on the building wall within the pool yard and also inside the pool equipment room.

2.6 NO SMOKING SIGNS

- A. Provide at all exterior doors and mechanical yard a "NO SMOKING WITHIN 25 FEET" sign.
- B. Color shall be red/black on a white background.
- C. Mount on wall with non-removable oval-head screws.

2.7 ALDRIDGE-BENGE FIREFIGHTER SAFETY ACT SIGNAGE

- A. Buildings with light-frame truss-type construction must be marked with a Maltese Cross emblem. The sign shall be 8 inches wide by 8 inches high and made of a bright red reflective color.
- B. Install on the exterior of the building within 24 inches to the left of the main entry door and between 48 and 72 inches above the finished floor, or as required by Code and F.S. 633.161, as amended.
- C. Approved manufacturers: www.compliancesigns.com, www.safetysign.com or approved equal.
- D. Refer to Drawings for location on the building.

2.8 BUILDING NAME (BUILDING ADDRESS IDENTIFICATION SIGN)

- A. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of 1/2 inch (12.7 mm). Address identification shall be placed in a position that is visible from the street or road fronting the property and/or provided in approved locations to facilitate emergency response.
- B. Signage to be provided by County and will match the existing building name signage at the site.
- C. Examples include "3600 A", "Restroom B", "Maintenance Building" and "Park Office".

2.9 DEDICATION PLAQUE (IF APPLICABLE)

- A. Material: Cast aluminum or cast bronze as selected by County or as detailed in the Drawings
- B. Size: 18 inches wide x 24 inches high
- C. Mounting: hidden screws
- D. Lettering: Calibri or Arial
- E. Plaque Surface: Textured/Pebble
- F. Border Style: Flat and smooth
- G. Lettering and Logos: Raised
- H. Layout: Either provided by County or included in the Drawings
- I. Provide plaque rubbing for approval before casting.
- J. Provide maintenance and cleaning instructions.
- K. The costs for the plaque will be through the pass-thru allowance.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Clean and prepare substrates prior to installation of products.
- B. Securely fasten all items so as to be square and level with surrounding elements.
- C. Install fire department locks and boxes in accordance with manufacturer's instructions and Fire Marshal's direction.
- D. Install all products to comply with manufacturer's instructions.

END OF SECTION

SECTION 10 18 00 INFORMATIONAL KIOSK

PART 1 GENERAL

1.1 SUMMARY OF WORK

- A. Provide, engineer, install and obtain permit for the prefabricated, engineered steel kiosk with concrete footings, in-ground (buried) mounting and other requirements as described below.
- B. Contractor's line item pricing includes all of the above and below requirements at no extra cost to County. Touch-up paint from the Manufacturer is included. Concrete slab, electric and solar power **are not included** in the line item pricing for the kiosk.
- C. Contractor shall provide signed and sealed engineered drawings prepared by an experienced Professional Engineer registered with the State of Florida with extensive design experience with the shelter manufacturer.
- D. Permitting, geotechnical testing and surveying may be paid for as a pass-thru line item or may be completed by County.

1.2 ADDITIONAL REFERENCES

- A. Florida Building Code with Broward County amendments, refer to Division 1.
- B. AISC 360-10 and Steel Construction Manual, latest edition.
- C. ASTM A36/A36M; A325; A563; A500; A653/A653M; A792/A792M; F1554.
- D. AWS D1.1, D1.3 and D1.8.
- E. Steel Structures Painting Council (SSPC) SP-2 and SP-10/NACE No. 2, latest editions.
- F. See Division 1 for additional references.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced company or person regularly engaged in installation of products specified in this Section. Manufacturer may require its own certification of the Installer or may require inspection by a Manufacturer's representative.
- B. Professional Engineer: An experienced company or person regularly engaged in the design of the Manufacturer's prefabricated structures.
- C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work.
- D. Coordination: Contractor shall coordinate all trades such as electric and site work to avoid delay.
- E. All steel components shall be factory welded by AWS certified welders and inspected by certified AWS inspectors in accordance with AWS minimum standards. **No welding shall occur at the job site.**
- F. No field modifications or revisions will be allowed without written authorization from the manufacturer.
- G. Performance Requirements:
 - 1. All structural steel shall be detailed, fabricated and erected in accordance with the latest edition of the AISC Specification Manual.
 - 2. Structural steel per AISC 360, "Specification for Structural Steel Buildings".
 - 3. Bolted connections per Research Council on Structural Connections (RCSC) "Specification for Structural Joints Using High-Strength Bolts".
 - 4. Welding qualifications according to AWS D1.1, "Structural Welding Code - Steel" or AWS D1.3, "Structural Welding Code - Sheet Steel" and D1.8 Seismic Supplement to D1.1/D1.1M
 - 5. SSPC SP10 or NACE No. 2 - Near White Blast Cleaning, latest edition; SSPC-SP2 hand cleaning is not acceptable.
 - 6. OSHA Steel Erection Standard 29 CFR 1926.750 Part R regarding anchor rods and anchor bolts.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 sections.
- B. Product Data: Manufacturer's data sheets on each product to be used, including installation methods, cleaning methods, preparation and storage and handling.
- C. Welding certificate(s).
- D. Shop Drawings: Provide the following, at a minimum, to the County Project Manager for approval:

1. Name and location of Project.
2. Name of manufacturer and model number.
3. Professional engineer's experience designing pre-fabricated structures for this manufacturer.
4. Plans including finished floor height, elevations, sections and dimensions including width, length, height, depth, column spacing and roof slope. Foundation design shall be for the loads applied and not a generic foundation design. Calculations shall include all member design for each different member type. Connection design for each different connection will determine the design of the bolts, welds, plate thickness and anchorage to the foundation.
5. Installation details and notes.
6. Governing building codes and edition.
7. Loads including dead load, live load, auxiliary loads and wind load/speed and exposure. Also include loads where applied acting simultaneously with concentrated loads in accordance with the governing building codes.
8. Required concrete footings and foundation, if applicable, with details and plans.
9. Material test reports.
10. Indicate compliance with AISC or AISI steel standards, including the edition and date.
11. Coordination plans with electric and site work, if applicable.
12. Sample warranty.
13. Maintenance instructions from the Manufacturer.
14. Details regarding the powder-coating and primer

- E. Selection Samples: Provide actual samples of Manufacturer's full range of available colors, patterns and textures. Samples shall be no smaller than 2 x 2 inches. Refer to Division 1 sections.

1.5 WARRANTIES

- A. Manufacturer shall provide a minimum **10-year warranty** on the structural framing members and hardware.
- B. Manufacturer shall provide a minimum **10-year warranty** on the powder-coated components.
- C. Manufacturer shall either offer its own minimum **10-year warranty**, or the warranty will be a minimum 10-year pass through warranty from the roofing manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Provide from one of the following approved products with all options, requirements and customizations as listed in this specification:
 1. Three post, steel kiosk
 - a. Triosk or equal from ICON Shelter Systems Inc.
 - b. KSK 3-8 or equal from Poligon by Porter Corp. (Basis of Design)
 - c. KT-08XX or equal from Steelworx/Coverworx Recreational Architecture (Steelworx)
 2. Two post, steel kiosk with display case on each side (2) and display case mounted to both posts
 - a. SG6x9TA or equal from ICON Shelter Systems Inc.
 - b. SSG 8x9 Display Case or equal from Poligon by Porter Corp.
 - c. KG-0608 or equal from Steelworx/Coverworx Recreational Architecture
 - d. Mini Shelter SLF-G8 by RCP Shelters, Inc.

2.2 IMAGES



Image 1: Example of Steelworx three post, steel kiosk



Image 2: Example of Steelworx two post, steel kiosk

2.3 MATERIALS

A. Roof requirements:

1. 24 gauge steel standing seam ("R" Panel) roof, ribs at 12 to 18 inches o.c.
 - a. As an additional cost, provide aluminum standing seam roof in lieu of the 24 gauge standing seam roof.
2. Fasten the roof panels to supports with concealed clips, spaced and located per Manufacturer.
3. Polyvinylidene fluoride (PVDF) resin-based metal coating such as Kynar 500 or Hylar 5000.
4. Minimum roof slope of 3:12 and maximum of 6:12.
5. Minimum eave height of 7 feet 0 inches (7'-0").
6. All roof trim to match the finish and color of the roof.
7. No raw edges as this promotes corrosion and is sharp to the touch.
8. Standing seam ribs shall run with the pitch of the roof for proper drainage.
9. Minimum overhang of 6 inches.
10. Roof peak caps shall be pre-fabricated with no field assembly required.
11. Roof screws shall be painted to match the roof material.
12. Roofing trim shall match the color and finish of the roofing material.
13. Additional requirements may be included in the Drawings.
14. Color shall be selected by the County Project Manager based upon manufacturer's standard color selection. Manufacturer shall offer at least ten standard colors for selection.

B. Powder Coating Finish:

1. All structural steel components (steel) shall be cleaned, pre-treated and finished in the following manner:
 - b. The steel shall be shot-blasted to the specification of SSPC-SP10 of near white blast cleaning. SSPC-SP2

- hand tool cleaning will not be an acceptable method.
- c. The shot-blasted steel is then washed with zinc-phosphate or iron-phosphate pre-treatment process.
- d. The steel is then coated with a zinc rich primer followed by a triglycidylisocyanurate (TGIC) durable polyester powder coating.
- e. As an additional cost, provide steel which is immersed in a liquid epoxy and coated through an electro-deposition process (E-coat or similar), and which is coated both on the inside and outside of the component to a uniform cover. The E-coat will totally encapsulate the part for additional corrosion protection.

C. Structural Members and Hardware:

1. All structural fasteners, connections and cover plates shall be hidden or concealed within the framing member as much as possible.
2. Columns and beams shall be square, rectangular or round without ornamentation or banding.
3. Shall be primed and powder-coated as noted above.
4. Hollow metal steel shall be ASTM A500 Grade B steel.
5. "I" beams, tapered columns or open channel sections will not be accepted for primary structural members.
6. All steel components and hardware shall be hot-dipped galvanized per ASTM A123 followed to ensure corrosion resistance.
7. Compression rings shall be made of ASTM A36 structural plate or of structural channel welded together to form the ring. All connections not requiring compression rings shall use ASTM A500, Grade B hollow structural sections (HSS) sections for these connections.
8. Welded connection plates shall be hot rolled steel per ASTM A36.
9. Anchor bolts shall be provided by the manufacturer. Install per the manufacturer's template at the dimensions and orientations as shown on the approved Shop Drawings.

D. Display Cases:

1. Includes lockable display cases as provided by the Manufacturer.
2. All locks shall be keyed alike.
3. Cork board interior.

PART 3 GENERAL

3.1 EXAMINATION

- A. Do not begin installation until the site and foundation, if applicable, have been properly prepared.
- B. Contractor shall ensure that all kiosk components are included and that they are in proper condition.

3.2 DELIVERY, STORAGE, AND HANDLING

- A. The structure shall be a pre-engineered package and shall be shipped as a pre-cut (excluding the roof panels) and pre-fabricated package including, but not limited to, the structural framing members, roof panels, fasteners, display cases, hardware and roof trim as well as project-specific installation instructions.
- B. **When the products are being unloaded, pad the forks of the forklift and use other precautions to protect the finishes of the kiosk and roofing materials. Do not use chains to move materials; use straps.**
- C. Store products in a secure and covered location to protect from the elements; store the products so that they are elevated above the ground and to allow for full air circulation around the materials to prevent puddling, mold, decay and insects.
- D. Keep products in manufacturer's unopened packaging until ready for installation.

3.3 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Coordinate the required spacing and locations of electric, plumbing and lightning protection.
- D. **Pour the concrete footings independently from the concrete slab, if applicable.**

3.4 **INSTALLATION**

- A. Install all structural components to be straight, plumb, and level; lay out as shown on shop drawings and survey; maintain all required clearances.
- B. Finished surfaces shall be cleaned after installation and be left free of imperfections.
- C. Comply with manufacturer's recommended procedures and installation sequence as well as final, County and Professional Engineer approved shop drawings.
- D. Any variations from the drawings and survey must be approved, in writing, by the Consultant or County Project Manager.
- E. Touch up damaged finishes with same paint as used by Manufacturer.
- F. Protect installed products until completion of project.
- G. Repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 10 21 13 PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid plastic restroom and shower partitions and screens of High Density Polyethylene (HDPE) or Solid Polyethylene (Solid Plastic).

1.2 REFERENCES

- A. ASTM A 666 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- C. National Fire Protection Association (NFPA) 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced company or person regularly engaged in installation of products specified in this Section. Manufacturer may require its own certification of the Installer.
- B. Materials: Doors, panels and pilasters shall be constructed from High Density Polyethylene (HDPE) or Solid Polyethylene (Solid Plastic) resins. Partitions shall be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. All plastic components shall be covered with a protective plastic masking.
- C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- D. Coordination: Furnish inserts and anchorages which must be built into other work for installation of partitions and related work; coordinate delivery with other work to avoid delay.
- E. Performance Requirements:
 - 1. Minimum Recycled Content: 25%
 - 2. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with the ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials. Refer to Drawings to determine if fire resistance is required.
 - a. Class A flame spread/smoke developed rating, tested to ASTM E84.
 - b. Class B flame spread/smoke developed rating, tested to ASTM E84.
 - 3. Material Fire Ratings:
 - a. National Fire Protection Association (NFPA) 286: Pass.
 - b. International Code Council (ICC): Class B.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 sections.
- B. Product Data: Manufacturer's data sheets on each product to be used, including installation methods, cleaning methods, preparation and storage and handling.
- C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.
- D. County to select color and finish from manufacturer's standard inventory.
- E. Selection Samples: Provide actual samples of manufacturer's full range of available colors, patterns and textures. Samples shall be no smaller than 2 x 3 inches. Refer to Division 1 sections.

1.5 WARRANTY

- A. Manufacturer shall guarantee its HDPE or Solid Plastic and all hardware against breakage, corrosion, and delamination under normal conditions for at least 15 years from the date of installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with below requirements, provide products from one of the following approved manufacturers unless otherwise specified on Drawings:
 - 1. AccuTec Products <http://www.accutecmfg.com/>
 - 2. American Sanitary Partitions Company www.am-sanitary-partition.com
 - 3. ASI Global Partitions Corp. www.globalpartitions.com
 - 4. Hadrian Inc. www.hadrian-inc.com
 - 5. Metpar Corporation www.metpar.com
 - 6. Scranton Products Co. Hidy Hiders www.scrantonproducts.com
 - 7. Substitutions may be submitted in accordance with the Product Substitution Procedures section of the Project Manual.
- B. Manufacturer shall offer these products in multiple colors, patterns and textures and in accordance with the below minimum requirements.

2.2 MATERIALS

- A. Panels, Partitions, Pilasters, Doors, Screens and Shower Compartments requirements:
 - 1. Solid HDPE or Solid Plastic of at least one inch thick and with rounded edges
 - 2. Suitable for exposed, wet and humid locations
 - 3. Waterproof
 - 4. Non-absorbent
 - 5. Graffiti-resistant textured surface
 - 6. Homogenous color throughout the material
- B. Zinc Aluminum Magnesium and Copper Alloy (zamac): ASTM B 86.
- C. Stainless Steel Castings: ASTM A167, Type 304.
- D. Aluminum: ASTM 6463-T5 alloy.

2.3 TOILET, SHOWER AND DRESSING COMPARTMENTS REQUIREMENTS

- A. Doors, panels, and pilasters shall be no less than 1 inch (25 mm) thick with all edges rounded to a radius. Doors and dividing panels shall be mounted based on height of specified system.
- B. Manufacturer shall offer doors, screens and panels in multiple heights.
- C. Restroom partitions shall be pilaster supported/floor mounted. Refer to Drawings for determination of whether overhead bracing is required.
- D. Doors
 - 1. If not stated on Drawings, ADA stall doors shall be 36 inches wide. Install an ADA sign. Provide a door pull and door stop on each swing side of the door.
 - 2. Standard stall doors shall be no smaller than 28 inches wide.
 - 3. Maximum 3/8 inch spacing between the door and the pilaster to ensure privacy, or door shall recess into the pilaster.
 - 4. Maximum height of the door shall be **12 inches** from the finished floor.
- E. Aluminum heat sink fastened to bottom edges if required for fire rating.

F. Pilasters

1. Minimum 3 inches wide and at the side of each door.
2. Height to match the side panels of the partition stall.

G. Pilaster Shoes

1. No less than 3 inches (76 mm) high.
2. Unless otherwise stated in the Drawings, provide one-piece molded HDPE or solid plastic secured to the pilaster with stainless steel, tamper-resistant bolts. If specified partition color does not have a matching HDPE or solid plastic shoe, use a stainless steel Type 304, 20 gauge shoe.

H. Modesty/Side Panels

1. Floor leg shall be integral with the panel.
2. Maximum height of the panel shall be **12** inches above the finished floor.

I. Headrail Brackets

1. Stainless steel, Type 304, minimum 20 gauge with a satin finish.
2. Secured to the wall with stainless steel tamper-resistant screws.

J. Wall, Modesty/Side Panel and Pilaster Brackets

1. Stainless steel Type 304 or heavy-duty aluminum.
2. Install continuous wall bracket equal to the height of the modesty/side panel.
3. Fasten to the pilaster with stainless steel, Type 304 tamper-resistant screws and fasten to the panels with stainless steel tamper-resistant bolts.
4. **Stirrup brackets shall not be accepted.**

K. Door Hinges

1. Stainless steel, Type 304 or heavy-duty aluminum.
2. Continuous helix hinge or spring hinge, refer to Drawings.
3. Continuous hinge is equal to the height of the door.

L. Door Hardware

1. Each door shall be supplied with one coat hook/bumper and door pull made of chrome-plated Zamac, Type 304 stainless steel or heavy-duty aluminum. Install at height to prevent theft from a person reaching over the door.
2. Latches and Strike
 - a. Emergency access slide latch and strike.
 - b. Stainless steel Type 304 or heavy-duty aluminum.
3. Door Pulls
 - a. ADA compliant.
 - b. Stainless steel Type 304, chrome-plated zamac or heavy-duty aluminum.
 - c. Provide a door pull on each side of the ADA accessible stall door.

2.4 PRIVACY AND URINAL SCREEN REQUIREMENTS

- A. Provide screens in urinal and entry toilet room applications per Drawings.
- B. Screens and pilasters shall be no less than one inch (25 mm) thick with all edges rounded to a radius.
- C. Screens shall be mounted at 10 to 18 inches above the finished floor.

- D. Screens shall extend no less than 18 inches from the back wall of the urinal.
- E. Manufacturer shall offer screens in multiple heights and widths.
- F. Styles: Wall mounted Screen or Pilaster-supported/Floor mounted Screens. Refer to Drawings.
- G. Floor legs shall be integral with the privacy or urinal screen.
- H. Refer to the Toilet, Shower and Dressing Compartments Requirements above for pilasters, shoes and bracket requirements.

PART 3 GENERAL

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of a subcontractor, notify Contractor and County Project Manager of unsatisfactory preparation before proceeding.

3.2 DELIVERY, STORAGE, AND HANDLING

- A. Store products in a secure and covered location to protect from the elements; keep in manufacturer's unopened packaging until ready for installation.

3.3 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.

3.4 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Do not begin installation until substrates have been properly prepared.
- D. Examine areas to receive partitions, screens, and shower compartments for correct height and spacing of anchorage/blocking, partition-mounted toilet accessories and plumbing fixtures that affect installation of partitions. Report discrepancies to the County Project Manager and Contractor.
- E. Coordinate the required spacing and location necessary for any partition-mounted accessories such as toilet paper dispensers shared by multiple toilet compartments.

3.5 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install partitions to be rigid, straight, plumb, and level; lay out as shown on shop drawings.
- C. Clearance at vertical edges of doors and panels shall be uniform top to bottom and shall not exceed 1/2 inch.
- D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- E. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 10 28 13 COMMERCIAL TOILET ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Products furnished and installed by Contractor under this section are included in the Drawings. These specifications shall supersede those on the Drawings. County may choose from any of the following for projects under this contract.
- B. Refer to Division 22 for plumbing accessories such as drains, urinals, water closets and faucets.

1.2 QUALITY ASSURANCE

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.
- C. Products: Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise acceptable to the County. Products are listed in the Drawings.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each accessory.
- B. Submittals as required of the Submittal Procedures section of the Project Manual.

1.4 WARRANTY

- A. Manufacturer's standard warranty shall be no less than one year from substantial completion.

PART 2 - PRODUCTS

2.1 MINIMUM CRITERIA

- A. All accessories shall be ADA compliant.
- B. Refer to the Drawings to determine which of the following accessories are required.
- C. **Unless stated otherwise, all stainless steel shall be Type 304, ASTM A 666, 0.0312 inch minimum nominal thickness.**
- D. All galvanized steel sheeting shall meet ASTM A 653/ A 653M with G60 hot-dipped zinc coating.
- E. All galvanized steel mounting devices shall meet ASTM A 153/ A 153M, hot-dipped after fabrication.
- F. All fasteners, screws, bolts and other hardware shall be fabricated from stainless steel and be theft and tamper resistant unless noted otherwise.
- G. Restroom accessories shall be provided by the following approved manufacturers and must meet the following minimum criteria:
 - 1. Bobrick Washroom Equipment, Inc. (Bobrick)
 - 2. Bradley Corp. (Bradley)
 - 3. A&J Washroom (AJW)
 - 4. American Specialties Inc. (ASI)
 - 5. Royce Rolls Ringer Company (Royce)
 - 6. As designated in the Drawings and below
 - 7. Substitutions for approved equals may be considered after award and in accordance with the Product Substitution Procedures.
- H. General: No stickers or labels are permitted on exposed faces of toilet and bath accessory units. On either interior surface not exposed to view or on back surface, provide identification of each accessory item by either a printed, waterproof label or a stamped name plate indicating manufacturer's name and product model number.
- I. Surface-Mounted Accessories: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Provide concealed anchorage wherever possible.
- J. Recessed Accessories: Except where otherwise indicated, fabricate units of all welded construction, without mitered corners. Provide anchorage which is fully concealed when unit is closed.

- K. **If available, and at no additional cost, provide and install stainless steel or zinc-coated hinges and anchorage when the accessory will be exposed to outdoor elements such as salt and humidity.**

2.2 LOW PROILE ELECTRIC HAND DRYER

- A. **Maximum depth of 4 inches from the mounting wall.**
- B. ADA compliant.
- C. Hands-free operation.
- D. Satin or brushed finish.
- E. **Type 304 stainless steel cover for locations without air-conditioning and stainless steel for locations with air-conditioning.**
- F. Warranty of five years or greater.
- G. Noise level less than 90 decibels.
- H. Approved products for spaces with or without air-conditioning: Bobrick B-7128 TrimDry™, Bobrick InstaDry™ B-7125, Excel Dryer ThinAir® or approved equal.
- I. Approved products for air-conditioned spaces: Bradley 2923-287400, World Dryer VERDEdri® Q-973A, Dyson Airblade or approved equal.

2.3 SOAP DISPENSER

- A. Wall-mounted Plastic:
 - 1. Accepts pre-packaged soap cartridge/cassette.
 - 2. Satin or brushed stainless steel appearance.
 - 3. Do not attach to mirror.
 - 4. ADA compliant.
 - 5. Vandal resistant with lock.
 - 6. Approved product: GOJO FMX-20 or approved equal from Toro or Kimberly-Clark Professional.
- B. Wall-mounted Stainless Steel:
 - 1. Accepts pre-packaged soap cartridge/cassette.
 - 2. Satin or brushed finish, Type 304 stainless steel.
 - 3. ADA compliant.
 - 4. Do not attach to mirror.
 - 5. Vandal resistant with lock.
 - 6. Approved product: American Specialties 5001-SS or approved equal. Bobrick B-4112 is not an approved product.
- C. Wall-mounted Sensor/Hands-free:
 - 1. Accepts pre-packaged soap cartridge/cassette.
 - 2. Satin or brushed stainless steel appearance.
 - 3. Wall-mounted.
 - 4. Do not attach to mirror.
 - 5. Battery operated.
 - 6. ADA compliant.
 - 7. Vandal resistant with lock.
 - 7. Approved product: American Specialties 5001-SS (liquid), GOJO LTX-12 (foam) or equal.

2.4 TOILET PAPER DISPENSER

- A. Vertical Dispenser:
 - 1. ADA compliant.
 - 2. Satin or brushed finish, Type 304 stainless steel.
 - 3. Holds two standard sized toilet paper rolls.
 - 4. Extra roll shall automatically drop into place when bottom roll is empty.
 - 5. Integral locking device.
 - 6. For recessed installations, install Bobrick B-4388 or approved equal.

7. For surface-mounted installation, install Bobrick B-4288, ASI Roval™ 20030 or approved equal.

B. Partition-mounted:

1. ADA compliant.
2. Satin or brushed finish, Type 304 stainless steel.
3. Holds two standard sized toilet paper rolls on each side of the partition (services two stalls)
4. Approved product: Bobrick B-386, Bradley 5422 or 5A20, or approved equal.

C. Jumbo Roll:

1. ADA compliant.
2. Satin or brushed finish, Type 304 stainless steel.
3. Holds one 9 or 10 inch toilet paper roll.
4. Integral locking device.
5. See through opening to determine how much roll is available.
6. Approved product: Bobrick B-2890, Royce JR10 or approved equal.

D. Double Jumbo Roll:

1. ADA compliant.
2. Satin or brushed finish, Type 304 stainless steel.
3. Holds two 10 inch toilet paper rolls.
4. Integral locking device.
5. See through opening to determine how much roll is available.
6. Approved product: Bobrick B-2892 or equal.

E. Slanted Top/Hood:

1. Slanted top/hood.
2. ADA compliant.
3. Satin or brushed finish, Type 304 stainless steel.
4. Holds three standard toilet paper rolls.
5. Locking device.
6. Surface-mounted.
7. Approved product: Royce STP-3 or approved equal.

2.5 COMBINATION TOILET PAPER DISPENSER AND SANITARY NAPKIN RECEPTACLE

1. Partition-mounted and partially recessed.
2. ADA compliant.
3. Satin or brushed finish, Type 304 stainless steel.
4. Holds two standard sized toilet paper rolls and a sanitary napkin receptacle on each side of the partition (services two stalls) as a space saver
5. Approved product: Bradley 594 or approved equal.

2.6 SANITARY NAPKIN RECEPTACLE

- A. Surface-mounted.
- B. **Satin or brushed finish, Type 304 stainless steel.**
- C. ADA compliant.
- D. All welded, seamless construction with piano hinge.
- E. Approved product: Bobrick B-270 or approved equal.

2.7 PRE-FABRICATED MIRRORS

- A. Tempered glass.
- B. **Minimum 15-year warranty against silver spoilage.**

- C. ADA compliant.
- D. **Satin or brushed finish, Type 304 stainless steel frame/channel.**
- E. Welded angle frame.
- F. Theft-resistant mounting.
- G. Approved products: Bobrick B-290 (fixed) and B-293 (fixed, tilted mirror at ADA stall) or approved equal.

2.8 RECESSED AND SEMI-RECESSED WASTE RECEPTACLES

- A. **Satin or brushed finish, Type 304 stainless steel.**
- B. Removable container.
- C. ADA compliant.
- D. Theft resistant with key.
- E. Welded construction.
- F. **Maximum 4 inch projecting depth from wall surface.**
- G. Refer to Drawings for type such as recessed, surface-mounted or under cabinet.
- H. Approved products: Bobrick B-3644 or B-43644 (recessed) or approved equal.

2.9 GRAB BARS

- A. Surface-mounted.
- B. Concealed anchoring.
- C. **Satin or brushed finish, Type 304 stainless steel.**
- D. 1-1/2 inch outside diameter.
- E. ADA compliant.
- F. Approved product: Bobrick B-6806 or approved equal.

2.10 DIAPER CHANGING STATIONS AND TODDLER WALL SEATS

- A. Shall meet or exceed ASTM F2285.
- B. Shall be ADA compliant.
- C. Antimicrobial/bacteria-resistant finish.
- D. Refer to Drawings for designation of mounting (horizontal or vertical), finish (plastic or stainless steel) and mounting (recessed or wall-mounted).
- E. Adjustable safety straps.
- F. Designed for one handed operation.
- G. Products shall be provided by one of the following approved manufacturers:
 - 1. Saniflow Corp. BabyMedi
 - 2. Bobrick/Koala Corp.
 - 3. Bradley Corp.
 - 4. American Specialties Inc. (ASI)
 - 5. DryBaby by World Dryer
 - 6. Substitutions for approved equals may be considered after award and in accordance with the Product Substitution Procedures.

2.11 BAG HOOKS

- A. **Heavy-duty, Satin or brushed finish, Type 304 stainless steel.**
- B. Install one hook next to each diaper changing station.
- C. Install one next to each lavatory at the vanity in the Women's Restroom.
- D. Hang at height necessary to meet ADA accessibility.
- E. This does not include the hooks included on the toilet stall partitions.
- F. Approved products: Bobrick B-6727 and B-6827, Bradley 9134 and 9124, ASI 7345-S, AJW UX116-SF and UX112-SF.

2.12 COUNTERTOP TRASH CHUTE

- A. Satin or brushed finish, stainless steel and commercial grade.
- B. Removable.

- C. ADA compliant.
- D. 8 inch minimum diameter; refer to drawings for exact size and shape.
- E. Depth of 2 to 4 inches.
- F. Refer to Drawings for type such as recessed, surface-mounted or under cabinet.
- G. Approved manufacturers: Doug Mockett & Company, Inc., Richelieu, Vollrath or approved equal.
- H. Trash receptacle to be provided by County.

2.13 DOOR KICK AND PUSH PLATES AND CORNER WALL GUARDS

- A. **Satin or brushed finish, Type 304 stainless steel.**
- B. Provide kick and push plates on the interior side of the restroom entrance/exit doors.
- C. Approved products: Royce KP-28, KP-32, #1 Guard and RPP or approve equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. No accessory other than the toilet paper dispenser shall project more than 4 inches from the finished wall surface.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces after removing temporary labels and protective coatings. Do not use any caustic or abrasive cleansers.

END OF SECTION

SECTION 10 44 43 FIRE EXTINGUISHER ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. At a minimum, provide the following for all new buildings.

1.2 SUBMITTALS

- A. Manufacturer's catalog cuts, product data sheets, and installation instructions for each item specified.
- B. Maintenance data for each item.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS AND CABINETS

- A. See Drawings for locations, type and size.
- B. Provide cabinet sized appropriately for each extinguisher. Refer to drawings for size and type.
- C. Cabinets shall be heavy-duty steel construction with a corrosion resistant finish.
- D. Cabinets shall be designed to accommodate the fire extinguisher being provided.
- E. Refer to Drawings for type such as recessed or wall-mounted.

2.2 FIRE EXTINGUISHER SIGNS

- A. Furnish and install on exterior side of rooms having fire extinguishers in the room. Signs shall have white raised letters chemically fused to 1/8 inch red acrylic plastic background. Signs to be 1-1/2 inch high x length required reading "FIRE EXTINGUISHER INSIDE".
- B. Also provide the above signs in corridors. Permanently affix to exterior wall.

2.3 FIRE DEPARTMENT ACCESS

- A. Provide a fire department access box at each main entrance exterior door and which was designed for outdoor use. Obtain ordering information from the Fire Marshal.
- B. Provide a fire department lock, such as a Knox® padlock, at each fence gate. Obtain ordering information from the Fire Marshal.
- C. Contractor shall be fully responsible for ordering, paying for, and installing all fire department required boxes and locks as required by the Fire Marshal and the NFPA.

2.4 APPROVED MANUFACTURERS

- A. Knox®
- B. SupraSafe
- C. Or approved equal

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Clean and prepare substrates prior to installation of signage and cabinet.
- B. Securely fasten all items so as to be square and level with surrounding elements.
- C. Install signage complying with manufacturer's instructions.
- D. Install fire department locks and boxes in accordance with manufacturer's instructions and Fire Marshal's direction.
- E. Install extinguisher cabinets complying with manufacturer's instructions.

END OF SECTION

SECTION 11 68 13 PLAYGROUND EQUIPMENT (FOR COASTAL AREAS)

PART 1 - GENERAL

1.1 SCOPE

- A. Contractor shall provide inclusive playgrounds for two age groups (ages 2 to 5 and ages 5 to 12) with a coastal package finish. The layout of the playgrounds shall differentiate the two distinct age groups with the areas separated by a buffer zone (e.g. shrubs, sidewalk or benches) to ensure that the 5-12 age group area is visible from any benches located in the 2-5 age group area. Please note that some manufacturers charge extra for the coastal package finish and some already include this as a standard.
- B. County shall choose colors available from the manufacturer's standard colors.
- C. Any deviation from the pre-designed playground shall be submitted for approval by the County Project Manager and Parks staff prior to issuance of a purchase order.
- D. **Included in the lump sum pricing of each playground and each additional (add-on) play component are footings, safety compliance audit as detailed below, all required signed and sealed drawings and wind load calculations completed by a State of Florida registered Professional Engineer as required for permitting. The shade structure above the playground is not included and is a separate line item. Signage will be provided and installed by County.**
- E. Each playground was designed by Parks staff with the manufacturer, and County will choose from the pre-designed playgrounds by the manufacturer that designed the playground.
- F. Prior to commencing the work, Contractor shall be responsible for applying for and obtaining all necessary permits from all authorities having jurisdiction.
- G. Contractor is advised that the lead times for the approved manufacturers differ and additional time will not be provided for Contractor's failure to include the appropriate lead time as required by the playground manufacturer.

1.2 RELATED DOCUMENTS

- A. Refer to Drawings for layout and components.
- B. Refer to additional specifications for other playground components such as the shade structure and playground surfacing; Contractor shall coordinate all of the playground components to meet required clearances, including use zone requirements.
- C. Refer to Division 1 section for additional references and definitions.
- D. Refer to Division 32 for surfacing requirements around and below the playground.

1.3 ADDITIONAL DEFINITIONS

- A. Certified Playground Safety Inspector (CPSI): Offered by the National Recreation and Park Association and National Certification Board, this individual is certified to inspect playgrounds for safety issues and to ensure playgrounds meet current national industry standards developed by the ASTM and CPSC. www.nrpa.org.
- B. Fall Height: According to ASTM F1487, "the vertical distance between a designated play surface and the protective surfacing beneath it."
- C. Use Zone: As defined by ASTM F1487, the "area beneath and immediately adjacent to a play structure or equipment that is designated for unrestricted circulation around the equipment and on whose surface it is predicted that a user would land when falling from or exiting the equipment."

1.4 ADDITIONAL REFERENCED STANDARDS

- A. Provide playground equipment which complies with or exceeds the latest editions of the following:
 - 1. ASTM F1487 Standard Consumer Safety Performance Specification for Playground Equipment for Public Use
 - 2. ASTM F2373 Standard Safety Performance Specification for Public Use Play Equipment for Children 6 Months through 23 Months (if applicable)
 - 3. U.S. Consumer Product Safety Commission (CPSC) No. 325, Public Playground Safety Handbook
 - 4. ADA Accessibility Guidelines for Buildings and Facilities, Play Areas
 - 5. ASTM D3363 Standard Test Method for Film Hardness by Pencil Test
 - 6. ASTM D2454 Standard Practice for Determining the Effect of Overbaking on Organic Coatings
 - 7. ASTM F1951 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment

8. ASTM F2049 Standard Guide for Fences/Barriers for Public, Commercial, and Multi-Family Residential Use Outdoor Play Areas.
9. Division 32 for playground surfacing requirements

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installers shall be properly trained, qualified and experienced with the following: the Florida Building Code; playground equipment/structures assembly; the CPSC No. 325 **and** who are approved by the playground manufacturer.
- B. Follow the manufacturer's instructions for all assembly and installation.

1.6 SUBMITTALS

- A. Prior to issuance of a purchase order or Notice to Proceed, provide the following to the County Project Manager:
 1. Shop drawings and 3D renderings showing assembly instructions, installation details, dimensions, fall heights for each component, and use zones which indicate any overlapping, height of all structures, and dimensions between components.
 2. Detailed drawings and survey of the proposed playground with dimensioned clearances in relation to surrounding sidewalks, shade structures, trees and site furnishings.
 3. 3D drawings showing the relationship of any hooded/roofed playground equipment in relation to the height of the shade structure to ensure that children cannot reach the shade structure or lighting from the hooded playground equipment (such as above a slide or platform). **Hooded/roofed areas shall be centrally located under the shade structure to restrict access to the shade structure fabric and supports in accordance with Section 8.14 (as amended) of the ASTM F1487.**
 4. Product test report.
 5. Proof that the playground equipment meets all of the requirements of this specification.
 6. Certification for the third party Certified Playground Safety Inspector (CPSI) who is independent of the Contractor and Manufacturer and whom will perform the safety compliance audit upon completion of the construction and prior to the playground opening to the public.
 7. Installer's certification from the playground manufacturer (if applicable) and qualifications as listed above.
 8. Manufacturer's color and finish charts.
 9. Product test reports performed by the manufacturer and witnessed by a qualified testing agency.
 10. Manufacturer's warranty which shall meet the warranty requirements of this specification.
 11. Manufacturer's written confirmation that the playground equipment to be installed meets or exceeds the additional referenced standards listed above.

1.7 WARRANTY

- A. Provide a minimum 15-year manufacturer's limited warranty on steel and aluminum components.
- B. Provide a minimum 3-year manufacturer's limited warranty on all plastic and HDPE components.
- C. Provide a minimum 1-year manufacturer's limited warranty on all moving parts and components such as gliders, rockers and swivels.
- D. Provide a minimum 5-year manufacturer's warranty on all freestanding musical instruments.
- E. All components must be installed as designed and recommended by the manufacturer; do not alter the design or use components other than as designed by the manufacturer as this may void the warranty.
- F. **Warranty cannot be voided or reduced if the playground equipment is installed near saltwater.**
- G. **Warranty shall not be pro-rated.**

1.8 PRE-INSTALLATION MEETING

- A. A pre-installation meeting shall be held to review site preparation, coordination of trades and components, scheduling, site availability, storage, work hours, utility coordination, safety compliance audit requirements, coastal package finish confirmation and other details for the County selected playground and any additional play components.
- B. This meeting shall not occur until the purchase order or Notice to Proceed has been issued.
- C. Contractor or County Project Manager shall arrange a date and time and notify all required attendees.
- D. Attendees should include:
 1. Contractor

2. County Project Manager
3. Park Manager or designee
4. Parks' safety personnel or designee
5. Playground Installer(s) – see above for qualifications
6. CPSI or local representative of the playground manufacturer
7. County Inspector or County CPSI

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Playground equipment with coastal package finish shall be provided by the following approved manufacturers as pre-designed and noted in the attached playground drawings:
 1. Landscape Structures (LSI) www.playlsi.com for Playgrounds C, F, G and I
 2. Miracle Recreation Equipment Company (Miracle) www.miracle-recreation.com for Playgrounds A and D
 3. Playcraft Systems (Playcraft) www.playcraftsystems.com for Playgrounds B, E, H and J
- B. Outdoor children's freestanding musical equipment, which does not require a coastal package finish, shall be provided by one of the above approved manufacturers:
 1. Freenotes Harmony Park (Freenotes) at www.freenotesharmonypark.com
 2. Concerto® by Miracle Recreation (Concerto) www.miracle-recreation.com
 3. Rhapsody® by Landscape Structures (LSI) www.playlsi.com

2.2 MATERIALS

- A. Clamp/Collar Connections for all but the Additional Play Components
 1. **Direct bolt between components and posts shall not be accepted**
 2. Components shall be attached to posts and uprights with a round clamp/collar that encircles the post to prevent slippage and which is tamper-resistant
 3. Stainless steel or aluminum construction
 4. Powder-coated to match the upright post color
- B. Fasteners and Hardware such as bolts, nuts, washers, screws and flanges
 1. Tamper-resistant
 2. Heavy-duty, corrosion-resistant stainless steel, zinc plated, galvanized or aluminum for corrosion and rust resistance
 3. Only use items provided with or recommended by the playground manufacturer
 4. Fastening systems shall utilize clamps or bolt-through fasteners for all components
- C. Posts, Uprights and Caps
 1. 3-1/2 or 5 inch outside diameter (O.D.) pipe or tube as included in the pre-designed playground drawings.
 2. Constructed of stainless steel, steel or aluminum with powder-coated finish
 3. Tight-fitting cap
- D. Coastal Package Finish
 1. As the standard finish, all metal structural components (metal) shall include a coastal package finish for proximity to salt and brackish water.
 2. The metal shall be shot-blasted to the specification of SSPC-SP-10 of near white blast cleaning.
 3. All welds shall be manually buffed; SSPC-SP2 hand tool cleaning will not be an acceptable method.
 4. The shot-blasted parts are then washed and coated with zinc rich (r better product) primer for superior corrosion protection, followed by one or more coats of triglycidylisocyanurate (TGIC) durable polyester powder coating of **at least 7 mils** applied electrostatically and then oven baked.
 5. Shall meet or exceed ASTM D3363.

E. Platforms, Ladders, Decks, Steps and Ramps

1. Punched or laser-cut opening of no greater than 1/2 inch
2. Minimum 14 gauge steel
3. Vinyl, PVC or polyethylene protective coating of at least 0.080 inches (8 mils) thick
4. UV-resistant to reduce color changes and weathering
5. Coated with a non-slip finish
6. Sloped to meet ADA requirements
7. **Coated on both the top surface and the underside of each component**

F. Rotationally Molded (aka Rotomolded) Plastic

1. Low density polyethylene (LDPE)
 - a. Color molded or color compounded into the material
 - b. Minimum tensile strength of 2,500 PSI
 - c. Minimum thickness of 0.25 inches
 - d. Complies with ASTM D-790 for the Flex Modulus Test
 - e. Complies with ASTM D-648 for heat distortion
 - f. Solid Panels
2. High density polyethylene (HDPE)
 - a. Precision cut from single solid sheet
 - b. Minimum thickness of 0.50 inches
 - c. Minimum tensile strength of 4,000 PSI
 - d. Complies with ASTM D-790 for the Flex Modulus Test
 - e. Complies with ASTM D-648 for heat distortion

G. Slides

1. Metal slides will not be accepted
2. Should be placed on site/under shade structure for maximum protection from sunlight, such as on the north side of the playground
3. **When possible, slides should be one continuous piece rather than segments attached to form the slide**

2.3 ADDITIONAL PLAY COMPONENTS

- A. The following play components may be installed in addition to the pre-designed playgrounds, depending on the budget, project site and County's needs. Some of the following additional play components may already be included in one or more of the pre-designed playgrounds. The County may choose from **any** of the following pre-selected products and manufacturers.
- B. **As stated above, and unless noted otherwise (UNO), these shall all be direct bury and are inclusive of all costs as stated in the Scope paragraph above. Provide inclusive/accessible mallets. Pricing is to provide for EACH add-on component.**
- C. **For Freenotes products, unit pricing includes steel posts.**
- D. Freestanding Arch Swing Set
1. 3-1/2 or 5 inch outside diameter (O.D.) arch frame
 2. Steel or aluminum frame with coastal package finish
 3. 3-1/2 or 5 inch diameter (O.D.) one beam/top rail no higher than 8 feet AFF
 4. Chains shall be coated with PVC, thermoplastic or similar finish to prevent corrosion and to insulate against heat
 5. For a four person swing set, the unit price includes (1) toddler full bucket seat, (1) inclusive swing seat for ages 5-12 and (2) slash-proof belt seats

E. Playground Add-on Price Group A includes any of the following (each item):

1. Miracle Saddle Seat (straight or angle)
2. Miracle Curved Balance Beam
3. Miracle Pirouette
4. Playcraft Alligator Balance Beam
5. Playcraft Snake Balance Beam
6. Playcraft Spinner Seat
7. Freenotes Flower
8. Concerto Small Cabasas

F. Playground Add-on Price Group B includes any of the following (each item):

1. LSI Single TuffRider
2. LSI Single DigiRider
3. LSI Double Bobble Rider
4. LSI Stand Up Spinner
5. LSI Saddle Spinner
6. LSI Curva Spinner
7. Miracle Barrel Ride
8. ~~Miracle four person, 5 inch dia. Arch Swings, 8 feet high top rail with seats and coatings in accordance with the Freestanding Arch Swing Set paragraph above~~
9. Playcraft Single Spring Rider
10. Playcraft Double Spring Rider
11. Playcraft Fir, Oak or Pine Climber with Topper, 5 branches
12. Playcraft Jumbo Climber
13. Playcraft Stand-n-Spin
14. Playcraft Spring Shape with Handles
15. Freenotes Aria
16. Freenotes Melody Xylophone
17. Freenotes Piper Marimba
18. Concerto 2 Congas
19. Concerto 3 Congas
20. Concerto Medium Cabasas
21. Concerto Large Cabasas
22. Rhapsody Tongue Drum
23. Rhapsody Tongue Drum Junior

G. Playground Add-on Price Group C includes any of the following (each item):

1. LSI TopsyTurny Spinner
2. Miracle Whirl with speed limiter
3. Playcraft Spring Seesaw
4. Freenotes Lilypad Cymbals
5. Freenotes Pagoda bells
6. Freenotes Flower collection (one each of turquoise, orange, yellow and indigo)
7. Freenotes Cadence
8. Freenotes Yantzee metallophone
9. Freenotes Griffin
10. Freenotes Piper marimba
11. Freenotes Pegasus
12. Concerto Vibes
13. Concerto Chimes
14. Concerto 5 Congas
15. Rhapsody Vibra Chimes Pentatonic Scale
16. Rhapsody Metallophone (Animato or Ditty)
17. Rhapsody Cascata Bells
18. Rhapsody Chimes Major Chord
19. Playcraft Arch Slide, 48 inches high

20. **Miracle four person, 5 inch dia. Arch Swings, 8 feet high top rail with seats and coatings in accordance with the Freestanding Arch Swing Set paragraph above**

H. Playground Add-on Price Group D includes any of the following (each item):

1. LSI Omni Spinner
2. LSI four person, 5 inch dia. Arch Swings, 8 feet high top rail with seats and coatings in accordance with the Freestanding Arch Swing Set paragraph above
3. Playcraft Merry Go Round with speed limiter
4. Playcraft four person, 5 inch dia. Arch Swings, 8 feet high top rail with seats and coatings in accordance with the Freestanding Arch Swing Set paragraph above
5. Rhapsody Grandiosa Chimes
6. Playcraft Thunder Dome

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

- A. **Inspect all components upon delivery** and again prior to assembly to ensure that no components are damaged and that all components are received. **When the products are being unloaded, pad the forks of the forklift and use other precautions to protect the finishes of the components.** Failure to complete inspections is not justification to extend the time for completion.
- B. Store materials in accordance with Division 1 requirements.
- C. Provide written confirmation to County Project Manager from the manufacturer or supplier that the delivered products include the coastal finish package.
- D. Provide the playground manufacturer's frequency and inspection checklist (this may be included in the maintenance guide).

3.2 INSTALLATION

- A. Notify the County Project Manager concerning any surface or subsurface feature, such as a utility, encountered during excavation or site clearing. Proceed only after unsatisfactory conditions have been corrected.
- B. Do not begin playground equipment installation before final grading is completed for the placing the playground safety surfacing.
- C. All installations shall be laid out by the Contractor and Installer in accordance with the survey and approved drawings.
- D. Install in compliance with manufacturer's written instructions and recommendations.
- E. Install components in sequence as recommended by manufacturer.
- F. Install in accordance with the manufacturer's drawings and survey, maintaining all required clearances such as the use zones as well as heights and slopes for the ramps and slides.
- G. Do not over torque or overtighten hardware. Do not strip bolted or screwed connections.
- H. Any variations from the drawings and survey must be approved, in writing, by the Consultant or County Project Manager.
- I. Install expansion anchors in locations to coincide with holes in equipment mounting flanges. Do not install expansion anchors for a minimum of 14 calendar days after concrete placement.
- J. Set playground equipment on concrete footings. Center base flanges on footings. Secure the equipment to the footings so that the equipment is level and plumb.
- K. Backfill playground equipment uprights with sand or other County approved material.
- L. Touch up damaged finishes with same paint as used by playground manufacturer.
- M. Variations from the installation indicated and all costs for removal and replacement shall be completed by the Contractor at no cost to County.
- N. Prepare and provide County Project Manager with a playground equipment report including a safety compliance audit prior to request for payment.

3.3 PLAYGROUND SAFETY COMPLIANCE AUDIT

- A. Provide, at no additional cost, a safety compliance audit by a third party CPSI, independent of the Contractor and Manufacturer, confirming compliance with the applicable standards cited above in Quality Assurance and Additional References.

B. Contractor shall arrange a date and time and notify all required attendees. Provide no less than three business days' notice of inspection. Meeting should be scheduled to coincide with the playground surfacing impact attenuation testing. Attendees should include:

1. Contractor
2. Contractor provided CPSI
3. Park Manager or County Project Manager
4. Parks' safety personnel or County's CPSI
5. Local representative of the playground manufacturer
6. County Inspector

3.4 MAINTENANCE KIT

A. Provide, at no additional cost to County, a project-specific playground maintenance kit including:

1. Playground manufacturer's matching touch-up paint and primer
2. Graffiti remover as recommended by the playground manufacturer
3. Sandpaper
4. Installation tools (if requires non-standard tools)
5. Extra hardware to replace missing or damaged playground hardware
6. Playground manufacturer's frequency and inspection checklist (this may be included in the maintenance guide)
7. Contact information for playground manufacturer's local representative or distributor

3.5 FINAL PAYMENT AND FINAL COMPLETION

A. Release of final payment and attainment of final completion requires the following, at a minimum:

1. Safety compliance audit letter, signed by the safety compliance audit company or CPSI, certifying that the playground meets or exceeds the minimum design standards as stated above
2. Maintenance Kit as detailed above
3. **As-builts or County approved Shop Drawings which show the final layout of the installed playground**
4. **Parts and components list of the installed playground**
5. All County requested repairs and replacement parts have been installed and accepted by the County
6. Warranty

END OF SECTION

SECTION 13 34 00 FABRICATED ENGINEERED STRUCTURES (FOR COASTAL AREAS)

PART 1 GENERAL

1.1 SUMMARY OF WORK

- A. Provide, engineer, install and obtain permit for the prefabricated, engineered shelter with a coastal package finish, concrete footings, in-ground mounting, electrical outlet, light fixtures, hose bibb, lightning protection system and other requirements as described below. Conceptual Drawings are included at the end of this section.
- B. Contractor's line item pricing includes all of the above and below requirements at no extra cost to County. Touch-up paint from the Manufacturer is included. **Concrete slab, plumbing to the site, electrical connection to the panel or transformer, and solar power are not included in the line item pricing for these prefabricated shelters.**
- C. Contractor shall provide signed and sealed engineered drawings by an experienced Professional Engineer as detailed below.
- D. Standard sizes to be offered are as follows, measured from eave to eave: 24 x 24 feet; 30 x 30 or 32 x 32 feet (depending upon the manufacturer); 24 feet hexagonal; and 40 feet hexagonal. Minimum eave height above finished floor is 96 inches (8'-0").
- E. Permitting, signed and sealed drawings, geotechnical testing and surveying may be paid for as a pass-thru line item or may be completed by County.
- F. When requested and at an additional cost, provide a low vented top (clerestory or cupola) open to the shelter below to release hot air. The low vented opening limits the bird nesting.

1.2 ADDITIONAL REFERENCES

- A. Florida Building Code with Broward County amendments, refer to Division 1.
- B. Division 26 Section on Lightning Protection Systems.
- C. 29 CFR / Occupational Safety and Health Administration (OSHA) Standard 1910 and 1926 safety standards, as applicable.
- D. AISC 360 Steel Construction Manual, latest edition.
- E. ASTM A36/A36M; A123; A325; A563; A500; A653/A653M; A792/A792M; F1554.
- F. AWS D1.1, D1.3 and D1.8.
- G. Steel Structures Painting Council (SSPC) SP-2 and SP-10/NACE No. 2, latest editions.
- H. Additional references as detailed in Division 1.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced company or person regularly engaged in installation of products specified in this Section. Manufacturer may require its own certification of the Installer or may require inspection by a Manufacturer's representative.
- B. Professional Engineer: An experienced company or person regularly engaged in the design of the Manufacturer's prefabricated structures and registered with the State of Florida.
- C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work.
- D. Coordination: Contractor shall coordinate all trades such as electric, plumbing, lightning protection and site work to avoid delay.
- E. All steel components shall be factory welded by AWS certified welders and inspected by certified AWS inspectors in accordance with AWS minimum standards. **No welding shall occur at the job site.**
- F. No field modifications or revisions will be allowed without written authorization from the manufacturer.
- G. Performance Requirements:
 - 1. All structural steel shall be detailed, fabricated and erected in accordance with the latest edition of the AISC Specification Manual.
 - 2. Structural steel per AISC 360, "Specification for Structural Steel Buildings".
 - 3. Bolted connections per Research Council on Structural Connections (RCSC) "Specification for Structural Joints Using High-Strength Bolts".
 - 4. Welding qualifications according to AWS D1.1 "Structural Welding Code - Steel" or AWS D1.3, "Structural Welding Code - Sheet Steel" and D1.8 Seismic Supplement to D1.1/D1.1M
 - 5. SSPC SP10 or NACE No. 2 - Near White Blast Cleaning, latest edition; SSPC-SP2 hand cleaning is not acceptable.
 - 6. OSHA Steel Erection Standard 29 CFR 1926.750 Part R regarding anchor rods and anchor bolts.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 sections.
- B. Product Data: Manufacturer's data sheets on each product to be used, including installation methods, cleaning methods, preparation and storage and handling.
- C. Welding certificate(s).
- D. Shop Drawings: Provide the following, at a minimum, to the County Project Manager for approval:
 - 1. Name and location of Project.
 - 2. Name of manufacturer and model number.
 - 3. Professional engineer's experience designing pre-fabricated structures for this manufacturer.
 - 4. Plans including shelter finished floor height, elevations, sections and dimensions including width, length, height, depth, column spacing and roof slope. Foundation design shall be for the loads applied and not a generic foundation design. Calculations shall include all member design for each different member type. Connection design for each different connection will determine the design of the bolts, welds, plate thickness and anchorage to the foundation.
 - 5. Installation details and notes.
 - 6. Governing building codes and edition.
 - 7. Loads including dead load, live load, auxiliary loads and wind load/speed and exposure. Also include loads where applied acting simultaneously with concentrated loads in accordance with the governing building codes.
 - 8. Required concrete footings and concrete slab with details and plans.
 - 9. Material test reports.
 - 10. Indicate compliance with AISC or AISI steel standards, including the edition and date.
 - 11. Coordination plans with electric, plumbing, lightning protection and site work, if applicable.
 - 12. Sample warranty.
 - 13. Maintenance instructions from the Manufacturer.
 - 14. Details regarding the coastal package finish and any other County requested information necessary to confirm all requirements will be met.
- E. Selection Samples: Provide actual samples of Manufacturer's full range of available colors, patterns and textures. Samples shall be no smaller than 2 x 2 inches. Refer to Division 1 sections.

1.5 WARRANTIES

- A. Manufacturer shall either offer its own minimum **10-year** warranty, or the warranty will be a minimum 10-year pass through warranty from the roofing manufacturer.
- B. Manufacturer shall provide a minimum **10-year** warranty on the structural framing members and hardware.
- C. Manufacturer shall provide a minimum **10-year** warranty on the powder-coated components for locations near brackish or saltwater.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Provide shelters from one of the following approved manufacturers **with all requirements, options and customizations as listed in this specification**:
 - 1. Cedar Forest Products
 - 2. Classic Recreation Systems Inc.
 - 3. ICON Shelter Systems Inc.
 - 4. Polygon by Porter Corp.
 - 5. RCP Shelters, Inc.

2.2 MATERIALS

A. Roof requirements:

1. 24 gauge steel standing seam ("R" Panel) roof, ribs at 12 to 18 inches o.c. UNO, over 30# felt.
 - a. As an additional cost, provide aluminum standing seam roof in lieu of the 24 gauge standing seam roof.
2. Primed, 2x tongue and groove (T&G) lumber roof deck when requested and at an additional cost.
3. Fasten the roof panels to supports with concealed clips, spaced and located per Manufacturer.
4. Polyvinylidene fluoride (PVDF) resin-based metal coating such as Kynar 500 or Hylar 5000.
5. Minimum roof slope of 3:12 and maximum of 6:12.
6. **No raw edges shall be accepted; this leads to corrosion and is sharp to the touch.**
7. Standing seam ribs shall run with the pitch of the roof for proper drainage.
8. When requested and at an additional cost, provide a low vented top (clerestory or cupola) open to the shelter below to release hot air. The low vented opening limits the bird nesting.
9. Minimum overhang of 10 inches.
10. Roof peak caps shall be pre-fabricated with no field assembly required.
11. Roof screws shall be painted to match the roof material.
12. Roofing trim shall match the color and finish of the roofing material.
13. Additional requirements may be included in the Drawings.
14. Color shall be selected by the County Project Manager based upon manufacturer's standard color selection. Manufacturer shall offer at least ten standard colors for selection.

B. Coastal Package Finish:

1. As the standard finish, all metal structural components (metal) shall include a coastal package finish for proximity to salt and brackish water.
2. All metal structural steel components (steel) shall be cleaned, pre-treated and finished in the following manner:
 - a. The steel shall be shot-blasted to the specification of SSPC-SP-10 of near white blast cleaning.
 - b. All welds shall be manually buffed; SSPC-SP2 hand tool cleaning will not be an acceptable method.
 - c. The steel is then washed and primed in a zinc rich primer (or better product) for superior corrosion protection.
 - 1) As an additional cost, provide steel which is immersed in a liquid epoxy and coated through an electro-deposition process (E-coat or similar), and which is **coated both on the inside and outside of the component** to a uniform cover. The E-coat will totally encapsulate the part for additional corrosion protection.
 - d. The parts are then coated with one or two coats of triglycidylisocyanurate (TGIC) durable polyester powder coating applied electrostatically and then oven baked for a TGIC finish **thickness of no less than 7 mils**.
 - e. Shall meet or exceed ASTM D3363.
 - f. Color shall be selected by the County Project Manager based upon manufacturer's standard color selection. Manufacturer shall offer at least 10 colors for selection.

C. Structural Members and Hardware:

1. **All structural fasteners, connections and cover plates shall be hidden or concealed within the framing member as much as possible.**
2. Columns and beams shall be square, rectangular or round without ornamentation or banding.
3. Shall be primed and powder-coated as noted above.
4. Hollow metal steel shall be ASTM A500 Grade B steel of at least 3/16 inch thickness.
5. "I" beams or open channel sections will not be accepted for primary structural members.
6. All steel components and hardware shall be hot-dipped galvanized per ASTM A123 followed to ensure corrosion resistance.
7. Compression rings shall be made of ASTM A36 structural plate or of structural channel welded together to form the ring. All connections not requiring compression rings shall use ASTM A500, Grade B hollow structural sections (HSS) sections for these connections.
8. Welded connection plates shall be hot rolled steel per ASTM A36.
9. All column bases shall include a hole, located in the center of the base plate, for electrical wiring or plumbing.
10. Anchor bolts shall be provided by the manufacturer. Install per the manufacturer's template at the dimensions and orientations as shown on the approved Shop Drawings.

2.3 ELECTRIC, PLUMBING AND LIGHTNING PROTECTION

- A. The Manufacturer shall provide the following cut-outs prior to delivery; **Contractor or its subcontractors shall not modify the structure in any way as this may void the Manufacturer's warranty or affect the finishes.**
 - 1. One cut-out for a while in use weatherproof electrical outlet, centered on the inside of the steel column, at 18 to 48 inches above finished floor. The electric shall be located above the flood plain.
 - 2. One cut-out for a hose bibb. Hose bibb will require a backflow preventer and shutoff valve, to be provided by the Contractor and included in the unit price for the shelter.
 - 3. All electrical wiring, solar power (if applicable), lightning protection and plumbing shall be run through the structural member prior to shelter erection.
- B. Included in the shelter line item price is the installation of the following: weatherproof, ground fault circuit interrupter (WP/GFCI) while in use electrical outlet; lightning protection system; and ceiling-mounted, vandal-resistant, 13 to 18 inch diameter, exterior LED light fixtures such as the Luminaire ARV13, Kenall MR13 or Cooper Lighting TR15. Dark sky or turtle friendly may be required and is no additional charge to the County. The 40 feet shelter will require two lighting fixtures; see Conceptual Drawings.

2.4 PRE-INSTALLATION MEETING

- A. A pre-installation meeting shall be held to review site preparation, coordination of trades and components, scheduling, site availability, storage, work hours, utility coordination, safety compliance audit requirements, coastal package finish confirmation and other details.
- B. This meeting shall not occur until the purchase order or Notice to Proceed has been issued.
- C. Contractor or County Project Manager shall arrange a date and time and notify all required attendees.

PART 3 GENERAL

3.1 EXAMINATION

- A. Do not begin installation until the site and foundation have been properly prepared.
- B. Contractor shall ensure that all shelter components are included and that they are in proper condition.

3.2 DELIVERY, STORAGE, AND HANDLING

- A. The structure shall be a pre-engineered package and shall be shipped as a pre-cut (excluding the roof panels) and pre-fabricated package including, but not limited to, the structural framing members, roof panels, fasteners, hardware and roof trim as well as project-specific installation instructions.
- B. **When the products are being unloaded, pad the forks of the forklift and use other precautions to protect the finishes of the shelter and roofing materials. Do not use chains to move materials; use straps.**
- C. **Inspect all components upon delivery and again prior to assembly to ensure that no components are damaged and that all components are received. Failure to complete these inspections is not justification to extend the time for completion.**
- D. Store products in a secure and covered location to protect from the elements; store the products so that they are elevated above the ground and to allow for full air circulation around the materials to prevent puddling, mold, decay and insects.
- E. Keep products in manufacturer's unopened packaging until ready for installation.

3.3 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Coordinate the required spacing and locations of electric, plumbing and lightning protection.
- D. **Pour the concrete footings independently from the concrete slab.**

3.4 INSTALLATION

- A. Install all structural components to be straight, plumb, and level; lay out as shown on shop drawings and survey; maintain all required clearances.

- B. Finished surfaces shall be cleaned after installation and be left free of imperfections.
- C. Comply with manufacturer's recommended procedures and installation sequence as well as final, County and Professional Engineer approved shop drawings.
- D. Any variations from the drawings and survey must be approved, in writing, by the Consultant or County Project Manager.
- E. Touch up damaged finishes with same paint as used by Manufacturer.
- F. Protect installed products until completion of project.
- G. Repair or replace damaged products before Substantial Completion.

3.5 FINAL PAYMENT AND FINAL COMPLETION

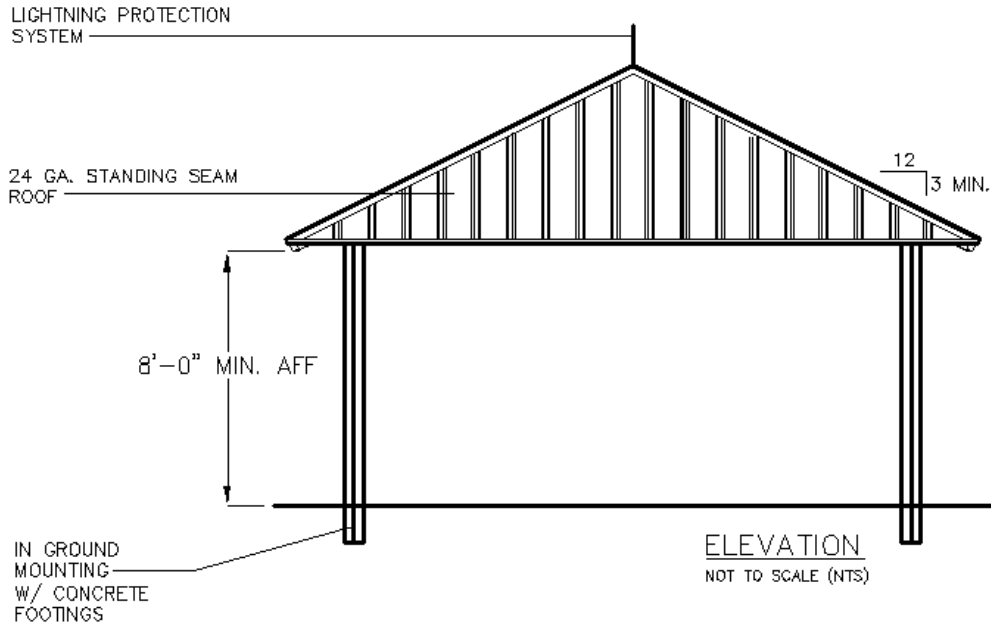
- A. Release of final payment and attainment of final completion requires the following, at a minimum:
 - 1. As-builts or County approved Shop Drawings which show the final layout of the installed structure
 - 2. All County requested repairs and replacement parts have been installed and accepted by the County
 - 3. Warranty
 - 4. Maintenance instructions from the Manufacturer (if not previously provided)

3.6 CONCEPTUAL DRAWINGS

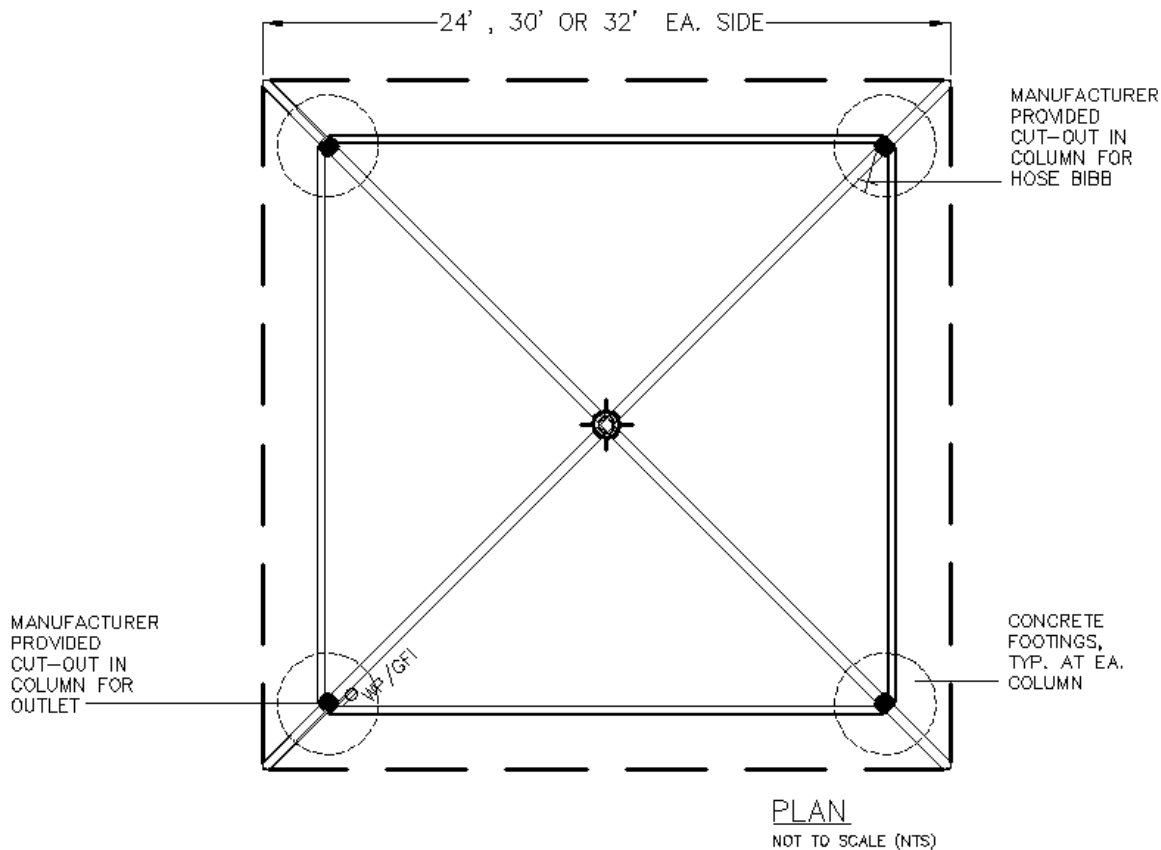
Refer to following pages.

PREFABRICATED SHELTER (SQUARE)

FOR CONCEPTUAL PURPOSES ONLY TO ILLUSTRATE SIZING AND MINIMUM REQUIREMENTS; SIGNED AND SEALED DRAWINGS FROM A PROFESSIONAL ENGINEER WILL BE REQUIRED FOR CONSTRUCTION

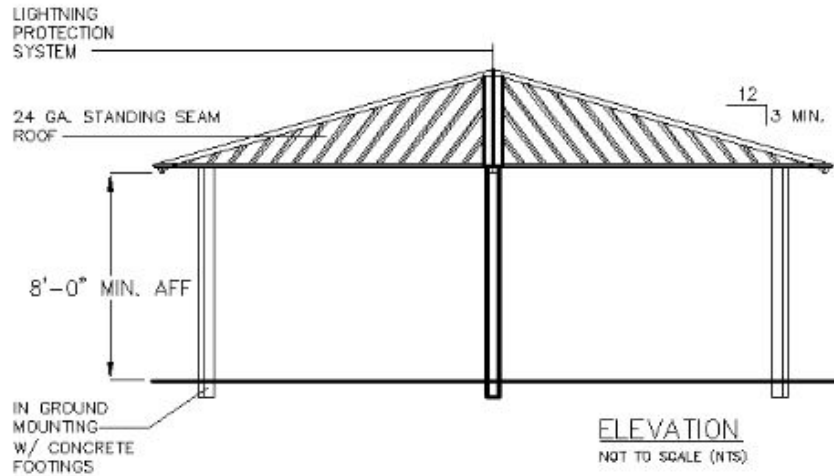


	SURFACE MOUNTED, LED LIGHT FIXTURE
	WEATHERPROOF, GROUND FAULT CIRCUIT INTERRUPTER
	SWITCH
EA	EACH
MIN.	MINIMUM
TYP.	TYPICAL

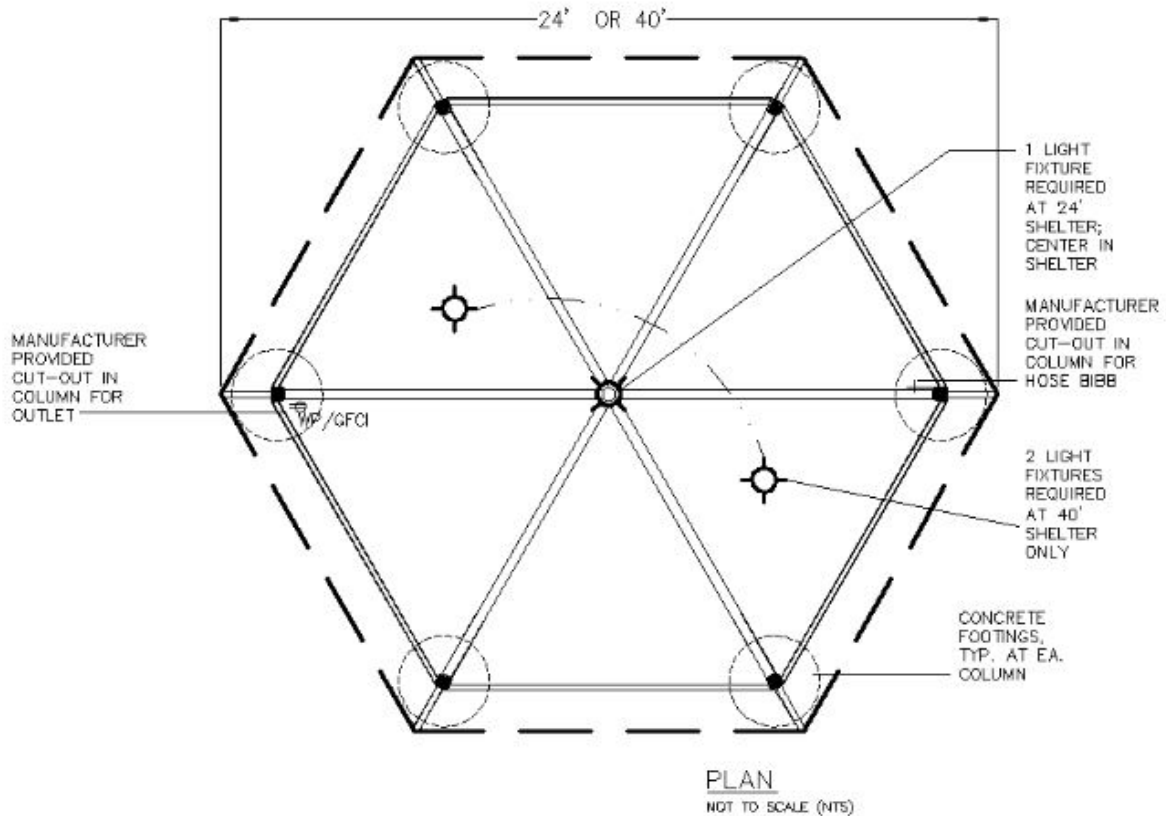


PREFABRICATED SHELTER (HEXAGON)

FOR CONCEPTUAL PURPOSES ONLY TO ILLUSTRATE SIZING AND MINIMUM REQUIREMENTS; SIGNED AND SEALED DRAWINGS FROM A PROFESSIONAL ENGINEER WILL BE REQUIRED FOR CONSTRUCTION



	SURFACE MOUNTED, LED LIGHT FIXTURE
	WEATHERPROOF, GROUND FAULT CIRCUIT INTERRUPTER
	SWITCH
EA	EACH
MIN.	MINIMUM
TYP.	TYPICAL



END OF SECTION

SECTION 13 34 23 FABRICATED (SHADE) STRUCTURES (FOR COASTAL AREAS)

PART 1 - GENERAL

1.1 SUMMARY OF WORK

- A. Provide, engineer, install and obtain permit for the fabricated, engineered shade structure with a coastal package finish, concrete footings, in-ground mounting and other requirements as described below. Sample Drawings may be included in the Contract Documents. **This specification applies to shade sails, hexagonal, cantilevered and hipped shade structures.**
- B. Contractor's unit pricing includes all of the above and below requirements at no extra cost to County. Touch-up paint from the Manufacturer is included. **Concrete slab and electrical connection to the panel or transformer are not included in the unit pricing for these shade structures.**
- C. Contractor shall provide signed and sealed engineered drawings prepared by an experienced Professional Engineer registered with the State of Florida with extensive design experience with the shade structure manufacturer.
- D. When installed above playground equipment, the minimum entry/eave height above finished floor surface is 10 feet and must meet all clearances above the playground equipment. The eaves shall not be accessible to patrons who climb on the playground equipment.
- E. When not installed above playground equipment and if not stated on the Drawings, the minimum entry/eave height above the concrete slab is 8 feet.
- F. Permitting, geotechnical testing and surveying may be paid for as a pass-thru line item or may be completed by County.
- G. The fabric shall be removable. The fabric's fastening device must be a quick release design that allows for quick and easy removal and installation without the need for special tools.

1.2 ADDITIONAL REFERENCES

- A. Florida Building Code (FBC), latest edition with revisions including Broward County amendments and high velocity wind zone requirements.
- B. 29 CFR / Occupational Safety and Health Administration (OSHA) Standard 1910 and 1926 safety standards, as applicable.
- C. AISC 360 Steel Construction Manual.
- D. AWS D1 .1 Structural Welding Code – Steel.
- E. NFPA 701 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
- F. ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
- G. ASTM A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- H. ASTM A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- I. ASTM A385, Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
- J. ASTM A500, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- K. ISO 1461, Hot-Dip Galvanized Coatings on Fabricated Iron and Steel Articles - Specifications and Test Methods
- L. Steel Structures Painting Council (SSPC) SP-2 and SP-10/NACE No. 2, latest editions.
- M. Best construction and management practices.

1.3 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- B. Installer Qualifications: An experienced company or person regularly engaged in installation of products specified in this Section. Manufacturer may require its own certification of the Installer or may require inspection by a manufacturer's representative.
- C. Professional Engineer: An experienced company or person regularly engaged in the design of manufacturer's shade structures.
- D. Coordination: Furnish inserts and anchorages which must be built into other work for installation of partitions and related work; coordinate delivery with other work to avoid delay.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 sections.

- B. Product Data: Submit manufacturer's detailed technical data for materials, fabrication, and installation, including catalog cuts of fabrics, anchors, hardware, fastenings, and accessories.
- C. Shop Drawings: Provide the following, at a minimum, to the County Project Manager for approval:
 - 1. Name and location of Project.
 - 2. Name of manufacturer and model number.
 - 3. Fabric name, manufacturer and product criteria.
 - 4. Professional engineer's experience designing prefabricated structures for this manufacturer.
 - 5. Plans including shelter finished floor height, elevations, sections and dimensions including width, length, height, depth, column spacing and roof slope. Foundation design shall be for the loads applied and not a generic foundation design. Calculations shall include all member design for each different member type. Connection design for each different connection will determine the design of the bolts, welds, plate thickness and anchorage to the foundation.
 - 6. Installation details and notes.
 - 7. Governing building codes and edition.
 - 8. Loads including dead load, live load, auxiliary loads and wind load/speed and exposure. Also include loads where applied acting simultaneously with concentrated loads in accordance with the governing building codes.
 - 9. Required concrete footings with details and plans.
 - 10. Material test reports.
 - 11. Indicate compliance with AISC or AISI steel standards, including the edition and date.
 - 12. Coordination plans with electric and site work, if applicable.
 - 13. Sample warranty.
 - 14. Maintenance instructions from the Manufacturer.
- D. Samples: Submit to County Project Manager the full range of color samples for the structure and fabric. Pictures or scans will not be accepted.

1.5 WARRANTIES

- 1. See individual components below for required warranties. Warranties cannot be voided or reduced for locations near saltwater.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Provide shade structures from one of the following approved manufacturers **with all requirements, options and customizations as listed** in this specification:
 - 1. Poligon by Porter Corp.
 - 2. Shade Structures Inc. dba USA Shade
 - 3. Shade Systems Inc.
 - 4. Skyways by Landscape Structures
 - 5. Superior Shade by Superior Recreational Products

2.2 MATERIALS

- A. Shade fabrics shall be constructed of high density polyethylene (HDPE) which meets or exceeds the following:
 - 1. Structural and fire resistance: per current edition of Florida Building Code (FBC) Chapter 31, Section 3105, Awnings and Canopies.
 - 2. Resistant to mold and mildew.
 - 3. Minimum Weight: **9.60 ounces** per square yard in accordance with ASTM D3776.
 - 4. Stentered to reduce shrinkage and to maintain tension.
 - 5. Yarn: 100% monofilament or monofilament and tape.
 - 6. Knit: Raschel or lock-stitch for protection against fraying and unraveling, especially at the rafters and supporting roof frame.
 - 7. Fire Resistance: Per FBC, NFPA 701 Test Methods 1 or 2 and/or ASTM E 84 Class A.
 - 8. Minimum Fabric Warranty: 10 years from date of substantial completion.
 - 9. All installed fabric panels must be equivalent in color, opacity and weight and without any holes and tears.

10. Colors: Minimum range of no less than five fabric colors available that meet the above criteria; color will be selected by County Project Manager prior to purchase by Contractor.
11. Provide one of the following approved HDPE shade fabrics. Please note that some of the below manufacturers may not offer the fabric shade color(s) as required for the project and the Contractor is responsible for verification that products offered meet all project requirements.
 - a. Architec 400® by Polyfab USA LLC
 - b. Commercial 95® 340 by GALE Pacific
 - c. Commercial Heavy 430 by GALE Pacific
 - d. Comtex® by Polyfab USA LLC
 - e. CoolNet™ by Shade Systems Inc.
 - f. Extrablock by ALNET
 - g. Monotec 370™ FR Series by Pro-Knit Industries

- B. **Reinforcing shall be provided at all framing joists, rafters and connections to prevent friction and tearing of the fabric; see Image A below.**

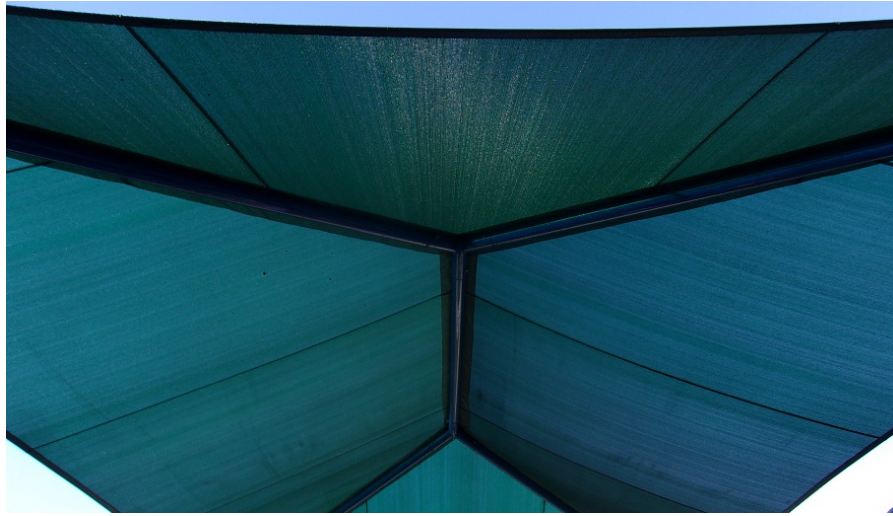


Image A: Required reinforcing at structure as shown

- C. Threading shall be made of either polytetrafluoroethylene (PTFE) or expanded polytetrafluoroethylene (ePTFE) which meets the following:
1. Immune to ultraviolet (UV) radiation and designed for outdoor and/or marine usage
 2. Install one of the below products unless otherwise specified on Drawings or elsewhere in the Project Manual:
 - a. Gore Tenara® by W.L. Gore
 - b. SolarFix® by AY Tech LLC
 - c. Or approved equal
- D. Coastal Package Finish
1. As the standard finish, all metal structural components shall include a coastal package finish for proximity to salt and brackish water.
 2. All metal structural steel components (steel) shall be cleaned, pre-treated and finished in the following manner:
 - a. The steel shall be shot-blasted to the specification of SSPC-SP-10 of near white blast cleaning.
 - b. All welds shall be manually buffed; SSPC-SP2 hand tool cleaning will not be an acceptable method.
 - c. The steel is then washed and primed in a zinc rich primer (or better product) for superior corrosion protection.
 - d. The parts are then coated with at least one coat of triglycidylisocyanurate (TGIC) durable polyester powder coating applied electrostatically and then oven baked **for a TGIC finish thickness of no less than 7 mils.**
 - e. Shall meet or exceed ASTM D3363.
 - f. Color shall be selected by the County Project Manager based upon manufacturer's standard color selection. Manufacturer shall offer at least 10 colors for selection.

- g. Minimum Finish Warranty: 3 years from substantial completion.

E. Structural Components and Fastenings

1. Current edition of Florida Building Code Chapter 16, Structural Design and Chapter 31, Section 3105, Awnings and Canopies
2. Each tensioning cable shall be looped and clamped at each end.
3. Minimum Warranty: 10 years from date of substantial completion. Warranty cannot be voided or reduced for locations near saltwater.
4. **Mounting: In ground, not surface mounted. The tops of concrete footings shall be no less than 8 inches below grade; this will require an increase in the length of the structural column to meet the minimum height.**
5. **All components and welds shall be clean, buffed and smooth to prevent any fraying or abrasion of fabric.**
6. Rafters at Shade Structure:
 - a. **At each rafter corner, install a slide or glide elbow fastening system that can be easily removed using typical tools such as a drill or wrench. No proprietary or special tools shall be necessary to remove the fastener or tensioner. Turnbuckles, cable clamps, fixed hooks or fasteners requiring winch type tools (come alongs) shall not be accepted.**
 - b. **Rafters shall be sealed on top without any openings or penetrations so as to reduce moisture and debris affecting the fastening mechanism.**
7. **All structural components, fasteners, cables and hardware shall be corrosion-resistant stainless steel, Grade 316 or better, or with a galvanized coating thickness which exceeds the minimums as listed in the referenced ASTM standards.**

F. Electrical Cut-outs

1. When requested by County, the Manufacturer shall provide the following cut-outs prior to delivery at no additional cost to County; Contractor or its subcontractors shall not modify the columns in any way as this may void the Manufacturer's warranty or affect the powder-coating finish.
 - a. One cut-out for a while in use weatherproof electrical outlet, centered on the inside of the steel column, at 18 to 36 inches above finished floor and above the flood plain.
 - b. One cut-out for an electrical switch or timer, centered on the inside of the steel column, at 40 to 48 inches above finished floor. This location shall be ADA accessible.
 - c. **All electrical wiring shall be run through the structural members prior to erection.**

2.3 FABRICATION

- A. All steel components shall be factory welded by AWS certified welders in accordance with AWS minimum standards. **No welding shall occur at the job site.**
- B. All weldment areas shall be prepared and shop coated with a galvanized or equivalent treatment.
- C. Prior to powder-coating, blast, prime and grind all corners and sharp edges to create a smooth surface.
- D. Tensioning cables shall be a minimum 5/16 inch diameter with galvanized coating over stainless steel with a minimum of two galvanized or stainless steel cable clamps per connection.
- E. Refer to fabric section for reinforcing requirements.
- F. **For hexagonal structures, the shade shall be comprised of six triangular shades, each of which is independent of the other and which can be removed and replaced rather than removing or replacing the entire shade. Each triangular shade shall be attached to the structure at three points.**

2.4 PRE-INSTALLATION MEETING

- A. A pre-installation meeting shall be held to review site preparation, coordination of trades and components, scheduling, site availability, storage, work hours, utility coordination, safety compliance audit requirements, coastal package finish confirmation and other details.
- B. This meeting shall not occur until the purchase order or Notice to Proceed has been issued.
- C. Contractor or County Project Manager shall arrange a date and time and notify all required attendees.

PART 3 - EXECUTION

3.1 MAINTENANCE AND TRAINING

- A. If requested, provide CD, DVD, flash drive or link to the manufacturer's website with videos on removal and reinstallation of the shade fabric.
- B. Prior to payment request, provide manufacturer's manual on the operation, care and maintenance of the shade structure and fabric.

3.2 EXAMINATION

- D. Do not begin installation until the site and foundation have been properly prepared.
- E. Contractor shall ensure that all shade structure components are included and that they are in proper condition.

3.3 DELIVERY, STORAGE, AND HANDLING

- A. When the products are being unloaded, pad the forks of the forklift and use other precautions to protect the finishes of the shade structure and its materials. Do not use chains to move materials; use straps.
- B. Inspect all components upon delivery and again prior to assembly to ensure that no components are damaged and that all components are received. Failure to complete inspections is not justification to extend the time for completion.
- C. Store products in a secure and covered location to protect from the elements; store the products so that they are elevated above the ground and to allow for full air circulation around the materials to prevent puddling, mold, decay and insects.
- D. Keep products in manufacturer's unopened packaging until ready for installation.

3.4 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Coordinate the required spacing and locations of electric, if applicable.
- D. **Pour the concrete footings independently from the concrete slab, if applicable.**

3.5 INSTALLATION

- A. Comply with manufacturer's recommended procedures and installation sequence as well as final, County and Professional Engineer approved shop drawings.
- B. Refer to the quality assurance section and Division 1 for minimum qualifications of the manufacturer and installer.
- C. Install all structural components to be straight, plumb, and level; lay out as shown on shop drawings and survey; maintain all required clearances such as those around a playground slide.
- D. Finished surfaces shall be cleaned after installation and be left free of imperfections.
- E. Comply with manufacturer's recommended procedures and installation sequence as well as final, County and Professional Engineer approved shop drawings.
- F. Any variations from the drawings and survey must be approved, in writing, by the Consultant or County Project Manager.
- E. Touch up damaged finishes with same paint as used by Manufacturer.
- F. Protect installed products until completion of project.
- G. Repair or replace damaged products before Substantial Completion.

3.6 FINAL PAYMENT AND FINAL COMPLETION

- A. Release of final payment and attainment of final completion requires the following, at a minimum:
 - 1. As-builts or County approved Shop Drawings which show the final layout of the installed structure
 - 2. All County requested repairs and replacement parts have been installed and accepted by the County
 - 3. Warranty
 - 4. Maintenance instructions from the Manufacturer (if not previously provided)

END OF SECTION

SECTION 22 42 00 COMMERCIAL PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Plumbing fixtures including urinals, water closets, lavatories, faucets, water coolers, hangers, drains, mop sinks and other commercial, heavy duty plumbing fixtures. The work shall be fully operational and capable of providing the service for which it was intended.

1.2 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and installation where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- B. Minimum Performance Requirements:
 - 1. No more than two plumbing fixtures shall be supplied by a 2 branch. Linear dimensions shall not exceed 10 feet.
 - 2. Fire Resistance: Materials shall comply with the following requirements, when tested in accordance with the ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials. Refer to Drawings to determine if fire resistance is required.
 - 3. Pipes must be sleeved through walls and floor using PVC.
 - 4. Comply with the Florida Building Code, including the Plumbing section and Tables 604.4 and 704.1 as amended.
 - 5. All exposed piping shall be chromium-plated brass UNO.
 - 6. All water service piping shall be solder-jointed copper when located above the finished floor, and PVC when below the floor, and Schedule 40 or 80 as required by Code.
 - 7. Support all horizontal soil piping at intervals of 5 feet or less.
 - 8. For piping above the ceiling, install the piping at the highest point as permitted by Code and permitting UNO.
 - 9. Make connections between equipment, whether or not furnished by others, to the piping systems provided under this section.
 - 10. Run piping to outside of building as indicated on the Drawings and connect to existing maintenance hatch (aka manhole).
 - 11. Sloping of horizontal drain pipes shall meet the requirements of FBC Table 704.1 for plumbing.
 - 12. Refer to FBC Plumbing Table 604.4, as amended, for maximum flow rates.

1.3 SUBMITTALS

- A. Submit under provisions of Division 1 sections.
- B. Product Data: Manufacturer's data sheets on each product to be used, including installation methods, cleaning methods, preparation and storage and handling.
- C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.
- D. County to select color and finish from manufacturer's standard inventory.
- E. Selection Samples: Provide actual samples of manufacturer's full range of available colors, patterns and textures. Samples shall be no smaller than 2 x 2 inches. Refer to Division 1 sections.

PART 2 PRODUCTS

2.1 WATER CLOSETS

- A. Floor discharge water closet requirements include:
 - 1. Floor Mounted
 - 2. Elongated bowl
 - 3. 1.0 to 1.28 gallons per minute (GPM) or gallons per flush (GPF)
 - 4. White color UNO
 - 5. Plastic, commercial (heavy duty), white, open front toilet seat with stainless steel hinge(s)
 - 6. Antimicrobial finish
 - 7. 1-1/2 inches diameter top spud for universal flushometer
 - 8. For standard water closets, provide model of 15 to 17 inches rim height

9. Bolt caps included
10. For ADA accessible water closet, provide an ADA compliant model
11. Contractor to coordinate the building construction and plumbing with the required roughing in for the water closet
12. Provide one of the following approved products: American Standard Madera with EverClean® finish, Kohler Wellcome Ultra or Highline Ultra, Sloan ST-2009 or ST-2029 with SloanTec® Hydrophobic Glaze or Toto Commercial Ultra-High Efficiency Toilet, or as designated in the Drawings.

B. Tank style water closet requirements include:

1. Designed for commercial use
2. Floor mounted
3. Elongated bowl
4. 1.0 to 1.28 gallons per minute (GPM) or gallons per flush (GPF)
5. White color UNO
6. Plastic, commercial (heavy-duty), white, open front toilet seat with stainless steel hinge(s)
7. Antimicrobial finish if available
8. Install at recommended heights such as for ADA accessibility
9. For standard water closets, provide model of 15 to 17 inches rim height
10. For ADA accessible water closet, provide an ADA compliant model
11. Contractor to coordinate the building construction and plumbing with the required roughing in for the water closet
12. For tank style water closets, provide one of the following approved products: American Standard Yorkville Vormax (wall discharge), Kohler Kingston (floor discharge), Sloan WETS with SloanTec® Hydrophobic Glaze (floor discharge), Toto Aimes or Carlyle II (floor discharge), Zurn Z5562 (floor discharge), or as designated in the Drawings.

C. Wall hung water closet and carrier requirements include:

1. Designed for commercial use
2. Elongated bowl
3. ***Carrier shall be heavy-duty to hold a weight of at least 300 pounds***
4. 1.0 to 1.28 gallons per minute (GPM) or gallons per flush (GPF)
5. White color UNO
6. Antimicrobial finish if available
7. Plastic, commercial (heavy-duty), white open front toilet seat with stainless steel hinge(s)
8. Install at recommended heights such as for ADA accessibility
9. Contractor to coordinate the building construction and plumbing with the required roughing in for the water closet
10. Provide products from American Standard, Kohler, Sloan, Toto, Zurn, or as designated in the Drawings.

2.2 URINALS

A. Urinal requirements include:

1. Wall-hung
2. Maximum 1.0 gallons per minute (GPM) or gallons per flush (GPF)
3. White color
4. Antimicrobial finish
5. 3/4 inch diameter top spud for universal manual flushometer
6. ADA compliant
7. Stainless steel strainer

- B. Provide one of the following approved products: American Standard Washbrook with EverClean® finish, Kohler Dexter or Bardon, Sloan SU-1009 with SloanTec® Hydrophobic Glaze or Toto Commercial Washout.

2.3 MANUAL FLUSHOMETERS

A. Manual flushometer requirements include:

1. Top spud, exposed
2. Brass construction
3. Chrome or satin finish
4. Self-cleaning debris screen
5. ADA compliant

6. Left and right and rough
7. Includes vacuum breaker and control stop

B. Provide products from one of the following approved manufacturers: American Standard, Kohler, Sloan or Toto.

2.4 AUTOMATIC, SENSOR-ACTIVATED FLUSHOMETERS

A. Automatic, sensor-activated flushometer requirements include:

1. Top spud, exposed
2. Brass construction
3. Chrome or satin finish
4. Exposed, self-contained transformer/flush valve (transformer/ flush valve is not installed in or behind the wall)
5. Self-cleaning debris screen
6. ADA compliant
7. Mechanical flush override
8. Includes vacuum breaker and control stop
9. Hardwired (not battery powered UNO)
10. No minimum daily usage required

B. Provide products from one of the following approved manufacturers: American Standard, Kohler, Sloan or Toto.

2.5 LAVATORIES

A. Wall-hung lavatory requirements include:

1. ADA compliant
2. Single hole for faucet
3. White color
4. For public park restrooms, provide one of the following approved products: American Standard Lucerne with EverClean® finish, Kohler Chesapeake or Soho, Sloan SS-3103 with SloanTec® or Toto Commercial Wall-mount Wheelchair User.
5. For restrooms located within an air-conditioned building, provide one of the following approved products: American Standard Murro or Decorum; Kohler Brenham, Greenwich, Pinoir or Soho; Sloan Ledgeback lavatory SS-3165 with SloanTec®; or Toto Commercial Wall-mount Wheelchair User.

B. Solid surface countertop and compatible sink basin requirements include:

1. ADA compliant assembly and installation
2. Comply with ASTM E84
3. Refer to Division 12 for further requirements if applicable to scope of work

C. All in One Handwashing Station/Lavatory requirements include:

1. ADA compliant assembly and installation
2. Available in multiple sizes and configurations
3. Color and finish to be selected by County Project Manager or Consultant
4. Faucet shall be included
5. Provide one of the following approved products: Bradley Advocate, ELX, OmniDeck and Verge; Sloan AER-DEC; Zurn Sundara; or approved equal.

2.6 LAVATORY FAUCETS

A. Sensor Activated

1. Single hole
2. Hardwired (no batteries required)
3. Integrated with all electronics contained in the faucet to free up the space underneath the vanity/lavatory
4. Commercial, heavy duty
5. Deck mounted
6. Vandal-resistant
7. Chrome or satin finish

8. ADA complaint
9. With mixing valve
10. Maximum 0.50 gallons per metering cycle
11. Lead free (AS)
12. Provide one of the following approved products: American Standard Paradigm Selectronic or NextGen Selectronic; or approved equal from Kohler, Delta, Sloan, Chicago Faucets or Zurn.

B. Metered faucet requirements include:

1. Single hole
2. Commercial, heavy duty
3. Deck mounted
4. Vandal-resistant, single push handle
5. Chrome or satin finish
6. Metered
7. ADA complaint
8. With mixing valve
9. Maximum 0.50 gallons per metering cycle
10. Provide one of the following approved products: American Standard Pillar Tap with Extended Spout; Moen M-Press 8894 or 8884; or Zurn Aquaspec Z86100-XL-RKR.

2.7 LAVATORY PLUMBING PROTECTION

- A. Cover all exposed lavatory plumbing with a plumbing cover or shroud.
- B. Provide one of the following approved products: shroud designed for the lavatory to be installed; Plumberex Handy-Shield MAXX or Pro-Extreme; Truebro Lav Guard 2; or approved equal.

2.8 SERVICE SINK FAUCET

A. Mop basin/service sink requirements include:

1. Wall-mounted
2. Lever handles for hot and cold water
3. ADA compliant handles
4. Spout has a 3/4 inch threaded hose end
5. Bucket hook
6. Includes top brace
7. Brass construction
8. Includes a vacuum breaker

- B. Provide products from one of the following approved manufacturers: Advance Tabco, American Standard, Chicago Faucets, Durastone Fiberglass, Fiat, Kohler, Speakman or Zurn.

2.9 MOP BASIN/SERVICE SINK

A. Mop basin/service sink requirements include:

1. Fiberglass construction
2. Edge/lip of 6 to 10 inches above finished floor
3. Integral drain with removable strainer
4. Install 12 inches high plastic or stainless steel splashguard above the basin at the surrounding walls
5. Refer to Drawings for required size and shape

- B. Provide products from one of the following approved manufacturers: E.L. Mustee, Fiat Products, PROFLO or Zurn.

2.10 FLOOR DRAINS

A. Floor and linear trench drain requirements include:

1. Type 304 or 316 stainless steel, cast iron or aluminum strainer plate/grate
2. Grate is high heel proof
3. Self-cleaning traps

4. No-hub fittings
5. **Square or rectangular shape UNO**
6. Installed below the top of the finished floor

- B. Provide products from one of the following approved manufacturers: Advance Tabco, Jay R. Smith Manufacturing, QM Drain, Infinity Drain, Josam, Watts or Zurn.

2.11 WATER COOLERS AND DRINKING FOUNTAINS

- A. Wall-mounted water cooler requirements include:

1. Refrigerated
2. Unfiltered
3. Vandal-resistant
4. Bi-level, ADA compliant
5. UL rated
6. Cane apron included
7. For exterior locations, water cooler must be rated for exterior use
8. Refer to Drawings for additional requirements
9. Provide products from one of the following approved manufacturers: Elkay, Haws, Halsey Taylor, Oasis Versacooler, or Sunroc
10. Includes a bottle filler UNO on the Drawings

- B. Freestanding, exterior water cooler requirements include:

1. Type 304 stainless steel
2. Powder-coated finish
3. One piece welded construction
4. Bi-level, ADA compliant
5. Refrigerated
6. Unfiltered
7. Vandal-resistant
8. Manufacturer shall offer at least six colors from which to choose UL rated
10. Lead free
11. Refer to Drawings for additional requirements
12. Provide product from one of the following approved manufacturers: Elkay, Halsey-Taylor, Most Dependable Fountains, Stern-Williams or Willoughby Stainless Fountains. With bottle filler, the basis of design is Most Dependable Fountains Model 1014518 SMSS. Without a bottle filler, the basis of design is Most Dependable Fountains Model 44018 SMSS.

- C. Freestanding, exterior drinking fountain requirements include:

1. Type 304 stainless steel
2. Powder-coated finish
3. One piece welded construction
4. Bi-level, ADA compliant
5. Bottle filler
6. Non-refrigerated
7. Unfiltered
8. Vandal-resistant
9. Manufacturer shall offer at least six colors from which to choose UL rated
11. Lead free
12. Recessed hose bibb with locking door
13. Refer to Drawings for additional requirements
14. Provide product from one of the following approved manufacturers: Elkay, Halsey-Taylor, Most Dependable Fountains Model 10145 SMSS (basis of design), Stern-Williams or Willoughby Stainless Fountains.

2.12 ELECTRIC TANKLESS WATER HEATERS

- A. Shall be designed for commercial use.
- B. Provide products from one of the following approved manufacturers: Bosch, Ecosmart, Eemax, Hubbell, Rheem, Rinnai or Stiebel.

2.13 HOSE BIBB

- A. Hose bibb requirements include:
 - 1. Freezeproof
 - 2. Vacuum breaker
 - 3. Shut off valve
 - 4. Threaded for standard sized hose connection
 - 5. Provide one hose bibb in each restroom
 - 6. For locations other than at a mop basin/service sink, provide a recessed, flush mounted lockable cover or box.
- B. Provide products from one of the following approved manufacturers: Jay R Smith Manufacturing, Josam, Watts or Zurn.

2.14 BACKFLOW PREVENTER

- A. Backflow preventer requirements include:
 - 1. Lead free cast bronze or brass
 - 2. Stainless steel 300 series springs
 - 3. Provide in accordance with Drawings and in best trade practice, and in accordance with Code
- B. Provide products from one of the following approved manufacturers: Watts, Zurn or approved equal.

2.15 WATER HAMMER ARRESTOR

- A. Provide in accordance with Drawings and in best trade practice, and in accordance with Code.
- B. Shall conform to ANSI/ASSE 1010 standards.
- C. No access door required.
- D. Provide products from one of the following approved manufacturers: Jay R Smith Manufacturing, Sioux Chief or Zurn.

2.16 WALL CLEAN-OUT AND ACCESS COVERS

- A. Interior wall cleanout cover requirements include:
 - 1. Designed for face of wall installation, compatible with tile, masonry and gypsum board construction
 - 2. Square or round frame
 - 3. Vandal-resistant
 - 4. Chrome plated
 - 5. Clean out plus
 - 6. Covers must maintain the same fire rating as the wall in which it is installed.
 - 7. Provide clean-outs at the foot of each plumbing stack, at each change of direction of horizontal lines and in horizontal runs at 75 feet intervals.
- B. Exterior wall cleanout cover requirements include:
 - 1. Concrete collar
 - 2. Screw type access plug
- C. Provide products from one of the following approved manufacturers: Jay R. Smith Manufacturing, Josam, Watts or Zurn.

2.17 VALVE LOCKS

- A. Install valve locks with keys at all flushometers to prevent vandalism and theft.
- B. Provide products from one of the following approved manufacturers: Harder Valve Locks or approved equal.

2.18 FITTINGS

- A. All threaded steel pipe shall be malleable iron, 150 lb. banded and galvanized UNO.
- B. All copper pipe water services shall be wrought copper, solder-joint type, 95-5 solder UNO.
- C. Provide either copper, galvanized malleable iron or brass ground joint unions for piping 2 inches diameter or smaller.
- D. For PVC pipe, use compatible molded preformed fittings and the manufacturer approved solvent UNO.
- E. For copper tube, drainage type, use wrought copper, solder joint, 95-5 solder UNO.

2.19 VALVE BOXES

- A. Valve boxes shall be constructed of precast concrete.
- B. Provide products from one of the following approved manufacturers: Jensen Precast, Oldcastle Precast or Quazite.

2.20 HANGERS

- A. Hanger requirements include:
 - 1. Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated in accordance with ASCE/SEI 7.
 - 2. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight and thrust loads of supported systems, system contents, and test water.
 - 3.. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 - 4. Shall be malleable or wrought iron split ring with adjuster.
- B. Provide products from one of the following approved manufacturers: Fee & Mason Manufacturing, Grinnell or approved equal.

PART 3 GENERAL

3.1 EXAMINATION

- A. Do not begin installation until surfaces and substrates have been properly prepared.

3.2 DELIVERY, STORAGE, AND HANDLING

- A. Store products in a secure and covered location to protect from the elements; keep in manufacturer's unopened packaging until ready for installation.

3.3 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.

3.4 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best results.
- C. Do not begin installation until surfaces and substrates have been properly prepared.
- D. Examine areas to receive plumbing fixtures and accessories for correct height and spacing. Report discrepancies to the County Project Manager and Consultant.

3.5 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install fixtures to be rigid, straight, plumb, and level; lay out as shown on shop drawings.
- C. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- D. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 26 05 00 COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.1 DESCRIPTION

- A. This specification related to Division 26 for electrical work.
- B. Drawings indicate extent and general arrangement of lighting and other electrical systems. If any departure from drawings is deemed necessary by Contractor, details of such departures and reasons therefore shall be submitted as soon as practical to the County Project Manager or Consultant for approval; Contractor shall not proceed until this written approval is obtained. No such departure shall be made without prior written approval of the Consultant or County Project Manager.
- C. Plumbing fixtures which may require electrical connections including flushometers, faucets, water coolers and water heaters are included in Division 22.

1.2 QUALITY ASSURANCE

- A. Qualifications: All installations shall be completed by an experienced, licensed and insured electrical firm, electrician or electrical journeyman; see References section.
- B. Minimum Performance Requirements:
 - 1. See References section for applicable codes and agencies. However, when these agencies and/or drawings call for or describe materials, quality of work or construction of a better quality/higher standard or larger size than is required by above rules and regulations, provisions of these requirements and/or drawings take precedence over requirements of said rules and regulations
 - 2. Any modification made to conform with said codes, ordinance or regulations, shall be completed at the Contractor's expense without additional reimbursement.
- C. Verify all existing conditions and if conflict arises, contact the County Project Manager or Consultant for instructions.
- D. All work, material and equipment provided shall comply with NEC, NFPA, FBC and UL requirements.

1.3 SUBMITTALS

- A. Submit under provisions of Division 1 sections.
- B. Product Data: Manufacturer's data sheets on each product to be used, including installation methods, cleaning methods, preparation and storage and handling.
- C. Shop Drawings: Provide layout drawings and installation details with location and type of material and equipment required.
- D. County to select color and finish from manufacturer's standard inventory.
- E. Provide manufacturer's maintenance and operation instructions.

PART 2 PRODUCTS

2.1 NAME PLATES

- A. Each major component of equipment shall have a manufacturer's name, model number and rating on a plate securely affixed in a conspicuous place.
- B. A name plate of a distributing agent/supplier in substitution of manufacturer's name plate shall not be accepted.
- C. Name plate to be die stamped, engraved, or etched to warrant long term legibility.

PART 3 GENERAL

3.1 PREPARATION

- A. Do not begin installation until surfaces and substrates have been properly prepared and cleaned; they shall be free from rust, grease, scale, dirt, dust and other foreign matter.

- B. Verify measurements and site conditions prior to installation. Submit discrepancies to Consultant or County Project Manager for instructions prior to proceeding with the installation.
- C. Notify Consultant or County Project Manager where headroom or space conditions appear inadequate. Where variances occur between drawings and specifications, the item or arrangement of better quality, greater quantity, or higher is included in the line item price.
- D. Keep conduit openings closed with approved caps or plugs prior to and as work is installed during construction to prevent foreign objects or liquids entering raceway.
- E. Fabricate supports with galvanized angle, channels, etc., to support panel boards, safety switches, lightning contractors, etc., where indicated in an open area, or where excessive weight requires additional supports, to height prescribed. Securely anchor equipment as required.
- F. Provide temporary electrical service for use by trades during construction. Coordinate with trades so not to impede progress of construction.
- G. Examine areas to receive electrical accessories for correct height and spacing. Report discrepancies to the County Project Manager and Contractor.

3.2 DELIVERY, STORAGE AND HANDLING

- A. Store products in a secure and covered location to protect from the elements; keep in manufacturer's unopened packaging until ready for installation.

3.3 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 RECORD SET AND AS-BUILTS

- A. Maintain an up-to-date, complete set of electrical prints showing the work completed and indicating every change from the original permitted drawings. Use green colored pencil/pen to mark work completed and red colored pencil/ pen to mark changes.
- B. For underground work, elevations, routings and locations shall be indicated and dimensioned to permanent references.
- C. All notes and changes on the as-builts shall legible and the intent shall be clearly understood.
- D. Electrical As-built Drawings will be checked at the election of the County Project Manager for compliance prior to release of any progress payment. Upon completion of the work, the legible drawing set (PDF or hardcopy) shall be provided to the County Project Manager.

3.6 WARRANTIES

- A. Commence warranty on date of final acceptance of installation, or when satisfactory beneficial use of installation is derived, whichever occurs first. Date used will be established by County.
- B. Upon acceptance of work, the County will assume responsibility of supervising, operating and maintaining equipment. The County will make emergency repairs only if Contractor is unavailable and such repairs will in no case void warranty or guaranty.
- C. Contractor shall replace defective material, parts and equipment and correct work deficiencies without delay upon being notified of such defect.
- D. Upon expiration of each of these limits noted herein, maintenance will be completed by the County at the County's expense.

3.7 ACCEPTANCE

- A. Acceptance will be made by Consultant or County Project Manager on basis of tests and inspection of job; see Division 1.
- B. Contractor shall provide personnel and equipment to operate and make any necessary adjustments to the equipment,

and to perform tests to make the equipment work as designed and in accordance with drawings and specifications. Demonstrative tests must be performed in the presence of the Consultant or County Project Manager at no additional cost to the County.

END OF SECTION

SECTION 26 06 00 SCHEDULES FOR ELECTRICAL

I. GENERAL

A. DESCRIPTION

Provide work related to this section to provide and erect a complete electrical system including materials and equipment assembled together, cleaned, tested, and guaranteed to permit its immediate functioning thereof in accordance with the Contract Documents.

B. QUALITY ASSURANCE

1. Provide material:
 - a. Standard product of approved manufacturers; substantiated by previously published data.
 - b. Not used.
 - c. Best quality available in each specified type or class, new and free from defects in manufacture or performance.
 - d. Product of a single manufacturer regardless of location within system.
 - e. Install each system component in strict accordance with manufacturer's recommendations for specific service conditions.
 - f. Permanently marked with manufacturer's identification showing:
 - (1) Manufacturer (not Supplier)
 - (2) Capacity
 - (3) Service rating
 - (4) Type, grade or class of each item as applicable
 - (5) Certification or approval if applicable
2. Perform field fabrication or assembly by licensed and qualified installers (see References section), per manufacturer's recommendations or as herein specified or shown on drawings.
3. Reference Standards: Listed by basic designation are a part of this specification to extent indicated by references.
4. All equipment shall be Nationally Recognized Testing Laboratory (NRTL) listed and labeled where applicable.

C. SUBMITTALS

1. Submit, for Owner's approval, manufacturer's data to indicate compliance with quality assurance.
2. Shop Drawings, Product Data and Samples.
 - a. Provide manuals, containing operating instructions, parts lists, control diagrams and Record Drawings per Division 1.
 - b. Submittal Schedule:
 - (1) Panelboards and Circuit Breakers
 - (2) Contactors and Controllers
 - (3) Raceways - boxes, and fittings
 - (4) Lighting Fixtures
 - (5) Lightning Protection System
 - (6) Raceway supports, trapezes, and installation methods, wires and cables
 - (7) Wiring devices
 - (8) Disconnect switches, identified to location, service usage, and fuses
 - c. Samples: Provide at least one 6 inch sample of each type and size wire including marked information cut from coil or reel on job and, if requested, samples of each type of switch, receptacle, wall plate, lighting fixture raceway, etc.
 - d. For electrical rooms, provide scaled, reproducible drawings, floor plans and wall elevations coordinated with other trades. Show all components sized as per submittal. After County's

equipment approval it will be acceptable for Contractor to relocate items in these rooms to gain an acceptable layout, per NEC, of no additional cost to the County.

3. Contractor shall submit one PDF set of shop drawings underlining all deviations from the Contract Documents.
4. Provide operation and maintenance guides for each equipment when applicable; see Division 1.

II. PRODUCTS

A. BOXES AND OUTLETS

1. Outlet Boxes: Provide boxes, fittings, clamps, hangers, etc., in pressed galvanized steel or rust-resistant malleable iron alloy. Use extra large boxes in accordance with NEC, in place of size specified, where necessary to prevent undue crowding of wires.
2. Junction and Pull Boxes: Flush or surface mounting as required, removable trim with screw cover. Boxes, code gage, galvanized, flat steel sheet with rust-resistant undercoat and grey baked finish coat, unless otherwise noted.
3. Underground units to have cast hubs and threaded openings for conduit with gasket covers. Cover, attached with screws. Exterior units shall be weatherproof.

B. CONDUCTORS

1. Conductors will be copper with 98% conductivity stranded type for No. 8 AWG and larger sizes; for No. 10 AWG and smaller sizes either stranded or solid type will be acceptable unless indicated otherwise.
2. Insulation shall be THW OR THWN rated for 600 volts.
3. Color coding shall be as follows:
 - a. 120/240 volts, 1-phase, 3W
Black - Phase A
Red - Phase B
White - Neutral conductor only
Green - Equipment grounding and/or bonding
 - b. 120/208 volts, 3-phase, 4-wires system
Black - Phase "A"
Red - Phase "B"
Blue - Phase "C"
White - Neutral conductor only
Green - Equipment grounding or bonding
 - c. Where colors are not available in larger sizes, provide colored taped ends at all accessible locations. Conductors used for control and/or signal shall be other colors.

C. SPLICE AND TERMINAL CONNECTORS

1. Splice and termination fittings compatible for use with cable furnished, NEMA Standard, and NRTL approved.
2. Termination and splice fittings for all conductors shall be solderless pressure-type copper connectors with nonflammable, self-extinguishing insulation of temperature rating equal to cable being connected.
3. For conductors No. 10 AWG and smaller, silicone filled safety connectors may be used.

D. INSULATING MATERIAL FOR SPLICES AND TERMINATIONS

1. Tape shall be as manufactured by Scotch, 3M or equal. Voids shall be filled with rubber tape or electrical insulation putty such as Scotchfil.
2. All splices shall be approved for wet locations.

E. RACEWAYS AND FITTINGS

1. Conduits: Rigid Metal Conduit, Intermediate Metallic Conduit (IMC) and/or Electrical Metallic Tubing (EMT) shall be hot dip galvanized steel. *Use of EMT is limited to non-exposed installations only.*
2. Fittings: Fittings shall be of similar metal to the conduit they are used with. Non-ferrous, cast of pot metal type fittings are not acceptable.
3. Flexible Metal Conduit: All flexible metal conduit shall conform to NEC Article 351-2 as amended. Fittings shall be straight or angle type.
4. Rigid Non-Metallic Conduit: Polyvinyl chloride (PVC) conduit, boxes and fittings shall conform to NEMA TC-2 and to Federal Specifications W-C1094 for Type II, Schedule 40. Provide end bells, spacers, plugs and couplings. Fitted plastic or other tough non-metallic fitted coupling providing a watertight joint shall be used. Use of PVC is restricted to locations specifically shown on Drawings. **If exposed to exterior conditions, provide sunlight resistant Schedule 80 unless otherwise specified.**
5. Fittings and Accessories: Bushings shall be nylon insulated metallic type. Furnish conduit straps, clamps, and clasp backs made of galvanized malleable iron. **Bushings of insulating material only shall not be acceptable.** Standard threaded conduit fittings shall be installed on exposed conduit. Electric metallic tubing connectors and couplings shall be compression type. Set screw type connectors and couplings shall not be allowed. Concrete tight type shall be used. Use heavy wall to thin wall adapters where heavy wall conduit joins EMT.

F. SAFETY SWITCHES/CIRCUIT BREAKER DISCONNECTS

1. Safety switches shall be the heavy-duty type (HD), fusible or non-fusible, with the poles, ampere, voltage and horsepower ratings indicated and shall have solid neutrals and grounding bar. Lugs shall be NRTL listed for copper-aluminum. External handle shall be lockable in the OFF position.
2. Switches shall be equipped with quick-make/quick-break mechanism. Switches with any other kind of mechanism are not acceptable. Manufacturer's catalog shall specifically state that the switch has quick-make/quick-break mechanism to be acceptable.
3. Enclosures for safety switches shall be NEMA-1, heavy duty except that switches to be installed on wet locations or indicated (WP) weatherproof shall be NEMA-3 unless marked NEMA-4. Provide hubs as required for NEMA-3 enclosures with suitable gaskets and bonding means. Enclosures shall be warranted for a period of at least 10 years from date of substantial completion.
4. Switches and disconnects shall be as manufactured by Siemens, Square D, Westinghouse, General Electric (GE), or approved equal.
5. Circuit breaker disconnects may be used in lieu of safety switches providing they comply with the safety switch requirement and are applied within their ratings and a shop drawing is submitted for approval.

G. CIRCUIT BREAKERS, MOLDED CASE

1. Circuit breakers shall be bolt-on type and shall conform to Federal Specification W-C-375a and NEMA Standard AB-1, as amended, unless indicated otherwise. Circuit breakers shall be of the ampere rating, voltage rating, number of poles and class or interrupting capacity (I.C.) as indicated in drawings. Minimum I.C. 10000 RMS. Interrupting ratings are given in root mean square (RMS), symmetrical amperes based on NEMA test procedures. Lugs and terminals shall be NRTL approved for copper-aluminum or copper only.
2. Each circuit breaker shall have a trip unit for each pole with elements providing inverse time delay under overload conditions and instantaneous magnetic trip for short circuit protection unless indicated otherwise. Trip elements shall operate a common trip bar to open all elements.

H. FUSES

1. Fuses shall be nonrenewable RK dual element type.
2. Fuses shall conform to NEMA FU-1 and U.L.-198 and shall be of the voltage, class and ampere rating indicated on drawings.
3. Contractor shall provide a spare set of fuses for all sizes and shall replace blown fuses up to final acceptance of the work.

I. PANELBOARDS

1. Panelboards shall be provided with bolted molded case circuit breakers. All buses shall be copper. Panelboards shall have minimum interrupting capacity of 10,000 unless otherwise indicated RMS amperes based on NEMA test procedures. Series connected ratings or current limiters are not acceptable unless otherwise indicated on drawings. Panelboards shall have distributed phase busing throughout and plated connectors. Any two single pole breakers shall be replaceable by 2-pole breaker and three single pole breakers to be replaceable by 3-pole breaker.
2. Panelboard boxes shall be 20 inches wide minimum, code gauge galvanized steel. Fronts shall be complete with door and flush combination type cylinder lock and catch. Panels shall be keyed alike. Fronts shall have adjustable indicating trip clamps, and directory frames with clear plastic covering inside. Panelboards shall be listed by a NRTL. Mains, branch circuit ratings, modifications, and mountings shall be as indicated on plans. Stencil panelboards with designations in one inch high white letters on outside of door.

J. EMPTY RACEWAY SYSTEMS

1. Provide empty systems as specified on Drawings.
2. Empty conduit system shall be left in good condition for the County to wire and install components, shall be blown clean and free of debris or obstructions. Conduits shall contain pull lines (nylon cords) and shall be capped with approved devices.

K. GROUNDING

1. Panelboard frames, fixture and devices, switch frame, fittings, boxes and raceways, transformer tanks, metal enclosures of electrical devices, and other parts, shall be effectively grounded as required by N.E.C. or as specified on drawings. ***Neutral wire shall never be used as grounding means.***
2. Necessary conduit, conductors, clamps, rods connectors and components for grounding system shall be furnished, installed and connected by Contractor or its electrical subcontractor. Use U-bolt w/nut ground connector or exothermic welding.
3. Protect grounding conductors from mechanical injury and rigid support. Grounding contact surfaces to be thoroughly cleaned and bright before connection is made to ensure a good metal contact.
4. Furnish and install ground rods at all locations shown on Drawings and/or required by codes. Ground rods shall be copper clad, 3/4 inch diameter and 10 feet long.
5. Provide equipment utilizing portable cords with type "S" or "SO" three conductor cord conforming to U.L. standard for flexible cords and fixture wires.

III. EXECUTION

A. GENERAL

1. Install items in proper locations as shown on drawings, rigid and secure, plumb and level, and in true alignment with related and adjoining work. Do not weld electrical materials for attachment or support.
2. Furnish anchor bolts and anchorage items as required to insure proper alignment and support.
3. Install supporting members, fastenings, framing, hangers, bracing, brackets, straps, bolts and angles as required to set and rigidly connect the work.
4. Control erection tolerance requirements to not impair strength, safety, serviceability, or appearance of installation, as approved by the County.
5. Determine exact location of conduit. Route conduit as shown on drawings where possible.
6. Install exposed conduit in a manner that avoids conflicts with other work.
7. Install switches, receptacles, special purpose outlets and cover plates complete in a neat manner in accordance with NEC and local electrical codes.
8. For verification on all underground work, notify County at least two business days in advance of back-filling.
9. Restore every wall penetration and/or grade trenching on existing installation required by this project.
10. Install underground conduit running at a depth of 18 to 30 inches.
11. Provide plastic engraved identification mark per drawings for every panelboard, switch, controller, timer, etc. Identification (I.D.) marks shall be made of plastic engraved with designation in one inch high white letters. The I.D. mark shall be installed visible on the front cover of the equipment or device.

B. CONDUIT AND WIRING

1. Install metallic conduit in accordance with NEC and as specified herein. Use care to prevent concrete and other materials from obstructing conduit, size as shown on Drawings. Bends and offsets shall be avoided where possible, but where necessary make with a hickey or bending machine. Make conduit bends in accordance with NEC. Use of a pipe tee or vise for bending conduit will not be permitted. Conduit which has been crushed or deformed shall not be installed.
 - a. Install conduit so any moisture collecting in conduit will be drained to nearest outlet or pull box, where possible.
 - b. When field cutting of conduit is required, thread and ream conduit to remove rough edges. Where conduit enters a box or other fittings, provide a bushing to protect wire from abrasion.
 - c. Provide conduit supports as required for vertical and horizontal runs.
2. Wiring Installation:
 - a. Wire shall not be pulled into conduit until mechanical work is substantially complete.
 - b. Do not bend cables during installation, either permanently or temporarily, to radii less than 12 times outer diameters, except where conditions make specified radius impracticable and shorter radii are permitted by NEC and NEMA Standard WC7, Appendix N, as amended.
 - c. If pulling lubricants are used, they are to be of type approved for the particular cable insulation.
 - d. Provide suitable installation equipment to prevent cutting and abrasion of conduits and wire during pulling of feeders. Wire scraped or otherwise damaged shall be discarded and replaced.
 - e. Pull cables to be installed in a single conduit together.
 - f. Where Drawing shown an equipment to be moved or removed, disconnect and reconnect as required.
 - g. Splices and Terminations:
 - (1) Make wire and cable splices only in junction or pull boxes, or in equipment cabinets. Splices in conduit or raceway will not be permitted. Make splices by means of pressure type connectors and cover with tape to and insulation level equal to that of cable.
 - (2) Use positive type connector installation tools as recommended by manufacturer.
 - (3) Mechanical hand tools, with dies for each conductor size recommended by manufacturer, may be used on conductor sized through No. 4/0. For larger sizes, use hydraulic tools.
 - (4) Before installation, apply anticorrosion electrical joint compound to all conductors and terminal bolting pads.

IV. PROJECT CLOSEOUT

A. CLEANING

1. Thoroughly vacuum clean the interior of the equipment immediately before testing, and again immediately before being put into service.
2. Prior to final inspection, interior and exterior of equipment shall be completely clean including lamps shall be washed and wiped clean if used during construction for temporary lighting.
3. Legally discard off site any existing item not to be reused. Recycle as much as possible the discarded items.

B. PAINTING

1. Perform on damaged equipment with entire area where damage occurs refinished to match factory paint.
2. Field painting shall be by spray method, using standard painting equipment, and with same quality paint and quality of work used at factory, so repainted areas are not detectable.
3. Painting of exposed electrical conduit supports and equipment is provided elsewhere in the specifications.

C. TESTS

1. Schedule and conduct testing of the electrical system. Testing includes all necessary personnel, instruments, materials, fuel, etc., required to complete tests at no cost to the County.
2. Immediately correct deficiencies found as result of tests. Tests include following:
 - a. Tests required to show that requirements of Drawings, specifications and rules and regulations have been fulfilled and all electrical systems are working properly and as intended.
 - b. Wiring and equipment installed to be completely operated and installation left in perfect working order.

D. SPECIAL TOOLS

Contractor to furnish a complete set of proper special tools for vandal-proof and/or tamper-proof equipment installed under this project.

E. WARRANTY

The Contractor shall warrant the entire installation including all labor and materials for a period of at least one year unless otherwise indicated on drawings and/or specifications.

END OF SECTION

SECTION 26 41 13 LIGHTNING PROTECTION FOR STRUCTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Lightning protection system (System) requirements for buildings and structures.

1.2 REFERENCES

- A. Underwriters Laboratories (UL) 96A, Standard for Installation Requirements for Lightning Protection Systems
- B. National Fire Protection Association (NFPA) 780, Standard for Installation Requirements for Lightning Protection Systems, latest edition
- C. National Fire Protection Association (NFPA) 70, National Electrical Code, latest edition

1.3 QUALITY ASSURANCE

- A. Thor Guard, Inc. is the manufacturer used at most County parks.
- B. Installer Qualifications: An experienced company or person regularly engaged in installation of products specified in this Section. Manufacturer may require its own certification of the Installer. All installations shall be in accordance with the above stated References.
- C. All components shall be UL-listed and marked in accordance with UL procedures.
- D. All components shall be new, Class I and constructed to suit the application in accordance with UL 96A.
- E. Coordination: Coordinate the System with installation of other systems and components such as electrical wiring, metal bodies requiring bonding to lightning protection components and building finishes.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 sections.
- B. Product Data: Manufacturer's specifications and catalog data on proper installation and each product to be used, including connections, fastenings and materials.
- C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.
- D. Certification that the roof adhesive for air terminals is approved by the manufacturers of both the terminal assembly and roofing material.
- E. Provide warranty.
- F. Provide operation and maintenance instructions per Division 1 requirements.
- G. Prior to installation, obtain written approval from the Consultant or County Project Manager of any proposed deviations.

1.5 WARRANTY

- A. Provide a minimum one-year warranty for all provided products and installation.

PART 2 PRODUCT REQUIREMENTS

2.1 AIR TERMINALS

- A. For poles shall be 1/2 inch diameter by 18 inches long copper unless mounted to aluminum equipment and UNO. Shall be installed and properly fastened inside the concrete pole and away from the electrical wire raceway.
- B. For the roof shall be 1/2 inch diameter by 24 inches long and for parapets 18 inches long.
- C. Air terminal material for roof and parapets shall be copper or aluminum to match roof and parapet materials in compliance with the referenced standards.
- D. For both copper and aluminum, shall be solid and attached to the building/structure or to the pole with proper support for each location.
- E. Locate in accordance with UL 96A and NFPA 780.
- F. Extend at least 10 inches above the object or area to be protected.

2.2 DOWN CONDUCTORS

- A. In lighting poles shall be not less than #4/0 AWG electrical grade copper.
- B. For buildings/structure, shall be electrical grade copper.
- C. Shall be routed outside of any building/structure and shall not penetrate or invade that building/structure. Shall be routed at least 6 feet from power or signal conductors.
- D. Provide number of down conductors on the drawings.
- E. Shall be continuous without splices.
- F. Shall be installed in PVC conduit concealed in a column or wall.

2.3 GROUND RODS

- A. Copper-clad, 3/4 inch diameter by 10 feet long.
- B. Exothermically welded to the Earth electrode system.
- C. Ground rod connections shall be made using either U-bolt with nuts, bronze connector or exothermic welding.
- D. Install in accordance with the drawings and/or as required by NFPA and UL.

2.4 CONNECTORS

- A. Thru-roof copper connectors or thru-roof transition connector from aluminum to copper shall be provided at every thru- roof location.
- B. Connections shall be made per NFPA and UL approved methods and manufacturer's recommendations.

PART 3 GENERAL

3.1 CORROSION PROTECTION

- A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture, unless moisture is permanently excluded from the junction of such materials
- B. Use conductors with suitable protective coatings where conditions would cause deterioration or corrosion of conductors.

3.2 DELIVERY, STORAGE, AND HANDLING

- A. Store products in a secure and covered location to protect from the elements; keep in manufacturer's unopened packaging until ready for installation.

3.3 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.

3.4 INSTALLATION

- A. Install in accordance with manufacturer's instructions, UL and NFPA requirements and per approved drawings.
- B. No part of the System shall be concealed until inspected by the County and UL.
- C. Immediately replace items found damaged or that do not comply with these specifications and approved drawings.
- D. All metal components shall be bonded to the System.

3.5 TESTING

- A. Apply for inspection by UL as required for UL Mastering Labeling of System.
- B. Upon completion of installation, test the resistance-to-ground with a resistance tester. Where tests show resistance to ground is over 5 ohms, take appropriate action to reduce the resistance, and re-test until system is in compliance with UL.

END OF SECTION

SECTION 26 56 13 LIGHTING POLES AND STANDARDS

PART 1 - GENERAL

1.1 SUMMARY OF WORK

- A. Provide, engineer, install and obtain permits for the lighting poles complete with the requirements as described below. Sample Drawings may be included in the Contract Documents.
- B. Contractor's unit pricing includes the installation as well as wind load calculations and the above and below requirements at no extra cost to County.
- C. Excluded from the unit price are: electrical connections from the light pole to the panel or transformer; footings; permit fees; surveying; and geotechnical testing. These may be paid for as a pass-thru item or may be completed by the County.
- D. Contractor shall provide signed and sealed engineered drawings prepared by an experienced Professional Engineer registered with the State of Florida with design experience with concrete light poles.

1.2 ADDITIONAL REFERENCES

- A. ACI 318 - Building Code Requirements for Structural Concrete
- B. ASTM A1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- C. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
- D. ASTM A421 - Standard Specification for Stress-Relieved Steel Wire for Prestressed Concrete
- E. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- F. ASTM B26 - Standard Specification for Aluminum-Alloy Sand Castings
- G. ASTM C33 - Standard Specification for Concrete Aggregates
- H. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- I. ASTM C50 - Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products
- J. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete
- K. Florida Building Code (FBC), latest edition with revisions including Broward County amendments and high velocity wind zone requirements per Division 1 of the Project Manual

1.3 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- B. Installer Qualifications: An experienced company or person regularly engaged in installation of products specified in this Section. Manufacturer may require its own certification of the Installer or may require inspection by a manufacturer's representative. Refer to Division 1 section regarding References.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 sections.
- B. Product Data: Submit manufacturer's detailed technical data for materials, fabrication, and installation, including dimensions, ground details and primary features and accessories.
- C. Provide the Effective Projected Area (EPA) for each pole to be installed.
- D. Provide the pole base and bolt requirements and installation requirements.
- E. Provide details for in-line fuse holders or fuses if an equal but different type than as recommended by the manufacturer is proposed.
- F. Shop Drawings: Provide the following, at a minimum, to the County Project Manager for approval:
 - 1. Name and location of Project.
 - 2. Name of manufacturer and model number.
 - 3. Pole drawings, foundations and wind loads designed in accordance with the latest codes and by a Professional Engineer registered with the State of Florida.
 - 4. Installation details and notes.
 - 5. Governing building codes and edition.

6. Coordination plans with electric and site work, if applicable.
7. Sample warranty.

G. Samples: Submit to County Project Manager the full range of color and textures available. County will select from the manufacturer's standard colors and textures.

1.5 WARRANTIES

1. Manufacturer shall provide a minimum 10-year warranty from date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Provide light poles from one of the following approved manufacturers **with all requirements, options and customizations as listed** in this specification:
1. Ameron Pole Products - Centrecon Series "M" and "S" (Basis of Design) www.ameronpoles.com
 2. Precast Specialties, LLC www.precastspecialties.com
 3. StressCrete Group www.stresscretegroup.com
 4. Or approved equal
- B. Maximum initial pre-stressing force shall be as designed for maximum ultimate strength at time of stress transfer.
- C. Spiral reinforcement shall be no less than 13 gauge for a 4 inch pitch and 11 gauge for 3-1/2 inch pitch. This reinforcement shall continue from the top of the pole over its entire length and be secured to the longitudinal reinforcement by an approved automatic caging method.
- D. Poles shall be pre-stressed concrete of the design and dimensions as shown in the manufacturer's catalog and machine-made in steel molds by the centrifugal process to ensure maximum density and a smooth finish. Reinforcing shall be placed to ensure that no cracking shall occur during normal handling. The Centrecon Series "S" poles or approved equal shall have a minimum raceway opening of 1-3/8 inch and the concrete cover over the pre-stressing wire shall not be less than 3/8 inch. The Centrecon Series "M" pole, or approved equal, shall have a minimum raceway opening of 2 inches and the concrete cover over pre-stressing wire shall not be less than 1/2 inch.
- E. The proportions of water to cement shall produce a concrete having a minimum compressive strength of 3,500 psi before transfer of pre-stressing force after curing. A minimum 28 calendar day compressive strength of 7,000 psi after atmospheric curing shall be required for concrete with natural aggregate. For concrete with terrazzo aggregate or color admixture, the minimum 28 calendar day compressive strength shall be 6,000 psi using spun cylinder test method.

2.2 TYPE

- A. Poles shall be a tapered concrete and consist of all of the following:
1. Dense, centrifugally cast concrete
 2. High-tensile steel pre-stressing strand throughout the shaft tensioned at a predetermined stress, thus placing the shaft in compression
 3. Spirally wrapped wire at a controlled pitch
 4. Machine made
 5. Finish is natural, colored, aggregated or terrazzo concrete
 6. Embedded style

2.3 MATERIALS

- A. Provide products which meet or exceeds the following:
1. Portland cement shall conform to the current specifications for "Portland Cement" (ASTM Designation C150). Cement shall be stored in a dry, well-ventilated location protected from weather.
 2. Aggregates shall conform to ASTM C33 and shall be uniformly graded from a maximum size of 1/2 inch to 5 percent passing #100 sieve.
 3. Water used in mixing concrete shall be clean and free from deleterious amounts such as silt, oil, acids, alkalies and organic materials.

4. Admixtures shall conform to ASTM C494.
5. Strength:
 - a. The design compressive strength of concrete at the time of pre-stressing shall be as shown on the shop drawings. Use enough water to obtain a workable mix.
 - b. During each working day, at least two companion test cylinders will be cast from a single batch of concrete. Test cylinders shall be centrifugally cast in rigid molds and spun about their longitudinal axes at a speed which will produce a mix compaction similar to that of the pole. Cure of the test cylinders shall be equivalent to the cure of the pole.
 - c. Strength test shall be made in accordance with ASTM C39 using the net area of the hollow cylinder to determine the compressive strength. The test strength shall be the average strength of at least two companion cylinders cast from the same batch and tested at the same age.
6. Steel:
 - a. Pre-stressing of wire shall conform to ASTM A421 except for strengths as noted elsewhere in this specification.
 - b. Mild reinforcing wire and spiral wire shall conform to ASTM A82.
 - c. Base steel plates shall conform to ASTM A36 for structural steel
 - d. Anchor bolts shall conform to ASTM specifications as designated on the shop drawings.
 - e. Top Mount coupling shall conform to ASTM specifications as designated on the shop drawings.
 - f. Mild deformed reinforcing bar shall conform to ASTM A615 grades 40 and 60.
 - g. Steel cage wire for reinforcement shall conform to ASTM A1064 for cold-drawn steel wire for concrete reinforcement.
 - h. Steel bar for reinforcement shall conform to ASTM A615 for deformed billet steel bars for concrete reinforcement.
7. All cast aluminum parts (handhole frames, cable exits, pole top collars, etc.) shall conform to ASTM B26, alloy SG70A, unless otherwise noted.

B. Design Standards:

1. Standards shall be designed for dead loads and wind loads which produce bending and torsion in the shaft induced by the fixtures and attachments. Design stresses due to loading and pre-stressing shall conform to ACI 318, AASHTO, and IBC. Manufacturing shall conform to PCI and ACI requirements.
2. Dead load deflections shall be equal to or less than one percent of the length of the pre-stressed shaft.
3. Dimensions and Tolerances: The number of spirals of cold-drawn circumferential wire along any 3 feet of length shall not be less than required by design.
 - a. The nominal concrete cover over the high-tensile pre-stressing strand shall be 3/4 inch while the nominal concrete cover over other steel shall be 1/2 inch except at openings and holes for attachments. Normal manufacturing tolerances will apply to the nominal covers.
 - b. Hole patterns for wait-walk signals, auxiliary signals and push buttons shall be located within 1 inch of the location specified on the drawings.
4. Centrifugal Concrete Aggregate and cement for concrete shall be batched by weighing. Water used in the mix shall be metered or weighed. Concrete shall be mixed for a sufficient time to obtain uniform consistency. There shall be no addition of water once the concrete has been discharged from the mixer.
5. Concrete shall be placed in molds as rapidly as possible after mixing by a method known to produce uniform distribution. Compaction to dense durable concrete shall be by horizontal centrifugation. Water and laitance forced to the center of the standard shall be drained.
6. The primary cure shall be of length so that sufficient compression strength of concrete (as stated on the manufacturer's drawings) is attained to prevent slippage of the pre-stressing cables. The cure method shall prevent loss of moisture in the standard. The standards shall receive a minimum air cure of 15 calendar days before delivery for installation.
7. Pre-stressing after concrete has attained the required compressive strength, the high-tensile pre-stressing strand shall be released so that its tension is at the maximum as designed for its ultimate strength at time of stress transfer.
8. Reinforcing steel, strand, wire, stud bolts, anchor lugs or plates shall be electrically bonded. Most arms shall be

- bonded to stud bolts or cables.
9. Two surface treatments are may be available: exposed and surface impacted by the mold. The surface may be exposed after sufficient concrete cure and the resulting surface shall be uniform in lines and surface texture. Seam marks in either treatment shall be removed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until the site and foundation have been properly prepared.
- B. Contractor shall ensure that all components are included and that they are in proper condition.

3.2 DELIVERY, STORAGE, AND HANDLING

- A. Store products in a secure and covered location to protect from the elements; store the products so that they are elevated above the ground and to allow for full air circulation around the materials to prevent puddling, mold, decay and insects.
- B. Handling and shipment of poles shall be handled carefully. Blocking and hold-downs shall be used during shipment to prevent movement or shifting. Poles shall be handled using methods that assure structural integrity and uniform surface appearance.

3.3 INSTALLATION

- A. Comply with manufacturer's recommended procedures and installation sequence as well as final, County and Professional Engineer approved shop drawings.
- B. Refer to the quality assurance section and Division 1 for minimum qualifications of the manufacturer and installer.
- C. Install all structural components to be straight, plumb, and level; lay out as shown on shop drawings and survey; maintain all required clearances.
- D. Finished surfaces shall be cleaned after installation and be left free of imperfections.
- E. Any variations from the drawings and survey must be approved, in writing, by the Consultant or County Project Manager.
- C. Touch up damaged finishes with same paint as used by Manufacturer.
- D. Protect installed products until completion of project.
- E. Repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 31 00 00 EARTHWORK

PART 1 - GENERAL

1.1 ADDITIONAL DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Consultant or County. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Consultant or County Project Manager. Unauthorized excavation, as well as remedial work directed by Consultant or County Project Manager, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed one cubic yard (CY) for bulk excavation or 3/4 CY. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
 - 1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42 inch wide, maximum, short-tip-radius rock bucket; rated at not less than 138 horsepower (hp) flywheel power with bucket-curling force of not less than 28,090 pounds/square foot (lbf) and stick-crowd force of not less than 18,650 lbf; measured according to SAE J-1179.
 - 2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 48,510lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.
- I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 CY or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.
- J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- K. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- L. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- M. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.2 SUBMITTALS

- A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.

- B. Pre-excavation Photographs or Digital Recording: Show existing conditions of adjoining construction and site improvements including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.3 QUALITY ASSURANCE

- A. Qualification: The Contractor or its earthwork subcontractor shall be experienced in performing pavement operations.
- B. Field Grading Equipment: Specialized grading equipment shall be utilized to minimize compaction of prepared subgrade and topsoil. The grader shall be equipped with dual laser pickup, dual laser grade range mode, and the laser pickup shall operate the blade elevation controls automatically once they are locked on the laser beam. Each of the two laser pickups will operate only one end of the grader blade respectively. The laser source shall be capable of accuracy to three places of a percent (i.e., 1.234% of grade) and shall be capable of operating either the positive or negative angle of configuration without physically moving the laser source head.

1.4 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by County or others unless permitted in writing by Consultant or County Project Manager and then only after arranging to provide temporary utility services according to requirements indicated.
 - 1. Notify County not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without County's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM or AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-2-5, and A-3, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487 or A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2 inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2 inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2 inch sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a one inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Narrowly graded mixture of washed crushed stone or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2 inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.2 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Low-density, self-compacting, flowable concrete material as follows:
 - 1. Portland Cement: ASTM C 150, Type I.
 - 2. Fly Ash: ASTM C 618, Class C or F.
 - 3. Normal-Weight Aggregate: ASTM C 33, 3/4-inch nominal maximum aggregate size.
 - 4. Foaming Agent: ASTM C 869.
 - 5. Water: ASTM C 94/C 94M.
 - 6. Air-Entraining Admixture: ASTM C 260.
- B. Produce low-density, controlled low-strength material with the following physical properties:
 - 1. As-Cast Unit Weight: 30 to 36 pounds/cubic foot (lb/cu. Ft.). at point of placement, when tested according to ASTM C 138/C 138M.
 - 2. Compressive Strength: 140 pounds/square inch (psi) when tested according to ASTM C 495.
- C. Produce conventional-weight, controlled low-strength material with 140-psi compressive strength when tested according to ASTM C 495.

2.3 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface as specified in the Contract Documents.
- C. Protect and maintain erosion and sedimentation controls during earthwork operations as specified in the Contract Documents.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.3 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs on grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.4 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus one inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 2. Over Excavation: If over excavation is required in the foundation recommendations from the Consultant, the Contractor shall over excavate, backfill, and compact the soil below the foundations as recommended by the Consultant.

3.5 EXCAVATION FOR WALKWAYS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades. Refer to drawings or Project Manual for final slope requirements.

3.6 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
 1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.7 SUBGRADE INSPECTION

- A. Notify the Consultant when excavations have reached required subgrade.
- B. If the Consultant determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Consultant, and replace with compacted backfill or fill as directed.

- D. Reconstruct subgrades damaged by accumulated water or construction activities, as directed by the Consultant, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Clean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Consultant or County Project Manager.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Consultant or County Project Manager.

3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, damp proofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud or standing water.

3.11 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud or standing water.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section "Cast-in-Place Concrete."
- D. Provide 4 inches thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.
- E. Place and compact initial backfill of subbase material, free of particles larger than one inch in any dimension, to a height of 12 inches over the utility pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Backfill voids with satisfactory soil while installing and removing shoring and bracing.
- G. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than one vertical to four horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.13 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 12 inch in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 - 1. Under structures, building slabs, steps, and pavements, scarify and re-compact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 98 percent.
 - 2. Under walkways, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 - 3. Under lawn or unpaved areas, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
 - 4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.15 GENERAL GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1/2 inch.
 - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of half an inch when tested with a 10 feet straightedge.

3.16 SUBBASE AND BASE COURSES

- A. Place subbase and base course on subgrades free of mud or standing water.
- B. On prepared subgrade, place subbase and base course under pavements and walks as follows:
 - 1. Place base course material over subbase course under hot-mix asphalt pavement.
 - 2. Shape subbase and base course to required crown elevations and cross-slope grades.
 - 3. Place subbase and base course 6 inches or less in compacted thickness in a single layer.
 - 4. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 5. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry unit weight according to ASTM D 698.
- C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Consultant or County Project Manager; reshape and re-compact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS EARTHWORK MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off County's property in accordance with Division 1 of the Contract Documents.

END OF SECTION

SECTION 31 10 00 SITE CLEARING

PART 1 - GENERAL

1.1 ADDITIONAL DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than one inch in diameter; and free of subsoil and weeds, roots, toxic materials, or other non-soil materials.
- B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated. Refer to Temporary Tree and Plant Protection section of the Project Manual, if applicable.

1.2 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated to remain County's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.3 SUBMITTALS

- A. Photographs or digitally record detailed existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings, according to the Project Record Documents section identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.4 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from County and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on County's premises where indicated.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.
- E. Do not commence site clearing operations until all existing above and underground utilities in the path of site clearing operations have been located, marked, and capped or disconnected for safe operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in the Earthwork section or on the Drawings.
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Contractor shall be responsible for applying for and obtaining all necessary permits from all authorities having jurisdiction prior to commencing site clearing and tree removal.
- B. Protect and maintain benchmarks and survey control points from disturbance during construction.
- C. Locate and clearly flag trees and vegetation to remain or to be relocated.

- D. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to County.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. The Contractor shall be required to prepare and submit an NPDES permit application utilizing the SWPPP.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE REMOVAL AND TREE PRESERVATION

- A. No trees shall be removed until approved in writing by County or Consultant. Tree removal may require a permit from the authority having jurisdiction.

3.4 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
 - 1. Do not store construction materials, debris, or excavated material within fenced area.
 - 2. Do not permit vehicles, equipment, or foot traffic within fenced area.
 - 3. Maintain fenced area free of weeds and trash.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
 - 1. Cover exposed roots with burlap and water regularly.
 - 2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 - 3. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
 - 4. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.
- D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Consultant or County's Project Manager.
 - 1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
 - 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Consultant or County's Project Manager and authorities having jurisdiction.

3.5 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by County or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Consultant or County's Project Manager no less than two business days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without Consultant or County's Project Manager's written permission.
- C. Excavate for and remove underground utilities indicated to be removed.
- D. Contractor is responsible for locating all existing utilities. Any utilities not located by the Contractor and damaged during the construction shall be repaired or replaced to County's satisfaction solely at the Contractor's own expense. No additional compensation shall be given to the Contractor for repairing or replacing underground utilities damaged during the Project.

3.6 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.
 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
 4. Use only hand methods for grubbing within tree protection zone.
 5. Chip removed tree branches and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

3.7 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 1. Remove subsoil and non-soil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Limit height of topsoil stockpiles to 72 inches.
 2. Do not stockpile topsoil within tree protection zones.
 3. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.8 SITE IMPROVEMENTS

- A. Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
 2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.9 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris as detailed in the construction waste section.

1. Separate recyclable materials produced during site clearing from other non-recyclable materials and transport them to recycling facilities.

END OF SECTION

SECTION 31 13 00 SELECTIVE TREE AND SHRUB REMOVAL

I. GENERAL

A. SUMMARY

1. The Work includes, but is not limited to, shrub, tree and stump removal, protection of the public, inspection of work, excavation, backfilling, grading, cleanup, and re-sodding as necessary.
2. Line item pricing includes the furnishing all labor, machinery, tools, chainsaws, apparatus, bucket trucks, cranes and other heavy equipment, chippers, stump grinders, ladders, means of transportation, supplies, equipment, materials, personal protective equipment, services and incidentals necessary to remove the trees and shrubs as requested by the County.

B. LICENSES, PERMITS, FEES AND CODES

1. Tree Removal Permits
 - a. For projects that are located in the Broward Municipal Services District (BMSD) or a County park in which the County is responsible for issuing permits, the Contractor shall obtain the necessary permits from the applicable Broward County agency and which will be paid for through an interagency transfer.
 - b. For projects that are located in any municipality of Broward County, Contractor shall contact the authority having jurisdiction to secure any necessary permits.
 - c. Where replacement trees are required, Parks and Recreation will provide and install such replacements unless otherwise stated.
2. Refer to Allowances section for payment of permits. Damages, penalties or fines imposed for failure to procure and pay any required licenses, permits and inspection fees will be borne by the Contractor.
3. Contractor shall be responsible for performing all work in accordance with all applicable laws, rules, regulations, ordinances and code requirements from the appropriate city, County, state and/or federal jurisdiction the project is located in.

C. QUALITY ASSURANCE

Contractor and its tree removal subcontractor shall have a complete knowledge of, and practice, all current arboreal practices and safety precautions.

D. SAFETY ON AND OFF THE JOB SITE

In performing the scope of work, all safety on and off the job site will be the sole responsibility of the Contractor. The County's on-site observations or inspections will be only for the purpose of verifying that the Work is being properly implemented. The County's on-site observations or inspections are not for safety purposes in regard to the Contractor's work on and off the job site.

II. EXECUTION

A. GENERAL

1. The removal work will not be performed at any time when it may be subject to damage by conflicting with another trade and their work.
2. Waste materials will be removed and legally be disposed of off the County's property, unless otherwise indicated, and at the Contractor's expense. See Division 1 sections on waste.
3. **Burning of combustible materials on the job site shall not be permitted.**
4. Contractor shall provide protection to structures, sidewalks, pavement, irrigation and other facilities in areas of work which are subject to damage during the work.
5. For open excavations, Contractor shall provide barricades and warnings which conform to the requirements of governing authorities, Division 1 and OSHA safety requirements.

6. The County reserves the right to utilize other contracts for these services.

B. SITE INSPECTIONS AND UTILITIES

1. The job site may have existing above ground and underground utilities, such as, but not limited to, irrigation, phone, electrical, water or storm sewers. The location of some of these existing utilities may have been indicated on the drawings to aid the Contractor in its search and location efforts. However, no guarantee is implied that the plans are accurate or complete.
2. It shall be the responsibility of the Contractor to verify the location of all utilities, structures, etc., by pot holing, hand excavation or other appropriate measures before performing any work that could result in damage or injury to persons, utilities, structures or property. The Contractor will make a thorough search for utilities, structures, etc., before work is commenced in any particular location. The Contractor will verify utility locations with the utility company.
3. Contractor will take immediate steps to repair, replace, or restore all services to any utilities or other facilities which are disrupted due to its operations. Further, the Contractor will engage any additional outside services which may be necessary to procure repairs on a continuous "around the clock" basis until services are restored and repaired. Contractor will also provide and operate any supplemental temporary services to maintain uninterrupted use of the facilities. All costs involved in the repairs and restoring disrupted service resulting from negligence on the part of the Contractor will be borne by the Contractor and it will be fully responsible for any and all claims resulting from the damage.
4. Contractor will not purposefully disrupt or disconnect any type of utilities whatsoever without first obtaining the written permission of the County. **Requests for disconnections must be submitted in writing and received by the County at least three business days prior to the time of the requested interruption.**

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C. ABOVE GROUND TREE REMOVAL

1. All branches shall be cut and chipped up to the largest capacity of the chipper. County reserves the right to stockpile any plant material that has been thoroughly chipped. All unchipped material shall be removed off the site by the Contractor and disposed of by legal means at the Contractor's expense.
2. Chippers shall have its blades maintained in a sharp condition.

D. BELOW GROUND TREE REMOVAL

1. Stumps shall be ground down completely. All grindings shall be removed from the site.
2. Roots larger than 3 inches shall be excavated and removed where found.
3. Parks and Recreation shall inspect the extent of the stump and root removal prior to any backfilling procedures.
4. Trees shall be removed off the site by the Contractor and disposed of by legal means at the Contractor's expense; see Division 1 waste sections.

E. BACKFILLING

1. The hole created by stump grinding and root removal shall be backfilled with fill material as approved by Parks and Recreation. The fill material shall be free of stump grindings, rocks greater than 3/4 inch diameter, and other debris.
2. Compact backfilled area to a minimum eighty-five percent (85%).
3. Dress off all areas to finish grades.

F. GRADING

The area surrounding the removed tree and shrub shall be re-graded and leveled as needed to remove any abrupt changes in elevation.

G. CLEAN UP

Contractor shall clean up and remove all debris from the entire job site to the satisfaction of the County prior to Final Acceptance.

END OF SECTION

SECTION 31 31 00 SOIL TREATMENT (INCLUDING TERMITES)

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Soil treatment below slabs-on-grade for subterranean insects.
- B. Soil treatment at interior and exterior foundation perimeter, for subterranean insects.
- C. Soil treatment under all concrete floor slabs on grade or fill.
- D. Where exterior foundation walls abut paving, sidewalk slabs, or other permanent surfacing.

1.2 SYSTEM DESCRIPTION

- A. Termiticide and Herbicide application to soil under new buildings and athletic paved areas as indicated on drawings and specified in this section.
- B. **Use of chlordane, heptachlor, aldrin or dieldrin is not allowed.**

1.3 QUALITY ASSURANCE

- A. Applicator Qualifications: Applicator shall be experienced, insured and licensed according to State of Florida regulations to apply the proposed termite control treatment and products in Broward County and the State of Florida.
- B. Regulatory Requirements: Formulate and apply termiticide according to the EPA-Registered Label and in accordance with chapters 1816, 2114 and other applicable chapters and sections of the FBC.
- C. Meet requirements of FBC Section 1816.

1.4 SUBMITTALS

- A. Submit the following to the Consultant or County Project Manager for review before commencing the soil treatment:
 - 1. Product data and product certificates signed by the Manufacturer, including manufacturer's specifications, chemical analysis, with recommended dilution, application directions, and safety precautions.
 - 2. Sample copy of Applicator's warranty for review.
 - 3. Applicator's qualifications including experience with copies of current local and State licenses.

1.5 STORAGE AND PROTECTION

- A. To avoid surface flow or over spray of toxicant from application site, do not apply soil poisons when soil or fill is excessively wet or after heavy rains.
- B. Unless treated areas are to be immediately covered, take precautions to prevent disturbances of treatment by human or animal contact.
- C. Comply with applicable laws, codes, and ordinances of Federal, State, and local regulatory agencies having jurisdiction over use of soil poisons.
- D. Provide warning signs and instruct workers to use protective measures for their safety.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of the Closeout Submittals section.
- B. Submit warranty: Properly executed, signed by a duly authorized officer or principal and notarized.

1.7 WARRANTY

- A. Upon completion of soil treatment and as a condition of substantial completion, furnish the Owner with a written warranty, from the Applicator, that shall provide that:
 - 1. Application was made at concentration, rates, and methods complying with Manufacturer's written instructions.
 - 2. Effectiveness of treatment is warranted for not less than 5 years without additional cost to the Owner.

3. Upon evidence of subterranean termite activity, re-treat area at no additional charge to the Owner. Additional treatment shall be sufficient to prevent termites from attacking building or its contents.
4. Upon occurrence of damage to building or to its contents within warranty period, re-treat soil and replace damage at no cost to the Owner.
5. Warranty shall be non-cancellable by all parties to the Contract except the Owner.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Products shall comply with the following, at a minimum:
 1. United States Environmental Protection Agency (EPA) regulations for termiticides.
 2. Broward County Health Department.
 3. Broward County Environmental Protection and Growth Management.
 4. Shall be registered with Florida Department of Agriculture and Consumer Services.
- B. Approved Products
 1. Termidor SC by BASF, EPA Registration No. 7969-210.
 2. Premise 75 by Bayer Environmental Science, EPA Registration No. 432-1332.
 3. Dragnet SFR by FMC Corporation., EPA Registration No. 279-3062.
 4. Demon Max by Syngenta Crop Protection, Inc., EPA Registration No. 100-1218.
 5. Or approved equal.

PART 3 – EXECUTION

2.2 APPLICATION

- A. Apply termiticide mixture to the following:
 1. Soil and earth that will be covered by or lie next to buildings.
 2. Masonry foundations.
 3. Areas around pipes and conduits penetrating slabs on fill to provide a lethal barrier to subterranean termites
- B. Apply termiticide mixture after subgrade has been made ready for placement of any floor slab vapor barrier, and as soon as practical before placement of concrete slabs and caps on masonry piers. Piling, pile caps, grade beams, foundation walls, and below grade waterproofing shall have been completed.
- C. Soil Conditions: Apply termiticide mixtures when moisture content soil is sufficiently low to allow uniform distribution of chemical throughout specified areas.
- D. To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
- E. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.
- F. Application Under Slabs on Fill
 1. Apply termiticide mixtures uniformly to all areas beneath concrete slabs-on-grade, including beneath walkways and entrance platforms and beneath sidewalks within 5 feet of buildings.
 2. Apply at rate per manufacturer's written instructions.
 3. Ground areas beneath concrete slabs-on-grade and paving abutting building slabs shall be similarly treated for a distance not less than three feet from building.
- G. Application along Foundation Walls, Pipes, and Conduits

1. Treat critical areas along both sides of exterior and interior foundation walls, columns, and around utility pipes, conduits, ducts and other similar items extending through soil beneath and next to new construction, to a depth, width, and rate per manufacturer's written instructions.
 2. Mix chemical with soil as it is placed against walls and utility lines.
 3. Apply at rate per manufacturer's written instructions.
- H. Application to Masonry Foundation Walls: Treat voids of unit masonry foundation walls, top of course occurring at or just above grade level, with additional treatment Apply at rate per manufacturer's written instructions.
- I. Apply borate treatment after framing, sheathing, and exterior weather protection is completed but before electrical and mechanical systems are installed.
- J. Re-treatment of Disturbed Soil: Retreat soil surfaces disturbed after treatment and before placement of slabs and covering structures.

2.3 CLEAN UP

- A. Improper disposal of pesticide, spray mixture, or rinsate is a violation of federal law. Comply with manufacturer's instructions for disposal of these materials and empty containers.
- B. Do not allow supplies of chemicals to remain on site unattended or unprotected from the elements.

END OF SECTION

SECTION 31 31 19 VEGETATION CONTROL (EXOTIC PLANT REMOVAL)

PART 1 - GENERAL

1.1. INTRODUCTION

- A. Broward County is responsible for managing nuisance, invasive vegetation in all County parks and other Broward County-operated locations and is responsible for restoring and preserving natural areas. Species that interfere with these goals include, but are not limited to, plants listed by the Florida Exotic and Pest Plant Committee. Some of the most problematic plants include: Brazilian pepper, melaleuca, Australian pine, earleaf acacia, lygodium, Java plum, schefflera, shoebutton ardisia, torpedo grass, paragrass, phragmites, sansaveria, and Tropical Soda Apple.
- B. Herbicides are the primary tool used to control these species. The methods of herbicide application include, but are not limited to: foliar spray, frill and girdle, stump, and basal treatment. Seedlings of some tree species in mixed plant communities may be hand-pulled in an effort to minimize the impact of herbicides on non-target vegetation. Pulled seedlings are left hanging on the native vegetation or in a pile to reduce the possibility of re-growth.
- C. Target vegetation is site and project specific and is primarily determined by the Parks and Recreation Division. Most of the plant species targeted for control are invasive and exotic to Florida. However, depending on where they grow, native plants can also cause problems or become invasive in certain environments. Treatment of native species will only occur at the County's discretion.
- D. Contractor shall provide personnel with extensive experience in the removal of exotic plants from natural areas (refer to References section of the Project Manual).
- E. The Contractor's supervisory staff for the exotic plant removal and herbicide application shall be experienced with the identification of the desirable native plant species and the exotic/nuisance plant species within and adjacent to the project area.
- F. The Contractor's supervisory staff for the exotic plant removal and herbicide application must possess applicable licenses issued by the Florida Department of Agriculture and Consumer Services (FDACS). A copy of these licenses shall be provided either prior to or at the pre-construction meeting but must be provided to the County Project Manager prior to issuance of the NTP.
- G. Contractor is responsible for providing crews, equipment, herbicide and supplies for treating wetland and terrestrial vegetation, exotic nuisance trees and other species using various application methods determined by the County.
- H. Access into the natural areas for treatment must not significantly impact native vegetation and soils.

1.2. PROJECT MANAGEMENT

- A. Prior to the commencement of this type of work, Contractor and its exotic plant supervisory staff and/or herbicide applicator shall attend the pre-construction meeting. Details of the meeting may include, but are not limited to, property boundaries, plant species to be treated, herbicide type and rates, method of application, number of crews and equipment needed. Refer to the Project Management and Coordination sections.
- B. The Contractor shall be responsible for the technical quality, staff coordination and adherence to cost and time schedules. Contractor shall also ensure the necessary coordination of each project, keeping deadlines in perspective and controlling all costs associated with the contract.
- C. The Contractor shall be responsible for immediate work stoppage and clean-up operations in the event of any fuel, herbicide, chemical or oil spill. Report any such incident to the County Project Manager and Park Manager immediately.
- D. The County shall monitor the work in progress and ensure that all work completed and products used are within the County's standards and requirements.

1.3. MATERIALS AND SPECIFICATIONS

- A. The Contractor shall select and utilize herbicides that will be effective to ensure eradication of targeted exotic/nuisance species that will not affect desirable native or planted species and comply with all applicable regulations in accordance with the current manufacturer's label. Cone sprayers are required for cut stem treatment method. Prior to application of any herbicide, the Contractor shall obtain approval of the selected herbicide from the County's Parks and Recreation Division environmental section or other applicable user agency.
- B. The Contractor shall not injure or kill non-nuisance or desirable native vegetation. The Contractor shall replace non-target trees and other plants that are injured or lost due to Contractor's actions, at no cost to County. Replacement shall be based on the most current and accepted industry standards available with regard to plants injured or killed and consistent with County environmental policies. Any property damaged by the Contractor, such as fencing, will be repaired or replaced at the Contractor's expense. Any ruts caused by the Contractor's vehicles or equipment must be filled in to grade before completion of project
- C. Upon completion of the work under this Contract, all equipment, chemical containers and appurtenances associated with the project will be removed from County's property.
- D. The Contractor shall assign ground crew supervisor(s) to each project and shall be available on-site at all times during control operations until project completion. The ground crew supervisor shall be able to communicate effectively with all crew members and County personnel. The ground crew supervisor shall be responsible for:
 - 1. Overseeing all control activities and safety on project sites.
 - 2. Assuring that all Contractor's crews are knowledgeable of, and remain within the property and treatment boundaries.
 - 3. Coordinating with the County Project Manager on a daily or weekly basis.
 - 4. Assuring availability and compliance with all appropriate herbicide labels, Material Safety Data Sheets (MSDS), and permit conditions.
 - 5. Assuring equipment is safe and in proper working condition.
 - 6. Avoiding damage to native and listed vegetation.
- E. The County reserves the right to recommend herbicides and examine and/or sample the selected spray materials. The County will consider alternative products or application rates recommended by the Contractor but reserves the right to determine the best approach.
- F. While on the job site, all herbicides and adjuvants must be kept with the project supervisor/herbicide applicator at the treatment site or in a secured, ventilated and locked truck, trailer, or shed as close to the treatment site as practical at all times, in accordance with Chapter 403.161, 403.413, 403.708 F.S. and Chapter 487.031 F.S., as amended.
- G. All products shall be stored in containers that are in good condition and sealed to prevent spill releases. All containers shall be inspected daily for leaks, labeled to identify their contents, and kept in a secure manner as to prevent the likelihood of leaks. The Contractor is responsible for keeping all empty containers in a secured, ventilated and locked truck, trailer or shed. The Contractor is also responsible for any leaks, spills, environmental damage, or theft of materials from the job site.
- H. The Contractor shall be responsible, to the satisfaction of the County, for the restoration or replacement of all native vegetation and property damaged as a result of any negligent activity by the Contractor.
- I. The Contractor shall have full responsibility for systematically treating the areas indicated. If the minimum acceptable performance is not achieved for any area of the project within a reasonable time frame following project completion (time frame is dependent upon species targeted, mode of action of treatment, site and weather conditions), additional thorough treatment of the target plant(s) shall be the responsibility of the Contractor at no additional cost to the County. Areas not treated or not responding to treatment may be required to be re-treated at the Contractor's expense, if it is determined that the Contractor provided faulty treatment measures or products.

- J. Minimum acceptable performance is defined as 100% treatment of the targeted vegetation within the boundaries of the treatment site with at least 95% control of targeted vegetation within the timeframe of the herbicide manufacturer's recommended period for control to occur. There will be times when an herbicide applicator will miss a few of the target plants, for various reasons; however, every effort must be made to treat every targeted plant.
- K. Contractor must dispose of all herbicides and adjuvants as per current legal requirements.

1.4. WORK BREAKDOWN STRUCTURE

- A. Vegetation treatments will be determined in terms of acres i.e., 43,560 square feet equals one acre. Effectiveness of vegetation treatments are measured in terms covered acres and treated acres.
- B. It is the Contractor's responsibility to request clarification of the work requested in the project if it is not completely clear to the Contractor.
- C. The County may request the Contractor to provide daily operating logs documenting the hours of operation, herbicide used and plant species treated. Reports may request the following:
 - 1. Supervisory staff/ground crew supervisor on site
 - 2. Location of work performed
 - 3. Hours worked
 - 4. Down time (covered in brief comments)
 - 5. GPS location with easting and northing or UTM coordinates
 - 6. Rate of herbicide
 - 7. Type and manufacturer of product(s) used
 - 8. Acres covered
 - 9. Coverage category
 - 10. Plants treated
 - 11. Wind measurement
 - 12. Weather condition
 - 13. Brief comments on daily activities
 - 14. Herbicide applicator's name and license number
- D. Applications must be performed in such a manner as to protect non- target organisms, the environment, and the public. This includes taking into consideration and employing appropriate means necessary to reduce drift in accordance with the South Florida Water Management District (SFWMD) (or other applicable water district) and Florida Department of Environmental Protection (FDEP) Herbicide Use Guidelines and similar requirements.
- E. Part of the County's mission is to protect and restore natural areas. Therefore, it is necessary that Contractor avoids potential negative impacts to protected and endangered species. Due caution must be exercised at all times when performing activities for the County. Care must be taken to avoid adverse impacts to native, or listed protected and endangered species. When working in an area where protected and endangered species may be present, Contractor must follow any established U.S. Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) guidelines that may apply for each individual species.
- F. Treatment methods will be determined by the Parks Manager on a case- by-case basis. Control methods that may be used for invasive non-native plants are listed below. Further description of these methods can be found in the University of Florida IFAS publication SP242 (Control of Non-native Plants in Natural Areas of Florida), as amended.
 - 1. Manual removal: Includes hand pulling, and using chainsaws or machete to cut and pile targeted vegetation.
 - 2. Stump treatment: After felling and removing large trees or brush, herbicide (concentrated or diluted) is sprayed or painted onto the cut surface.
 - 3. Basal bark: Herbicide is applied, commonly with a backpack sprayer directly to the bark around the circumference of each stem /trees.

4. Foliar: Herbicide is diluted in water and applied to leaves using backpack, spray-tanks, and electric sprayers.
 5. Frill and girdle (sometimes called hack and squirt): Cuts into the cambium are made completely around the circumference of the stem/tree and herbicide (concentrated or diluted) is applied to each cut.
- G. The County may request marker dyes to be used for keeping track of what vegetation has been treated.
- H. The Contractor must review and comply with all conditions set forth on the product label.

END OF SECTION

SECTION 32 31 13.3 FENCE REMOVAL

PART 1 GENERAL

1.1. SUMMARY

- A. The work described in this section consists of providing fencing removal as described below. This applies to all sizes and types of fencing such as chain link, PVC and recycled plastic.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

2.1. INSPECTION

- A. Examine the conditions under which the fence and gates are to be removed and correct unsatisfactory conditions before proceeding with the work.

2.2. COORDINATION

- A. Coordinate the removal schedule with the Park Manager or designee. Prior to removal, the Park Manager or designee will establish the location for the materials to be stockpiled.

2.3. REMOVAL

- A. County will pick-up and recycle the removed chain link and railings to the best extent possible.
- B. Remove and stockpile for pick-up and recycling by County.
- C. For chain link, stock pile in 50 foot rolls.
- D. Remove gates with frames and fabric as assembled units with hardware attached and stock pile.
- E. **Store the stockpiled materials in a way so as not to damage the landscaping below and around the materials. Allow for drainage of the area.**
- F. Remove line, end, pull and corner posts along with the attached concrete footings and/or anchors.
- G. Legally dispose of the posts, concrete and other removed materials to a waste facility off site.
- H. Fill all resulting holes to grade with clean sandy fill material to grade; material may require approval by the County.
- I. **The unit price includes legal disposal and recycling costs.**

END OF SECTION

SECTION 32 13 43 PERVIOUS CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Work consists of furnishing and installing a pervious concrete system with these specifications and any applicable drawings. Unit price excludes the testing and signage as detailed below.
- B. The pervious concrete system allows for infiltration of water rather than creating runoff. This is only designed for pedestrian areas, car parking and low traffic areas due to its low strength.
- C. A pervious concrete system shall not be used for the following:
 - 1. Athletic facilities
 - 2. Areas with anticipated heavy traffic loads
 - 3. Where heavy trucks will be used
 - 4. Within 10 feet of the entrance to a solid waste receptacle or dumpster
 - 5. Where excessive fine material will be deposited on the surface of the pervious concrete such as from roof or landscaping runoff and in areas adjacent to unpaved traffic paths unless these are graded below and sloped away from curbs or pervious concrete areas.
- D. Related Requirements:
 - 1. Divisions 1, 31, 32 and 33 of the Project Manual.

1.2 ADDITIONAL REFERENCES

- A. American Society for Testing and Materials (ASTM), latest editions
 - 1. ASTM C29 Test for Unit Weight and Voids in Aggregate.
 - 2. ASTM C33 Specification for Concrete Aggregates.”
 - 3. ASTM C42 “Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - 4. ASTM C117 “Test Method for Material Finer than 75 Microns (No. 200) Sieve in Mineral Aggregates by Washing.”
 - 5. ASTM C138 test Method for Unit Weight, Yield and Air Content (Gravimetric) of Concrete
 - 6. ASTM C150 Specifications for Portland Cement (Types I or II only.)
 - 7. ASTM C172 Practice for Sampling Fresh Concrete
 - 8. ASTM C260 Specification for Air-Entraining Admixtures for Concrete
 - 9. ASTM C494 Specification for Chemical Admixtures for Concrete.
 - 10. ASTM C595 Specifications for Blended Hydraulic Cements (Types IP or IS only.)
 - 11. ASTM C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
 - 12. ASTM C989 Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
 - 13. ASTM C1077 Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
 - 14. ASTM C1688 Test Method for Density and Void Content of Freshly Mixed Pervious Concrete
 - 15. ASTM C1701 Standard Test Method for Infiltration Rate of In Place Pervious Concrete
 - 16. ASTM D 557 Tests for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10 Pound Rammer and 18-inch Drop.
 - 17. ASTM E329 Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction.
- B. American Concrete Institute (ACI), latest editions
 - 1. 330R Guide for the Design and Construction of Concrete Parking Lots
 - 2. ACI 522R Pervious Concrete

- C. American Association of State Highway and Transportation Officials (AASHTO), latest edition
 - 1. AASHTO T 180 Moisture-Density Relations of Soils Using a 10 lb (454kg) Rammer and 457-mm (18 in.) Drop
- D. FDOT Standard Specifications for Road and Bridge Construction, see Division 1 references for edition
 - 1. Section 345-10 Plant and Equipment
 - 2. Section 350-18 Thickness Determinations
 - 3. Section 923-1 Chemical and Physical Requirements of Water for Concrete
- E. National Ready Mixed Concrete Association (NRMCA)
 - 1. 2PPCRT Pervious Concrete Contractor Certification Policies and Procedures Manual

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Contractor shall submit a list of at least three previously installed projects for the Installer. Contact names, telephone numbers, and date of completion shall be listed for each project. Refer to the minimum qualifications and experience as detailed in Division 1.
 - 2. The Installer shall be a certified NRCMA Certified Installer or Craftsman, or similar certification. A NRCMA certified Technician is not acceptable as this person does not meet the field experience requirements.
- B. Pre-installation Meeting:
 - 1. A meeting to be attended by the County Project Manager, Contractor, Installer and Engineer of Record prior to the commencement of work. A sample meeting checklist may be available from the Florida Concrete & Products Association at www.fcpa.org
 - 2. The Installer's qualifications should be provided prior to this meeting
 - 3. Establish the location of the mock-up
- C. Mockups: Build mockups to verify selected products, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Install a 5 feet x 5 feet area following the installation practices described in below. This area shall be used to verify joint sizes; lines; laying pattern(s); color(s); and texture of the proposed paver installation.
 - 2. To provide a proper representation of color blend, blending during installation of sample mock-up will be pulled from a minimum of 3 cubes.
 - 3. This area shall be the standard from which the work will be judged.
 - 4. Subject to approval by the County, the mock-up may be retained as part of the finished work. If mock-up is not retained, remove and dispose of mock-up at the completion of the project.

1.4 SUBMITTALS

- A. Prior to commencement of work, Contractor shall submit to the County Project Manager its proposed mix design with proportions of materials.
- B. Design Mix:
 - 1. Direct all runoff from impervious areas, landscaping, rooftop, sidewalks, etc. away from the pervious concrete system or provide an alternate design that shows adequate storage capacity and control of sediment to ensure proper functioning of the pervious concrete system for pre-approval by the Engineer of Record and County.
 - 2. A minimum separation of two feet is required between the estimated seasonally high water table and the bottom of the pervious concrete system when the system is designed to store and infiltrate stormwater into the soils.

3. An acceptable form of conventional concrete curbing (FDOT Type "D") shall be constructed to a minimum depth of 6 inches beneath the bottom of the pervious concrete slab in order to protect the edges of the slab from potential erosion and to promote flow downward.
4. Pervious concrete system design shall have a minimum thickness of 6 inches in cross section.
5. Pervious concrete areas shall be clearly identified with signs at each entrance to the property or as approved by the County. **These signs are included in the unit price.**

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide locally available material having a record of satisfactory performance.
- B. Cement
 1. Portland Cement Type I or II conforming to ASTM C 150 or
 2. Portland Cement Type IP or IS conforming to ASTM C 595
- C. Aggregate for Pervious Mixture
 1. Use FDOT No. 8 coarse aggregate (3/8 inches to No. 16) per ASTM C33 or
 2. No. 89 coarse aggregate (3/8 inch to No. 50) per ASTM D448
 3. If other gradation of aggregate is to be used, submit data on proposed material to County or Engineer of Record for approval.
- D. Admixtures
 1. Type A Water Reducing Admixtures per ASTM C494 or
 2. Type B Retarding per ASTM C494 or
 3. Type D Water Reducing/Retarding per ASTM C494
 4. A hydration stabilizer can be utilized and is recommended in the design and production of pervious concrete. This stabilizer suspends cement hydration by forming a protective barrier around the cementitious particles, which delays the particles from achieving initial set. The admixture's primary function should be as a hydration stabilizer; however, it must also meet the requirements of ASTM C494 Type B Retarding or Type D Water Reducing/Retarding admixtures.
 5. Water shall be potable or shall comply with FDOT Standard Specifications Section 923. Measured length or width of test specimens shall not differ by more than +/- 0.063 inch while measured thickness shall not differ by more than +/- 0.125 inch.
 6. Non-Woven Geotextile Filter Fabric: Geotextile fabric shall comply with AASHTO M 288 based on application and installation conditions. Verify compatibility between geotextile and adjacent soils for filtration, clogging and permeability and follow manufacturer recommendations for use as separation layer between subgrade soils and the aggregate reservoir layer.

2.2 PROPORTIONS

- A. Cement Content: For pavements subjected to vehicular traffic loading, the total cementitious material shall not be less than 550 pounds per cubic yard.
- B. Aggregate Content: The volume of aggregate per cubic yard shall be equal to 27 cubic feet (CF) when calculated as a function of the unit weight determined in accordance with ASTM C29 jigging procedure.
- C. Admixtures: Admixtures shall be used in accordance with the manufacturer's instructions and recommendations.
- D. Mix Water: Mix water shall be such that the cement paste displays a wet metallic sheen without causing the paste to flow from the aggregate. Mix water yielding a cement paste with a dull-dry appearance has insufficient water for hydration.
 1. Insufficient water results in inconsistency in the mix and poor bond strength.

2. High water content results in the paste sealing the void system primarily at the bottom and poor surface bond.

2.3 AGGREGATE RESERVOIR

- A. The aggregate shall be a clean, open-graded crushed stone, recycled crushed concrete or No. 57 stone as approved by the Engineer of Record and County.
- B. Proof roll the aggregate reservoir layer to ensure that the required pavement thickness is obtained in all locations. Re-grade any disturbed aggregate reservoir, as needed.

2.4 GEOTEXTILE FABRIC

- A. A non-woven geotextile fabric shall be placed on top of the subgrade when an aggregate reservoir layer is present. The fabric shall be wrapped around the side and over the top of the aggregate reservoir extending a minimum of 12 inches from the edge at the top.
- B. A 0% slope is recommended but a maximum 0.3% slope is allowed for the top of subgrade/bottom of the aggregate reservoir.
- C. A non-woven geotextile fabric is recommended as a separation layer to reduce the erosion potential of sediment of the subgrade soils.

2.5 SUBGRADE MATERIAL

- A. The top 6 inches of the subgrade shall be composed of granular or gravel-like soil that is predominantly sandy with no more than a moderate amount of silt or clay.
- B. Subgrade Permeability: The Engineer OF Record or County may request, prior to placement of the pervious pavement that the subgrade be tested for rate of permeability by double ring infiltrometer in accordance with ASTM D3385 or other pre-approved test method for subgrade soil permeability. The tested permeability must reasonably compare to the design permeability. Soil permeability shall be no less than 0.5 inches per hour.
- C. Subgrade Support
 1. The subgrade shall be compacted by a mechanical vibratory compactor to a maximum density of $92\% \pm 2\%$ of a maximum dry density as established by ASTM D 1557 or AASHTO T 180. Subgrade stabilization shall not be permitted.
 2. If fill material (embankment) is required to bring the subgrade to final elevation, it shall be clean and free of deleterious materials. It shall be placed in 6 inch maximum layers and compacted by a mechanical vibratory compactor to a maximum density of $92\% \pm 2\%$ of a maximum dry density as established by ASTM D1557 or AASHTO T 180.
 3. Construct the subgrade to ensure that the required pavement thickness is obtained in all locations. Keep all traffic off and away from the prepared subgrade during construction to the maximum extent practical.
 4. Scarify, regrade and re-compact disturbed subgrade prior to placement, as needed.
 5. The subgrade shall be in a moist condition within +3% of the optimum moisture content as determined by the standard compaction test ASTM D1557 or AASHTO T 180.
 6. Forms may be of wood or steel and shall be the depth of the pavement. Forms shall be of sufficient strength and stability to support mechanical equipment without deformation of plan profiles following spreading, strike-off and compaction operations.

PART 3 - EXECUTION

3.1 MIXING, HAULING AND PLACING

- A. Prior to commencement of any work, the Contractor shall conduct a pre-installation meeting as detailed in this specification.
- B. Mix Time: Truck mixers shall be operated at the speed designated as by the concrete manufacturer.

- C. The mixture may be transported or mixed on site and should be used within one hour of the initial batch introduction of mix water, unless otherwise approved by the Engineer of Record. This time can be increased to 90 minutes when using an extended set control admixture specified below.
- D. Discharge: Each mixer truck will be inspected for appearance of concrete uniformity according to this section. A maximum of 10 gallons of water may be added by the Installer to obtain the required mix consistency, but no later than the allowable time for use stated elsewhere in this specification. A minimum of 25 revolutions at the manufacturer's designated mixing speed shall be required following any addition of water to the mix.
- E. Re-tempering with mix water is prohibited.
- F. Concrete shall be deposited as close to its final position as practicable and such that fresh concrete enters the mass of previously placed concrete. The practice of discharging onto the aggregate reservoir/subgrade and pulling or shoveling to final placement is not allowed.
- G. Spread the concrete using a short-handle, square-ended shovel or rake. Moisten the aggregate reservoir/ subgrade prior to placement. Do not allow any traffic (vehicular or pedestrian) on the fresh concrete.
- H. Unless otherwise approved by the Engineer of Record in writing, provide mechanical strike-off equipment of either slipform or form riding with a following compactive unit that will provide a minimum of 40 pounds per foot vertical force. The pervious concrete pavement will be placed to the required elevation and shall not deviate more than +3/8 inch in 10 feet from profile grade. If placing equipment does not provide the minimum specified vertical force, a full width roller or other full width compaction device that provides sufficient compactive effort shall be used immediately following the strike-off operation. Compact fresh concrete to stay within the requirements in this specification.
- I. After mechanical or other approved strike-off and compaction operation, no other finishing operation will be allowed. Do not use steel trowels or power finishing equipment.
- J. If surface vibration is used, it shall be set at the lowest frequency during placement and it shall be shut off immediately when forward progress is halted for any reason.
- K. The maximum pavement placement width is 20 feet unless the Contractor and its Installer can demonstrate competence to provide pavement placement in widths greater than the maximum specified to the satisfaction of the Engineer of Record.
- L. Pervious concrete shall be bordered by curbing or header curb, especially when it abuts an asphaltic pavement.
- M. Tolerances: Compact fresh pervious concrete within the following tolerances and mechanically sweep pavement surface prior to testing for compliance based on the following:
 - 1. Elevation: +3/4 inch, -0 inch
 - 2. Thickness: +1-1/2 inch, -1/4 inch
 - 3. Contraction joint depth: +1/4 inch, -0 inch
- N. Curing procedures shall begin immediately or no more than 20 minutes from concrete discharge unless longer working time is accepted by the Engineer of Record. The pavement surface shall be completely covered with a minimum 6 mils thick polyethylene sheet or other approved covering material. Cut sheet to a minimum of 6 inches wider than the full placement width. The cover shall overlap all exposed edges and shall be secured (without using dirt or stone) to prevent dislocation due to winds or adjacent traffic conditions. Prior to covering, a fog or light mist is allowed to be sprayed above the surface when required due to ambient conditions (temperature, wind and humidity). Cover the pervious concrete and equipment when delivery is delayed for 20 minutes or more.
- O. Required Cure Time:
 - 1. For Portland Cement Type I, II, or IS, provide a minimum of 7 uninterrupted consecutive days (168 hours)
 - 2. For Portland Cement Type I or II with Class F Fly Ash (as part of the 550 pounds per cubic yard minimum cementitious) or Type IP, provide a minimum of 10 uninterrupted consecutive days (240 hours)
 - 3. No truck traffic shall be allowed for 10 days (240 hours)

4. No passenger cars or lightweight trucks shall be allowed for 7 days (168 hours)

P. Jointing:

1. Prior to construction, the Engineer of Record may provide a joint layout plan or require the Contractor to submit for approval a plan view of the intended pervious area showing the location of all proposed joints.
2. Control (contraction) joints shall be installed at a maximum of 20 feet intervals. Smaller joint spacing is recommended. They shall be installed to a depth of one quarter of the thickness of the pavement.
3. These joints will be installed in the plastic concrete within 16 hours of placement.
4. Isolation (expansion) joints will not be necessary when pervious concrete is abutting hardened concrete or structures.

3.2 TESTING AND INSPECTION

- A. County will retain an independent, third party testing laboratory that understands the properties of pervious concrete. The testing laboratory shall conform to the applicable requirements of ASTM E329 and ASTM C1077 and shall be inspected and accredited by the Construction Materials Engineering Council, Inc., or by an equivalent recognized national authority.
- B. The Agent of the testing laboratory performing field sampling and testing of concrete shall be certified by the ACI as a Concrete Field Testing Technician Grade I or by an equivalent recognized state or national authority.
- C. Fresh Density
 1. Determine density using a minimum 0.25 CF cylindrical metal measure. Fill and compact the measure in accordance with ASTM C1688.
 2. Fresh density shall be within + 5 pounds per cubic feet of the designed density
- D. In-Place Infiltration to determine the in-place infiltration in accordance with ASTM C1701.

3.3 ENVIRONMENTAL CONDITIONS

- A. Pervious concrete system shall not be installed during heavy rain, freezing conditions or flooding.
- B. Pervious concrete system shall not be installed on frozen soil subgrade or aggregates.

3.4 MAINTENANCE

- A. A dry, mechanical sweeping and vacuuming of the surface is required within 6 months after placement; this service is included in the unit price.
- B. In-Service Pavement (not included in the unit price): An annual dry, mechanical sweeping and vacuuming of the surface or other acceptable method approved by the Engineer or perform an in-place infiltration test in accordance to ASTM C1701 to determine the need for maintenance. Perform at least one test per 5,000 square feet of pervious concrete system.

3.5 PROTECTION AND REPAIRS

- A. Once the work is complete, the Owner shall be responsible for protecting the work from sediment deposition and damage due to subsequent construction activity on the site.
- B. Repairs shall be full-depth. Remove entire section (joint-to-joint) and replace with new pervious concrete in accordance with these specifications for new concrete placement.
- C. Saturated subgrade: Remove a minimum of three inches and replace with an approved clean, open-graded aggregate prior to placement of pervious concrete. Follow procedures as outlined above.

END OF SECTION

SECTION 32 14 13.19 PERMEABLE INTERLOCKING CONCRETE PAVERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work consists of furnishing and installing a permeable interlocking concrete pavement (PICP) system in accordance with these specifications and in general conformance with the lines, grades, design, and dimensions shown on the plans. Water passes around the permeable pavers and does not pass through the pavers.
- B. The work includes:
 - 1. Verifying subgrade elevations and slope generally conform to the lines, grades, infiltration rate, density, and site conditions depicted in the construction documents;
 - 2. Unit price includes furnishing and installing geotextile and/or geomembrane liner (where required), horizontal drainage piping (where required), subbase course, base course, bedding course, edge restraint, pavers, permeable joint material and testing in general conformance to the lines and grades shown on the applicable drawings and as required of this section. Drains are not included in the unit price.
- C. Related Requirements:
 - 1. Divisions 1, 31, 32 and 33 of the Project Manual.

1.2 ADDITIONAL REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C33 Standard Specification for Concrete Aggregates
 - 2. ASTM C94 Standard Specification for Ready-Mixed Concrete
 - 3. ASTM C131 Standard Test Method for Resistance to Degradation of Small-Sized Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - 4. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse-Grained Aggregates
 - 5. ASTM C140 Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
 - 6. ASTM C936 Standard Specification for Solid Concrete Interlocking Paving Units
 - 7. ASTM C979 Standard Specification for Pigments for Integrally Colored Concrete
 - 8. ASTM C1645 Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Interlocking Paving Units
 - 9. ASTM C1781 Standard Test Method for Surface Infiltration Rate of Permeable Unit Pavement Systems
 - 10. ASTM D 2922 Standard Test Methods for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)
 - 11. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
 - 12. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
 - 13. ASTM D3034 Standard Specification for Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings
 - 14. ASTM D3350 Standard Specification for Polyethylene Plastic Pipe and Fittings Materials
 - 15. ASTM D4873 Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples
 - 16. ASTM E2835 Standard Test Method for Measuring Deflections using a Portable Impulse Plate Load Test Device
- B. Interlocking Concrete Pavement Institute (ICPI)
 - 1. Permeable Interlocking Concrete Pavement Manual, latest edition
 - 2. Permeable design for hydrologic and structural design
 - 3. Technical Specifications and Bulletins

1.3 QUALITY ASSURANCE

A. Installer Qualifications:

1. Contractor shall submit a list of at least three previously installed projects for the Installer. Contact names, telephone numbers, and date of completion shall be listed for each project. Refer to the minimum qualifications and experience as detailed in Division 1.
2. The Installer shall be a Certified Concrete Paver Installer certified by the ICPI or similar certification. A list of ICPI certified installers can be found at https://ams.icpi.org/icpissa/icpicenssainstallerlkup.query_page.

B. Mockups: Build mockups to verify selected products, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Install a 5 feet x 5 feet paver area following the installation practices described in below. This area shall be used to verify joint sizes; lines; laying pattern(s); color(s); and texture of the proposed paver installation.
2. To provide a proper representation of color blend, blending during installation of sample mock-up will be pulled from a minimum of 3 cubes.
3. This area shall be the standard from which the work will be judged.
4. Subject to approval by the County, the mock-up may be retained as part of the finished work. If mock-up is not retained, remove and dispose of mock-up at the completion of the project.

1.4 SUBMITTALS

A. Contractor shall submit to the County Project Manager for approval a minimum of four (4) full-size samples of each concrete paver in the type, size, color and finish specified for County's approval.

B. Prior to delivery of the associated material to the site, the Contractor shall submit the following product-specific documentation for County's approval:

1. Aggregates
 - a. Sieve analysis per ASTM C136 for subbase, base, bedding and joint aggregate materials
 - b. Minimum 3 pound sample of each material for independent testing.
2. Concrete Pavers
 - a. Test results from an independent testing laboratory for compliance to ASTM C936.
 - b. Safety Data Sheets (SDS).
3. Geosynthetics
 - a. One 18-inch x 18-inch panel of each type of geosynthetic (geotextile or geomembrane liner) to be used for inspection and testing. The sample panels shall be uniformly rolled and shall be wrapped in plastic to protect the material from moisture and damage during shipment. Samples shall be externally tagged for easy identification. External identification shall include the name of the manufacturer; product type; product grade; lot number; and physical dimensions.
 - b. Current National Transportation Product Evaluation Program (NTPEP) evaluation report.
 - c. Safety Data Sheets (SDS).

PART 2 - PRODUCTS

2.1 PAVERS

1. Basis of Design: Eco-Holland by Belgard Commercial
 - a. Size: 4 inches x 8 inches x 3-1/8 inches (80 mm)
 - b. Color: To be chosen by County from Manufacturer's standard colors
 - c. Finish: Standard (Smooth)

- d. ADA compliant
 - e. Weight: Designed and approved for use by trucks and buses
2. Or approved equal.
- B. Pavers shall meet the minimum material and physical properties set forth in ASTM C 936, Standard Specification for Interlocking Concrete Paving Units.
- 1. Measured length or width of test specimens shall not differ by more than +/- 0.063 in, while measured thickness shall not differ by more than +/- 0.125 inch
 - 2. Average compressive strength of 8,000 psi (55 MPa) with no individual unit under 7,200 psi when tested in accordance with ASTM C140.
 - 3. Average absorption of 5% or less with no unit greater than 7% when tested in accordance with ASTM C140.
 - 4. Efflorescence shall not be a cause for rejection.
 - 5. Pigment in concrete pavers shall conform to ASTM C979.

2.2 AGGREGATE MATERIALS

- A. General Requirements:
- 1. Clean, non-plastic aggregate, free from deleterious or foreign matter, manufactured from crushed rock. Recycled aggregates shall not be used.
 - 2. Percent of angular and sub-angular particles greater than 90%. Rounded river gravel shall not be used.
 - 3. Abrasion of the aggregate used shall be less than 40 as per ASTM C131.
 - 4. All aggregates shall be washed and have less than 2% passing the No. 200 (0.075 mm) sieve.
 - 5. All aggregate material gradations shall be tested in accordance with ASTM C136.
- B. Bedding Course/Joint Fill Material – open-graded aggregate conforming to the following gradation. No. 89 or No. 9 stone may be used as joint fill material. If No. 8 stone material is not available locally, No. 89 can be used as a bedding course if choke criteria is met with underlying base aggregate.

ASTM C33 Size No. 8

<u>Sieve Size</u>	<u>Percent Passing</u>
1/2 inch (12.5 mm)	100
3/8 inch (9.5 mm)	85 to 100
No. 4 (4.75 mm)	10 to 30
No. 8 (2.36 mm)	0 to 10
No. 16 (1.18 mm)	0 to 5
No. 200 (0.075 mm)	0 – 2

- C. Base Course Material - open graded aggregate conforming to the following gradation:

ASTM C33 Size No. 57

<u>Sieve Size</u>	<u>Percent Passing</u>
1-1/2 inch (37.5 mm)	100
1 inch (25 mm)	95 to 100
1/2 inch (12.5 mm)	25 to 60
3/8 inch (9.5 mm)	0 to 10
No. 4 (4.75 mm)	0 to 5
No. 200 (0.075 mm)	0 - 2

- D. Subbase Course Material – open-graded aggregate conforming to the following gradation. ASTM No. 3 or No. 4 may be used as subbase material if No. 2 stone is unavailable locally.

ASTM C33 Size No. 2

<u>Sieve Size</u>	<u>Percent Passing</u>
3 inch (75 mm)	100
2- 1/2 inch (63 mm)	90 to 100
2 inch (50 mm)	35 to 70
1-1/2 inch (37.5 mm)	0 to 15
3/4 inch (19 mm)	0 to 5
No. 200 (0.075 mm)	0 – 2

2.3 EDGE RESTRAINTS

- A. Edge restraints shall be cast in place concrete curbs in general conformance with the specifications and dimensions in the construction documents

2.4 GEOSYNTHETICS

- A. Geotextile and/or geomembrane liner materials shall be selected by the Engineer of Record based on the intended use.
- B. Provide a current National Transportation Product Evaluation program (NTPEP) evaluation if applicable.

2.5 PIPE UNDERDRAINS

- A. Where shown on the plans, pipe underdrains shall be perforated or slotted PVC pipe manufactured in accordance with ASTM D3034 or corrugated HDPE pipe manufactured in accordance with ASTM D3350. **Drains are not included in the unit price.**

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prior to commencement of any work, the Contractor shall conduct a pre-construction meeting with the County and Installer. The pre-construction meeting should establish quality control and responsibilities and at a minimum verify:
 1. The location of the mock-up, and whether it will be part of the final construction or need to be removed.
 2. The site layout is in general conformance to the construction documents. In particular, the location and elevation of discharge points (if any) of the pipe underdrains.
 3. The subgrade lines and elevations are in general conformance with the construction documents. The subgrade elevations shall be within +/- 0.1 ft of the specified grades.
 4. The minimum slope of subgrade shall be at least 0.5% or as specified in the design.
 5. Subgrade soil conditions and grades meet the requirements in the construction documents.
 6. The details of the site's erosion and sediment control plan.
- B. Proof-roll prepared subgrade to identify soft pockets and areas of excess yielding. Proceed with subbase installation only after deficient subgrades have been corrected. Scarify subgrade surface following any stabilization efforts before installing subbase course.
- C. If compaction is required, verify compaction of the subgrade is in general conformance with the Contract Documents prior to placing subbase materials.
- D. Once the Contractor has confirmed the subgrade conditions are in general conformance with the requirements in the construction documents, the Installer shall begin installing the subbase material. By initiating installation of the subbase material, the Contractor acknowledges acceptance of the subgrade.

3.2 DELIVERY, STORAGE AND HANDLING

- A. Contractor shall coordinate delivery and paving schedule to minimize interference with normal use of buildings and the site adjacent to paving.

- B. Contractor shall check all materials upon delivery to assure that the proper materials have been received and are in good condition before signing off on the manufacturer's packing slip.
- C. Contractor shall protect all materials from damage or contamination due to job site conditions and in accordance with manufacturer's recommendations. Damaged or contaminated materials shall not be incorporated into the work.
- D. Concrete pavers shall be delivered to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by forklift or clamp lift. Unload and store concrete pavers at the job site in such a manner that no damage occurs to the product.
- E. Contractor shall handle and transport aggregates to avoid segregation, contamination, and degradation and keep different materials sufficiently separated as to prevent mixing. The material shall not be dumped or stored one material on top of another unless it is part of the installation process. Materials shall be covered to prevent removal by wind.
- F. Geosynthetics shall be delivered, stored and handled in accordance with ASTM D4873.

3.3 ENVIRONMENTAL CONDITIONS

- A. Pavers shall not be installed during heavy rain, freezing conditions or flooding.
- B. Pavers shall not be installed on frozen soil subgrade or aggregates.

3.4 MAINTENANCE MATERIALS

- A. Provide ten (10) square feet additional paver material for use by County for maintenance and repair.
- B. Store extra paver materials in County-designated location prior to request for final payment.

3.5 INSTALLATION OF SUBBASE AND BASE COURSES

- A. Keep the area where the pavement is to be constructed free from sediment during the entire job. Any materials contaminated with sediment shall be removed and replaced with clean material.
- B. Install geotextiles as required in accordance with the applicable drawings. The geotextile is applied to the bottom and sides of the excavation with overlapping joints a minimum of 12 inches in the direction of drainage. Overlaps to be constructed to "shingle" moisture from upstream panel to downstream panel. Allow for enough geotextile to exceed the final elevation of the surface. After completion of the surface, the excess geotextile should be cut flush with the finished grade. Secure in place to prevent wrinkling.
- C. Install the subbase course and base course at the thicknesses, compaction rates, surface tolerances, and elevations outlined below.
 - 1. Place and spread the first layer of subbase without displacing or damaging the geosynthetics (if used). To prevent damage, tracked vehicles shall not be allowed directly on the geotextiles or geomembranes during the initial spreading process of the subbase layer.
 - 2. The aggregate should be spread and compacted in uniform layers not exceeding 6-inch loose thickness. Compaction is performed using either a 10 ton vibratory roller or a minimum 13,500 lb-f centrifugal force reversible vibratory plate compactor.
 - 3. For each lift, make at least two passes in the vibratory mode and at least two passes in the static mode and continue compaction until there is no visible movement in the materials.
 - 4. At the specified elevation(s), install the pipe underdrains in accordance with the manufacturer's recommendations. Ensure the pipes are sloped to provide proper drainage to the outlets. Pipes shall be surrounded by a minimum of 4 inches of base course material to prevent damage during compaction. Care must be taken not to damage pipe underdrains during subsequent aggregate installation.
 - 5. Final subbase surface tolerance shall be plus or minus 0.1 feet over a 10-foot straight edge laid in any direction.
 - 6. Final base surface tolerance shall be +/- 3/4 inch over a 10-foot straight edge laid in any direction.
 - 7. Provide proper compaction near curbs, grade beams, concrete collars around utility structures, lights standards, tree wells, building edges and other protrusions as applicable to the project.

D. Before starting to place the bedding course, the base shall be inspected and approved by the County or the Engineer of Record.

E. Use part of the compacted base area as a control strip for density testing by a third party, independent test company. The testing company shall complete density and moisture content measurements of the drainage layer. The testing company shall have and maintain current radioisotope licenses for each gauge and these shall be calibrated within the past 12 month. The density and moisture standard counts shall be within 2% to 4% of the most recent calibration values. A certificate and date of calibration shall accompany each gauge.

1. Target Density

- a. Determine a target density on the control strip during under the following conditions: after initial placement and compaction of the base aggregate layer; when there is a perceptible change in the appearance or gradation of the aggregate; and when there is a change in the source of aggregate.
- b. Test field density according to ASTM D 2922. Field density tests shall be performed on compacted base materials to determine within acceptable limits of a target density.

2. Control Strip

- a. The testing company shall construct a control strip for the determination of a target density consisting of a single uniform lift as specified in the contract documents, but not more than 4 inches thick and covering approximately 600 square yards in area. No testing shall be performed within 10 feet from any unrestrained outside edge of the work area. The control strip may be incorporated into the project upon acceptance of density measurements by the testing company.
- b. During construction of the control strip, the surface of the aggregate shall be visibly moist and maintained as such throughout construction and compaction.
- c. After initial placement of the aggregate base material, the compaction equipment shall make two passes over the entire surface of the control strip. Field densities and field moisture contents, using the backscatter/indirect method, shall be determined at five randomly selected locations at least 15 feet apart. The dry density and moisture content shall be calculated for each of these locations and the averages shall be used as initial values. The maximum compacted thickness of the aggregate base layer measured for density shall be 4 inches.
- d. The compaction equipment shall then make two additional passes over the entire surface of the control strip. After compaction, three separate, random field density and moisture content determinations shall be made, using the backscatter/indirect method, and a new average dry density and moisture content shall be calculated.
- e. If the new average dry density exceeds the previous value by more than 1.2 pcf (20 kg/m³) then two additional passes of the equipment shall be carried out as described above. If the new average dry density does not exceed the previous value by more than 1.2 pcf (20 kg/m³), then compaction of the control strip will be considered satisfactory and complete.
- f. Upon satisfactory completion of the control strip, an additional seven field density and moisture tests, using the backscatter/indirect method, shall be taken at random locations and the dry density and moisture content values shall be determined. The final dry density and moisture content of the control strip shall be the average of these seven values plus the three most recent values obtained upon completion.

3. Compaction

- a. Use a vibratory roller or reversible vibratory plate compactor, as detailed above. Do not crush the aggregate.

4. Test Report shall include:

F. Light Weight Deflectometer (LWD) for Compacted Base Aggregate Deflection Testing:

1. After three preloading drops, the maximum average deflection from three additional drops shall be no greater than 0.5 mm.
2. Conduct LWD tests on every (800 tons) of remaining area of compacted base aggregates.

G. LWD Test Report shall include the following:

1. Project description.
2. Sketch of the test area and numbered test locations.
3. Aggregate type and layer thicknesses.
4. Aggregate characteristic properties: gradation, porosity, bulk density.
5. Compaction equipment type and weight.
6. Static and/or vibratory compaction.
7. Number of passes of the compaction equipment.
8. Average of three deflections for each location.
9. Individual and average wet field density, moisture content and dry density values after each compaction in accordance with ASTM D 2922.
10. Calculation of target density.

3.6 INSTALLATION OF EDGE RESTRAINTS

- A. All concrete edge restraints shall be constructed to dimensions and grades in general conformance with the construction documents and shall be supported on a compacted base not less than 6-inches thick and meet local requirements or the requirements of curbs and gutters. All concrete shall be in accordance with ASTM C94 requirements.

3.7 INSTALLATION OF BEDDING COURSE, PAVERS, AND JOINT MATERIAL

- A. Spread the bedding course evenly over the base course and screed to a nominal 2 inch thickness utilizing an approved mechanical spreader or by screed rails and boards. Do not use the bedding material to fill depressions in the base course surface. Surface tolerances shall be +/- 3/8 inch over a 10-foot straight edge.
- B. Ensure that concrete pavers are free of foreign material before installation. Concrete pavers shall be inspected for color distribution and all chipped, damaged, or discolored concrete pavers shall be replaced. Initiation of concrete paver placement shall be deemed to represent acceptance of the pavers.
- C. Lay the concrete pavers in the pattern(s) shown on the drawings. Maintain straight pattern lines. For mechanical installations, follow the stitching details as submitted and verified during the mock-up.
- D. Paving units shall be installed simultaneously from a minimum of 3 bundles for hand installations, and 6 bundles for mechanical installations to provide proper color blending.
- E. Joints between the individual concrete pavers shall be uniformly maintained and installed in accordance with the in-place dimensions
- F. Fill gaps at the edges of the paved area with cut pavers or edge units. Do not install cut pavers smaller than one-third of a whole paver along edges subject to vehicular traffic – trim two pavers to fit.
- G. Cut pavers using a masonry saw or splitting device. Upon completion of cutting, the area must be swept clean of all debris.
- H. Using a low amplitude plate compactor capable of at least 5,000 lbs. (22 kN) compaction at a frequency of 75 Hz –100 Hz, compact and seat the concrete pavers into the bedding course.
- I. The pavers shall be compacted to achieve consolidation of the bedding course and brought to level and profile by not less than three passes. Initial compaction should proceed as closely as possible following the installation of the paving units and prior to the acceptance of any traffic.
- J. Any units that are structurally damaged during compaction shall be immediately removed and replaced.
- K. Apply the joint material to the surface and sweep into the joints and voids. Fill joints and voids then sweep off excess material before vibrating the material down into the joints using a plate compactor. This will typically require two to three passes with the plate compactor.

- L. Do not compact within 6 feet of unrestrained edges of the paving units.
- M. All work to within 6 feet of the laying face must be left fully compacted at the end of each day.
- N. Sweep off excess aggregate when the job is complete.

3.8 AS-BUILT CONSTRUCTION TOLERANCES

- A. Final inspection shall be conducted to verify conformance to the drawings after removal of excess aggregate. All pavements shall be finished to lines and levels to ensure positive drainage at all drainage outlets and channels.
- B. The final surface elevations shall not deviate more than +/- 3/8 inch under a 10 ft long straight edge.
- C. Lippage shall be no greater than 1/8-inch difference in height between adjacent pavers.
- D. Bond lines for the pavers shall be +/- 1/2-inch over a 50-foot string line.
- E. Verify the in-situ surface infiltration rate of the permeable pavement is a minimum of 100 inches per hour using ASTM C1781.

3.9 MAINTENANCE AND PROTECTION

- A. At the completion of the work, the Contractor shall provide the County Project Manager with the manufacturer's PICP System Operation and Maintenance Guidelines.
- B. Once the work is complete, the Owner shall be responsible for protecting the work from sediment deposition and damage due to subsequent construction activity on the site.
- C. The Contractor shall return to the site after 6 months from the completion of the work and conduct an inspection of the PICP System with the County, Engineer of Record and Installer in accordance with the PICP System Operation and Maintenance Guidelines.

END OF SECTION

SECTION 32 16 00 CURBS, GUTTERS, SIDEWALKS AND DRIVEWAYS

PART 1 - GENERAL

1.1 SUMMARY

- A. Concrete pavement, curbs and sidewalk shall be constructed to the lines and grades and dimensions required for a complete installation as shown on the Drawings and specified herein.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition, including Supplements (FDOT Standard Specifications).
 - 2. American Society of Concrete Contractors - The Contractors Guide to Quality Concrete Construction, latest edition.
 - 3. American Concrete Institute (ACI) - Field Reference Manual - ACI SP-15(99) Specifications for Structural Concrete, latest edition.
- B. Qualification: The Contractor or its concrete paving subcontractor shall be experienced in the construction of concrete pavement curbs and walkways.

1.3 SUBMITTALS

- A. Shop drawings for reinforcing, joint material and mix designs shall be submitted for review in accordance with the Submittals section of the Project Manual.

PART 2 - PRODUCTS

2.1 CONCRETE

- A. Concrete shall be conforming to the Cast-in-place Concrete section of the Project Manual unless noted or specified otherwise.

2.2 REINFORCING AND WELDED WIRE FABRIC

- A. Joint reinforcing and welded wire fabric shall conform to other specification sections.

2.3 JOINT SEALER

- A. Joint sealer shall be a two part urethane self leveling sealant for horizontal surfaces that has been developed for foot and vehicular traffic.
 - 1. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
 - 2. Colors of Exposed Joint Sealants: As selected by Consultant or County Project Manager or County Project Manager from manufacturer's full range.
- B. Cold-Applied Joint Sealants
 - 1. Multicomponent Low-Modulus Sealant for Concrete and Asphalt: Proprietary formulation consisting of reactive petropolymer and activator components producing a pourable, self-leveling sealant.
 - a. Products: W.R. Meadows Sof-Seal or equivalent.

C. Hot-Applied Joint Sealants

1. Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3406.
 - a. Products: W.R. Meadows Poly-Jet or equivalent.
2. Sealant for Concrete and Asphalt: Single-component formulation complying with ASTM D 3405.

D. Primers

1. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

E. Joint-Sealant Backer Materials

1. General: Provide joint-sealant backer materials that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.
2. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.
3. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

PARTS 3 - EXECUTION

3.1 SUBGRADE CONDITION

- A. The finished subgrade shall be maintained in a smooth, compact condition and any areas which are disturbed prior to placing of the concrete shall be restored at the Contractor's expense. The subgrade shall be moist at the time the concrete is placed. Water shall be uniformly applied ahead of the paving operations as directed by the Consultant or County Project Manager. If the Contractor does not maintain the subgrade in the required moist condition, a vapor barrier sheet will be required between the subgrade and the concrete.
- B. The sub-grade shall be accurately trimmed to the required elevation with a 1/4 inch tolerance. High areas shall be trimmed to proper elevation. Low areas may be filled with suitable material and compacted to the specified density or filled with concrete integrally with the placing of the pavement.

3.2 SLOPES

- A. Sidewalks shall not exceed 1:21 slope in the direction of travel and 1:51 cross slope. If multiple directions of travel exist, the maximum slope in all directions shall not exceed 1:51.
- B. A ramp with a slope of 1: 12 maximum may be install with a run no greater than 72 inches and a rise no greater than six inches. A 5 foot x 5 foot flat landings, with maximum 2% slope in all directions, must be provided on the top and bottom of the ramp. Sidewalk and ramp slopes shall be conformance with ADA standards for accessible design, ADA Accessibility guidelines (ADAAG) and FBC.
- C. Notification: Contractor shall examine the construction documents and site conditions thoroughly and notify the Consultant or County Project Manager and Civil Engineer if the site conditions do not allow construction of sidewalks in conformance with these specifications and in conformance with the requirements above. Do not proceed with construction prior to receiving clarification. Proceeding without stated notification will result in the Contractor being fully responsible for removal and replacement of all non-conforming construction at his cost with no additional time or compensation consideration.

3.3 SETTING FORMS

- A. The forms shall be accurately set to line and grade and such that they rest firmly, throughout their entire length upon the compacted subgrade surface. Forms shall be joined neatly and tightly and braces to test the pressure of the concrete and the finishing operations. The alignment and grade of all forms shall be approved before and immediately prior to the placing of concrete.
- B. Form Materials: Construct forms for this work of either wood or metal. Provide forms that are straight, free from warp or bends, and of sufficient strength, when staked, to resist the pressure of the concrete without deviation from line and grade. For all items constructed on a radius, use flexible forms that provide a continuous curve at specified radii. Forms shall be continuous for lengths not less than 12-feet, unless a change in direction is required. Do not use scraps and salvaged material for formwork.
- C. Depth of Forms: Ensure that forms have a depth equal to the plan dimensions for the depth of concrete being deposited against them.
- D. Chemical release agents shall be applied to inside surface of all forms. Apply release agents to concrete surface if existing concrete surface is to be used as a form.

3.4 MIXING CONCRETE

- A. Concrete shall be mixed in accordance with the Cast-in-place Concrete requirements.

3.5 PLACING CONCRETE

- A. The concrete shall be distributed on the subgrade to such depth, that, when it is consolidated and finished, the slab thickness required by the Drawings will be obtained at all points and the surface will at no point be below the grade specified for the finished surface, after application of the allowable tolerance. The concrete shall be deposited on the subgrade in a manner which will require as little re-handling as possible.
- B. Fabric reinforcement shall be placed at mid slab depth, and the fabric shall be maintained at this location during the placing and finishing operations.
- C. Concrete shall be thoroughly consolidated against and along the faces of all forms, by means of hand-operated, spud-type vibrators. Vibrators shall not be permitted to come in contact with the subgrade or a side form. Vibration at any one location shall not continue so long as to produce puddling or the accumulation of excessive grout on the surface. In no case shall the vibrator be operated longer than 15 seconds in any one location.

3.6 STRIKING-OFF, CONSOLIDATING AND FINISHING CONCRETE

- A. Immediately after the placing, the concrete shall be struck off, consolidated and finished, to produce a finished pavement conforming to the cross section, width and surface sequence of operations shall be as follows: strike-off; vibratory consolidation; screeding; floating; removal of laitance; straight edging; and final surface finish.
- B. Screeding: Strike-off the concrete by means of a wood or metal screed, used perpendicular to the forms, to obtain the required grade and remove surplus water and laitance.

3.7 STRAIGHT EDGING AND SURFACE CORRECTIONS

- A. After floating has been completed and the excess water removed, but while the concrete is still in a plastic state, the surface of the concrete shall be tested for trueness with an accurate 10 feet straightedge. The straightedge shall be furnished by the Contractor. The straightedge shall be held in successive positions parallel to the road center line, in contact with the surface, and the whole area tested from one side of the slab to the other as necessary. Any depressions shall be immediately filled with freshly mixed concrete and struck-off; consolidated and refinished. High areas shall be cut down and refinished. Straightedge testing and surface correction shall continue until the entire surface appears to conform to the required grade and cross section.
- B. Ensure that the surface variations are not more than 1/4 inch under a 10 feet straightedge, or more than 1/8 inch on a 5 foot transverse section. Finish the edge of the sidewalk with an edging tool having a radius of 1/2 inch.

3.8 FINAL FINISH

- A. As soon as the water sheen has disappeared from the surface of the pavement and just before the concrete becomes non-plastic, a light broom finish or other finish as called for in the plans, shall be given to the surface.
- B. Apply fine finish by an approved hand method to curb cut ramps in lieu of broom finish.

3.9 EDGING

- A. After the final finish has been applied, but before the concrete has become non-plastic, the edges of the pavement along each side of the strip being placed, on each side of construction joints and along any structure extending into the pavement, shall be carefully rounded to a 1/2-inch radius except as otherwise indicated. A well-defined and continuous radius shall be produced and a smoother, dense mortar finish obtained. All concrete shall be completely removed from the top of the joint filler.
- B. All joints shall be checked with a straightedge before the concrete has become non-plastic and, if one side of the joint is higher than the other or the entire joint is higher or lower than the adjacent slabs, corrections shall be made as necessary.

3.10 JOINTS

- A. Construction Joint
 - 1. Construction joints shall be located as shown on the Drawings.
- B. Expansion joints around structures and at 50 linear feet o.c.
 - 1. Expansion joints shall be formed by placing pre-molded expansion joint material about all structures and features projecting through, into or against the concrete. Unless otherwise indicated, such joints shall be 1/2 inch in width.
 - 2. All expansion joints shall receive 2-part urethane joint sealer.
- C. Transverse Expansion Joints
 - 1. Open type transverse expansion joints shall be provided at all sidewalk returns and at 50 feet intervals and wherever indicated on the Drawings. Open type joints shall be formed by staking a 1/4 inch thick metal bulkhead in place and placing concrete on both sides. After the concrete has set sufficiently to preserve the width and shape of the joint, the bulkhead shall be removed. After the sidewalk has been finished over the joint, the slot shall be opened and edged with a tool having a 1/4 inch radius. Transverse expansion joints shall be cleaned and filled with joint filler strips 1/4 inch thick conforming to the requirements of AASHTO M-1 53.
 - 2. All transverse expansion joints shall receive 2-part urethane joint sealer.
- D. Scored Joints
 - 1. Scored joints shall be either formed or sawed at 5- foot intervals and shall extend to a depth of at least one fourth of the sidewalk slab thickness. Scored joints for slabs that are not sidewalks shall be as indicated in the plans. Absolute maximum distance between scored joints on slabs to be 12-feet. Joints shall be placed within 6 hours of concrete placement.

3.11 CURING

- A. After the finishing operations have been completed and as soon as the concrete has hardened sufficiently that marring of the surface will not occur, the entire surface and the edges of the newly placed concrete shall be covered and cured with membrane curing compound.
- B. Curing compound shall be uniformly applied to the surfaces to be cured, in a single coat, continuous film, at the rate of one gallon to not more than 200 square feet, by a mechanical sprayer.

- C. Curing compound shall not be applied during periods of rainfall. Curing compound shall not be applied to the inside faces of joints to be sealed. Should the film become damaged from any cause within the required curing period, the damaged portions shall be repaired immediately with additional compound. Upon removal of side forms the sides of the slabs exposed shall immediately be coated to provide a curing treatment equal to that provided for the surface.

3.12 CURB AND SIDEWALK CONSTRUCTION

- A. The concrete curbs and sidewalks shall be constructed on a prepared smooth subgrade of uniform density. Large boulders and other obstructions shall be removed to a minimum depth of 6 inches below the finished subgrade elevation and the space shall be backfilled with sand, base course material or other suitable material which shall be thoroughly compacted by rolling or tamping. The Contractor shall furnish a template and shall thoroughly check the subgrade prior to depositing concrete.
- B. Concrete for curbs, and sidewalks shall be formed, mixed, placed and finished in conformance with the requirements of other specification sections and Drawings, except as modified herein. Concrete shall be cured with a clear membrane curing compound which shall be applied at a uniform rate of one gallon per 200 square feet in accordance with the requirements specified herein before under pavement construction.

3.13 CURBS

- A. Curbs shall be constructed in uniform sections ten feet in length except where shorter sections are necessary for closures or arcs. The sections shall be separated by sheet metal templates set perpendicular to the face and tip of the curve and not less than 2 inches longer than the depth of the curb. The templates shall be held firmly during the placing of the concrete and shall be allowed to remain in place until the concrete has set sufficiently to hold its shape but shall be removed while the forms are still in place.
- B. After the concrete has sufficiently set for a minimum of 12 hours, the Contractor shall remove the forms and backfill the spaces on each side. The earth shall be compacted in satisfactory manner without damage to the concrete work. Minor defects shall be filled with a mortar composed of one part Portland cement and two parts fine aggregate.
- C. All curbs and curb ramps shall be in accordance with the FDOT Standard Specifications.

3.14 FORM REMOVAL / REPAIR OF MINOR DEFECTS

- A. Remove the forms within 24 hours after placing the concrete, and then fill minor defects with mortar composed of one part portland cement and two parts fine aggregate. Plastering on the face of the curb or sidewalks will not be allowed.
- B. Remove and replace any rejected sidewalk, curb, curb and gutter, or valley gutter without additional compensation.

3.15 REPAIR OF MAJOR DEFECTS

- A. Sidewalks, curbs, curb and gutter, or valley gutter not in full conformance with these specifications, the reference standards, or applicable codes shall be removed and replaced without additional compensation or time extension. Reasons for rejection may include, but not limited to, failing to meet construction quality standards, tolerances, or specified appearance and finish.

END OF SECTION

SECTION 32 17 23 PAVEMENT MARKING

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Pavement marking.
 - 2. Protection of painted markings.
 - 3. Aluminum or steel sign panels and posts.
 - 4. Exterior signage indicated on the drawings and specified in this section.

1.3 SUBMITTALS

- A. Submit properly identified manufactures product data and technical data prior to starting work for review and acceptance of all components to be used.
- B. Submit shop drawings for review, indicating construction details, sizes, elevations, installation requirements, gages, thickness of materials, color and other information necessary to show compliance with the requirements of this section.
- C. Submit paint tests, as specified in Section 971 of FDOT Specifications and as applicable to hereinafter specified material.

1.4 QUALITY ASSURANCE

- A. All signage must comply with the latest edition FBC and all referenced standards included therein as well as all other applicable code ordinances.
- B. Work shall be performed in accordance with the Contract Documents in a neat and accurate manner.
- C. All equipment shall be of type and design that will readily obtain the required uniformity of application of the pavement markings both as to thickness of coating and as to alignment.
- D. Applicable Publications: The following publications of the issue listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:
 - 1. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction. (Latest Edition) (FDOT Specifications).
 - 2. Manual on Uniform Traffic Control Devices for Streets and Highways published by the U.S. Department of Transportation, (MUTCD) Federal Highway Administration, (Latest Edition)

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Paint: In accord with requirements as specified in Section 971 of the FDOT Specifications.
 - 1. Paint shall be factory mixed, quick drying and non-bleeding type.
 - 2. Color shall be as per FDOT requirements.
 - 3. Striping, arrows, lane markers and stop bars shall be provided with paint containing reflective additive.
- B. Thermoplastic paint: In accord with the applicable Technical Specifications (Section 711) of the Florida Department of Transportation and Broward County Standards.
- C. Reflectors: In accord with Broward County Minimum Standards Applicable to Public Right-of-Way under Broward County Jurisdiction, Exhibit 25A, available at www.municode.com (Broward County Minimum Standards).
- D. Sign Panels:
 - 1. Aluminum or galvanized steel in accordance with the applicable requirements of Section 700 "Highway Signing" of the FDOT Specifications or Broward County Minimum Standards.
 - 2. Size, shape and color as indicated on the drawings or as directed by County.

E. Sign Support Posts:

1. Aluminum or Galvanized Steel in accordance with the applicable requirements of Section 700 "Highway Signing" of the FDOT Specifications or Standard Road Details and Specifications (DCPWD).
2. Size, shape and color of posts and mountings as indicated on drawings or as directed by County.

PART 3 – EXECUTION

3.1 INSPECTION

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

3.2 SIGN PANELS AND SUPPORT INSTALLATION

- A. Secure breakaway sign post assembly to concrete substrate and sign panel to aluminum posts according to FDOT and County recommendations
1. Section 700 "Highway Signing" of FDOT Specifications
 2. Manual on Uniform Traffic Control Devices (MUTCD)
 3. Broward County Minimum Standards
- B. Approved shop drawings and as indicated on drawings

3.3 PAVEMENT MARKINGS

- A. Sweep dust and loose material from the sealed surface.
- B. Apply paint striping as indicated on the drawings, with suitable mechanical equipment to produce uniform straight edges.
1. Apply in no less than (2) two coats as per manufacturer's recommended rates of applications.
- C. Protect pavement markings until completely dry in accordance with manufacturer's recommendations.
- D. Time of Application: Painting shall be done only during daylight hours and, as far as practical, shall be terminated in time to permit sufficient drying by sunset.
- E. Weather Limitations: No paint shall be applied when any moisture is present on the surface to be painted or when the air temperature is below 40 degrees Fahrenheit. Painting shall not be done when winds are sufficient to cause spray dust.
- F. Preparation of Surface to be Painted: The surface which is to be painted shall be cleaned, by compressed air or other effective means, immediately before the start of painting and shall be clean and dry when the paint is applied. Any vegetation or loose soil shall be removed from the pavement before striping is begun.
- G. Mixing Paint: The paint shall be thoroughly mixed before it is poured into the painting machine and no thinning of the paint in the machine will be allowed at any time. Before the start of each day's work the paint container, the connections and the spray nozzles on the machine shall be thoroughly cleaned with paint thinner or other suitable cleaner.
- H. Paint Application: The traffic markings shall be of the specified dimensions with clean, true edges and without sharp breaks in the alignment. A uniform coating of paint shall be obtained and the finished markings shall contain no light spots or paint skips. Any stripes that do not have a uniform, satisfactory appearance, both day and night, shall be corrected.
- I. Rate of Paint Application: The minimum rate of application for paint shall be as follows:
1. Six inch solid parking stall stripes: 18.5 gallons per mile.
 2. Any other width stripe or marking: A direct proportion of the above.
- J. Required Film Thickness: The minimum wet film thickness for all painted areas shall be 15 mils.
- K. Alignment of Stripes: Where a stripe deviates from the correct alignment, as indicated by the string line, by more than one inch in any 20 foot length, it shall be obliterated and the stripe corrected hereinafter as specified in paragraph "Corrective Measures".

3.4 PROTECTION OF PAINTED MARKINGS

- A. Protection of Stripes: All newly painted stripes, or other markings, shall be protected until the paint is sufficiently dry to permit vehicles to cross the marking without damage from the tires.
- B. Repair of Damaged Areas: Any portions of the stripes damaged by passing traffic or from any other cause shall be repainted.

3.5 DIMENSION AND ALIGNMENT TOLERANCE

- A. Dimensions: No marking shall be less than the specified width. No markings shall exceed the specified width by more than 1/2 inch. Alignment tolerances shall be as specified herein.
- B. Correction Rates: Any corrections of variation in the width of the alignment of stripes shall not be made abruptly but the stripes shall be returned to the design width at the rate of at least 10 feet for each 1/2 inch of correction.

3.6 CORRECTIVE MEASURES:

- A. All painted markings which fail to meet the specifications, including the permissible tolerances and the appearance requirements, or are marred or damaged shall be corrected.
 - 1. All drip and spattered paint shall be removed. When it is necessary to remove paint, it shall be done by means that will not damage the underlying surface of the pavement. When necessary to correct a deviation that exceeds the permissible tolerance in alignment, that portion of the stripe affected shall be removed and repainted in accordance with these specifications.
- B. Corrective Devices: Misalignment, defective surfaces, etc., shall be corrected by chemical agents, or by any other type of mechanical device which will effectively remove the paint without damage to the pavement surface, or prevent the reapplication of markings.

END OF SECTION

SECTION 32 18 13 SYNTHETIC GRASS SURFACING (TURF)

PART 1 - GENERAL

1.1 SUMMARY OF WORK

- A. Provide and install a permeable surfacing system of synthetic grass (turf) and SBR shock absorbing course (turf system) over compacted sub-base with concrete curbing at all edges for playgrounds and other Park areas. **Unit price includes all labor including manufacturer's certified installer(s), tools, equipment, infill, delivery and incidentals necessary to complete the installation and as detailed below. Field tests are not included in the unit price as they will be completed by the County.**
- B. The sub-base, crushed aggregate and concrete edging which is not provided by the Manufacturer **is not included** in the line item pricing for the turf system. See Division 31 for earthwork requirements.
- C. The entire surface shall be ADA accessible.
- D. Permitting, geotechnical testing and surveying may be paid for as a pass-thru line item or may be completed by County.

1.2 ADDITIONAL DEFINITIONS

- A. Certified Playground Safety Inspector (CPSI): Offered by the National Recreation and Park Association and National Certification Board, this individual is certified to inspect playgrounds for safety issues and to ensure playgrounds meet current national industry standards developed by the ASTM and CPSC. www.nrpa.org.
- B. Critical Height: Standard measure of shock attenuation. According to the U.S. Consumer Product Safety Commission (CPSC) *Public Playground Safety Handbook*, this refers to the approximate fall height below which a life-threatening head injury would not be expected to occur. This rating should be greater than or equal to the fall height of the highest piece of playground equipment. The fall height is the distance between the highest designate play surface on a piece of equipment and the protective surface beneath it.
- C. Critical Fall Height: The height from which a critical injury can occur.
- D. Fall Height: According to ASTM F1487, "the vertical distance between a designated play surface and the protective surfacing beneath it." Note: The highest designated play surface used to define the fall height is defined by ASTM F1487 for play structures of specific types.
- E. Field Test: According to ASTM F2223, "performance testing of the playground surface in the field."
- F. G-max: Measure of the maximum acceleration (shock) produced by an impact.
- G. Head Injury Criteria (HIC): According to ASTM F2223, this is a measure of impact severity that considers the duration over which the most critical section of the deceleration pulse persists as well as the peak level of deceleration.
- H. SBR: Styrene-butadiene rubber.

1.3 ADDITIONAL REFERENCES

- A. Provide surfacing system complying with or exceeding requirements in the *latest* editions of the following:
 - 1. ADA Accessibility Guidelines for Buildings and Facilities including Play Areas
 - 2. ASTM 1951 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment
 - 3. ASTM D1335 Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings
 - 4. ASTM D5034 Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)
 - 5. ASTM D2859 Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
 - 6. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
 - 7. ASTM D624 Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
 - 8. ASTM F2223 Standard Guide for ASTM Standards on Playground Surfacing
 - 9. ASTM F355 Standard Test Method for Impact Attenuation of Playing Surface Systems, Other Protective Sport Systems, and Materials Used for Athletics, Recreation and Play
 - 10. ASTM F1292 Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment when installed in a playground use zone
 - 11. ASTM F1487 Standard Consumer Safety Performance Specification for Playground Equipment for Public Use; this standard will determine the minimum fall height for playground equipment such as swings, spring rockers and climbers
 - 12. U.S. Consumer Product Safety Commission (CPSC) No. 325, Public Playground Safety Handbook

- B. Surfacing system shall be IPEMA certified to meet Section 4.2 of ASTM F1292-18 or more current. A list of certified products can be viewed from the IPEMA website at www.ipema.org.
- C. Refer to Division 1 specifications for additional references such as FBC, Division 31 for earthwork and Division 11 for playground equipment.

1.4 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- B. Manufacturer's Qualification: Shall have been manufacturing the applicable product for at least consecutive three years. If offering a product other than one of the approved products listed, at least one South Florida installation is required to determine how the product has survived the extreme environmental conditions. A site visit to that location by County staff may be required to determine whether the product is approved for use by the County and Contractor.
- C. Installer Qualifications: An experienced company or person regularly engaged in installation of products specified in this Section. Manufacturer may require its own certification of the Installer or may require inspection by a manufacturer's representative.
- D. Coordination: Contractor shall coordinate delivery and installation with other work, such as the playground installation, to avoid delay.
- E. The playground surfacing shall meet or exceed the critical height rating of the highest piece of playground equipment.

1.5 SUBMITTALS

- A. Submit under provisions of Division 1 sections.
- B. Product Data: Submit manufacturer's detailed technical data for materials, fabrication, and installation.
- C. Shop Drawings: Provide the following, at a minimum, to the County Project Manager for approval:
 - 1. Name of manufacturer and model number.
 - 2. Layout of play area showing all playground components, site furnishings, fences, borders, fall heights and footings.
 - 3. Permeability coefficient results.
 - 4. Flammability (PILL) test results or equivalent test results per ASTM D2859.
 - 5. Installation sections, details and notes including sub-base and curbs.
 - 6. Location and type of drainage provisions.
 - 7. Governing building codes and edition.
 - 8. Required concrete curbing with details, dimensions and plans.
 - 9. Material test reports including permeability, flammability (PILL test), G-max and HIC in accordance with above references.
 - 10. Accessibility report with slopes per ASTM 1951.
 - 11. Warranty.
 - 12. Maintenance and repair instructions from the Manufacturer.
 - 13. Manufacturer and infill product to be installed.
 - 14. Installer's certification from the manufacturer (if required) and qualifications and experience with installation of the surfacing product.
 - 15. Material certificates provided by the Manufacturer.
 - 16. Results of the Manufacturer's Laboratory Test in accordance with ASTM F1292, latest edition.
- D. Samples: Submit to County Project Manager one sample each of the turf, seam assembly, composite nailer board, stainless steel fastener, shock absorbing course to indicate the color and texture. Pictures or scans will not be accepted.
- E. Additional requirements for the substitution/approved equals in accordance with Division 1, if applicable.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Provide one of the approved turf system products as selected by the County:
 - 1. TotTurf ProPlay Plus or Elite including colors (Basis of Design)

2. Or approved equal

B. Product Requirements

1. All products and materials provided shall be recommended by the surfacing manufacturer for their intended use and shall be compatible with each other.
2. Passing rating of the Critical Fall Height Laboratory Test per ASTM F1292 Section 4-2 requiring the following:
 - a. G-max: Less than 200
 - b. HIC: Less than or equal to 1,000
3. Passing rating of the Critical Fall Height field test per ASTM F1292 Section 4-4, Performance of Installed Playground Surfaces, requiring the following:
 - a. G-max: Less than 200
 - b. HIC: Less than or equal to 1,000
4. Flammability per ASTM D2859: Passes.
5. Permeability: Shall provide both lateral and vertical drainage.
6. Turf Finish: Anti-microbial.
7. Minimum Tufting Gauge: 3/8 inch with configuration of dual yarn in the same row.
8. Minimum Tuft Bind Strength at Backing per ASTM D1335: 10 pounds.
9. Minimum Pile Height: 1-1/4 inches.
10. Maximum Pile Height: 2 inches.
11. Minimum Face Weight: 55 ounces.
12. Minimum Total Product Weight: 79 ounces.
13. Infill: no crumb rubber, rubber granules or uncoated silica will be accepted; provide acrylic coated sand such as Envirofill, T°Cool or HydroChill or wood granules such as BrockFill.
14. Filter Fabric: If required by manufacturer.
15. Seam adhesives: As approved by the turf manufacturer.
16. Backing: Dimensionally stable.
17. Geotextile Fabric: If required, provide as recommended by the turf system manufacturer.
18. Nailer Board: Composite board or as approved by the Manufacturer. Wood will not be accepted by the County.
19. Aggregate: As recommended by Manufacturer and as approved by County.
20. When installing nailer boards, secure around the perimeter with minimum stainless steel staples or nails as per Manufacturer's recommendations. Edging shall be flush with the adjacent curbing and walkway.
21. System Thickness: As recommended by Manufacturer in a consistent thickness to pass the Critical Fall Height Laboratory and Field Tests to meet or exceed the critical height rating of the highest piece of installed playground equipment. For example, if the highest fall height is associated with a climber that has a fall height of 8 feet, then 8 feet is the drop point from which the entire playground surfacing must meet the impact attenuation performance criterion.
22. Shock absorbing course:
 - a. Porous and flexible
 - b. Consists of styrene-butadiene rubber (SBR) base mat or mulch
 - c. Wire-free
 - d. Lead-free
 - e. Thickness will vary depending upon the application and fall zone

C. Warranty

1. **Manufacturer shall provide a minimum 7-year warranty guaranteeing that the product will be free from defects in materials, excessive or premature wear and ultraviolet degradation.**
2. Contractor is responsible for registering the product with the Manufacturer and providing such proof to the County.

PART 3 - EXECUTION

3.1 TURF BASE

- A. The sub-base shall be cleared, leveled and compacted at the required depth below the finished surface height. The drainage course shall be salt-free angular stone that is hard, sound and durable.
- B. Prepare substrates to receive surfacing products according to Manufacturer's written instructions and details.
- C. Verify that substrates are sound and without high spots, ridges, holes, and depressions that could result in defects or puddling.
- D. The perimeter of the area shall be defined with a composite nailer board or other County and Manufacturer approved solution. Nailer boards shall be secured into concrete or blacktop or held in place with rebar spikes.
- E. The entire surface shall be clean and free from any foreign and loose material.
- F. Install turf over the area indicated on the plans and in the thicknesses needed to comply with the HIC requirements of the playground equipment.
- G. The turf will be rolled out in sections, cut around the poles, and seamed together using the mechanical seaming system as the primary bond.
- H. **No seams shall be located in high traffic areas such as the landings of slides or at climbers.**
- I. Surface slope not to exceed 2% in any direction.

3.2 DELIVERY, STORAGE, AND HANDLING

- A. Store products in a secure and covered location to protect from the elements; store the products so that they are elevated above the ground and to allow for full air circulation around the materials to prevent puddling, mold, decay and insects.
- B. Deliver the products on the day of installation.
- C. Keep products in manufacturer's unopened packaging until ready for installation.

3.3 INSTALLATION

- A. Refer to the quality assurance section above and Division 1 for minimum qualifications of the manufacturer and installer.
- B. Finished surfaces shall be cleaned after installation and be left free of imperfections.
- C. Comply with manufacturer's recommended procedures and installation sequence as well as final, County approved shop drawings.
- D. Any variations from the shop drawings and survey must be approved, in writing, by the Consultant or County Project Manager.
- E. Install when the weather meets the Manufacturer's recommendations.
- D. Protect installed products until completion of project.
- E. Repair or replace damaged products before Substantial Completion.

3.4 CPSI TESTING

- A. Testing includes both a Laboratory Test and Field Test to demonstrate that the surfacing passes both tests for the Critical Fall Height for the highest equipment as detailed above as well as for ADA accessibility and drainage. Field testing will be provided by the County.
- B. Contractor shall arrange a date and time and notify all required attendees. Provide no less than two business days' notice of testing. Meeting should be scheduled to coincide with the playground safety inspection. Attendees should include:
 - 1. Contractor
 - 2. Manufacturer's certified Installer
 - 3. Contractor's CPSI
 - 4. Park Manager, Park safety personnel or designee
 - 5. Local representative of the surfacing manufacturer
 - 6. County Inspector
- C. Manufacturer provided test data must be based upon, and representative of, the installed product and associated installation details.

- D. Remove a circular or oval portion and replace installations where test results indicate that the turf system does not comply with these requirements.
- E. Make all corrections as noted in the Field Tests(s).
- F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work.

3.5 FINAL PAYMENT AND FINAL COMPLETION

- A. Release of final payment and attainment of final completion requires a copy the CPSI impact attenuation testing report, signed by the testing company, certifying that the surfacing meets or exceeds the minimum design standards and is in accordance with the impact attenuation testing paragraph.
- B. If not previously provided, provide maintenance and repair instructions from the Manufacturer.
- C. **At no additional cost, provide the Park Manager with an additional 100 lbs. of the same infill that was used in the installation; the infill shall be new and the packaging must be sealed and include the Manufacturer and product names on it.**
- D. Confirmation from the CPSI that Contractor and its Installer have made all corrections as noted in the of the Field Test(s).
- E. Proof of product registration per the warranty section above.

END OF SECTION

SECTION 32 18 16.1 PLAYGROUND PROTECTIVE SURFACING (SBR BONDED MULCH)

PART 1 - GENERAL

1.1 SUMMARY OF WORK

- A. Provide and install permeable, poured-in-place SBR bonded rubber mulch with polyurethane binder surfacing system over a compacted sub-base and with curbing at all edges for playgrounds and other Park areas. **Unit price includes all labor including manufacturer's certified installer(s), tools, equipment, delivery and incidentals necessary to complete the installation and as detailed below. Field tests are not included in the unit price as they will be completed by the County.**
- B. The sub-base of crushed aggregate, sod, concrete or asphalt is **not included** in the line item pricing for the surfacing. See Division 31 and Drawings for earthwork requirements.
- C. Permitting, geotechnical testing and surveying may be paid for as a pass-thru line item or may be completed by County.

1.2 ADDITIONAL DEFINITIONS AND ACRONYMS

- A. Certified Playground Safety Inspector (CPSI): Offered by the National Recreation and Park Association and National Certification Board, this individual is certified to inspect playgrounds for safety issues and to ensure playgrounds meet current national industry standards developed by the ASTM and CPSC. www.nrpa.org.
- B. Critical Height: Standard measure of shock attenuation. According to the U.S. Consumer Product Safety Commission (CPSC) *Public Playground Safety Handbook*, this refers to the approximate fall height below which a life-threatening head injury would not be expected to occur. This rating should be greater than or equal to the fall height of the highest piece of playground equipment.
- C. Critical Fall Height: The height from which a critical injury can occur.
- D. Fall Height: According to ASTM F1487, "the vertical distance between a designated play surface and the protective surfacing beneath it." Note: The highest designated play surface used to define the fall height is defined by ASTM F1487 for play structures of specific types.
- E. Field Test: According to ASTM F2223, "performance testing of the playground surface in the field."
- F. G-max: Measure of the maximum acceleration (shock) produced by an impact.
- G. Head Injury Criteria (HIC): According to ASTM F2223, this is a measure of impact severity that considers the duration over which the most critical section of the deceleration pulse persists as well as the peak level of deceleration.
- H. SBR: Styrene-butadiene rubber

1.3 ADDITIONAL REFERENCES

- A. Provide surfacing complying with or exceeding requirements in the *latest* editions of the following:
 - 1. ADA Accessibility Guidelines for Buildings and Facilities including Play Areas.
 - 2. ASTM F1951 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.
 - 3. ASTM D2859 Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.
 - 4. ASTM F2223 Standard Guide for ASTM Standards on Playground Surfacing.
 - 5. ASTM F355 Standard Test Method for Impact Attenuation of Playing Surface Systems, Other Protective Sport Systems, and Materials Used for Athletics, Recreation and Play.
 - 6. ASTM F1292 Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment when installed in a playground use zone.
 - 7. ASTM F1487 Standard Consumer Safety Performance Specification for Playground Equipment for Public Use; this standard will determine the minimum fall height for playground equipment such as swings, spring rockers and climbers.
 - 8. U.S. Consumer Product Safety Commission (CPSC) No. 325, Public Playground Safety Handbook.
 - 9. ASTM F2479 Standard Guide for Specification, Purchase, Installation and Maintenance of Poured-In-Place Playground Surfacing.
- B. Surfacing shall be IPEMA certified to meet Section 4.2 of ASTM F1292-18 or more current. A list of certified products can be viewed from the IPEMA website at www.ipema.org.
- C. Refer to Division 1 section for additional references such as FBC, Division 31 for earthwork and Division 11 for

playground equipment.

1.4 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- B. Manufacturer's Qualification: Shall have been manufacturing the applicable product for at least three years. If offering a product other than one of the approved products listed, at least one South Florida installation is required to determine how the product has survived the extreme environmental conditions. A site visit to that location by County staff may be required to determine whether the product is approved for use by the County and Contractor.
- C. Installer Qualifications: An experienced company or person regularly engaged in installation of products specified in this specification. All of the approved manufacturers require its own certification of the Installer and may require inspection by a manufacturer's representative.
- D. Coordination: Contractor shall coordinate delivery and installation with other work, such as the playground installation, to avoid delay.
- E. The playground surfacing shall meet or exceed the critical height rating of the highest piece of playground equipment.

1.5 SUBMITTALS

- A. Submit under provisions of Division 1 sections.
- B. Product Data: Submit manufacturer's detailed technical data for materials, fabrication, and installation.
- C. Shop Drawings: Provide the following, at a minimum, to the County Project Manager for approval:
 - 1. Name of manufacturer and model number including all binders and urethane.
 - 2. Permeability coefficient results.
 - 3. Flammability (PILL) test results or equivalent test results per ASTM D2859.
 - 4. Installation details and notes including sub-base, curbs, ramps and playground slides.
 - 5. Location of drainage accessories.
 - 6. Governing building codes and edition.
 - 7. Required concrete curbing with details, dimensions and plans.
 - 8. Material test reports including permeability, flammability (PILL test), G-max and HIC in accordance with above references.
 - 9. Accessibility report, including slopes, per ASTM F1951.
 - 10. Warranty.
 - 11. Maintenance and repair instructions from the Manufacturer.
 - 12. Installer's certification from the manufacturer and qualifications and experience with installation of the surfacing product.
 - 13. Material certificates provided by the Manufacturer.
 - 14. Results of the Manufacturer's Laboratory Test in accordance with ASTM F1292, latest edition.
- D. Samples: Submit to County Project Manager one sample to indicate the color and texture. Pictures or scans will not be accepted.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Provide one of the approved products:
 - 1. DuraTurf Bonded Rubber by Sport Surface Specialties, LLC www.sportsurface.net
 - 2. GT Impax™ Recycled Bonded Rubber www.gametime.com
 - 3. TotTurf Bonded Rubber by Robertson Recreational Surface www.totturf.com
 - 4. Or approved equal.
- B. Product Requirements
 - 1. All products and materials provided shall be recommended by the surfacing manufacturer for their intended

- use and shall be compatible with each other.
- 2. Minimum permeability coefficient: 5 feet per minute and 8 inches of rainfall per hour. Shall provide both lateral and vertical drainage.
- 3. Passing rating of the Critical Fall Height Laboratory Test per ASTM F1292 Section 4 requiring the following:
 - a. G-max: Less than 200
 - b. HIC: Less than or equal to 1,000
- 4. Passing rating of the Critical Fall Height field test per ASTM F1292 Section 4, Performance of Installed Playground Surfaces, requiring the following:
 - a. G-max: Less than 200
 - b. HIC: Less than or equal to 1,000
- 5. Flammability per ASTM D2859: Passes.
- 6. Rubber Mulch:
 - a. 100% recycled, colored styrene-butadiene rubber (SBR)
 - b. Wire-free
 - c. Lead-free
 - d. Various sizes
 - e. No foam or rubber granules shall be allowed
 - f. Poured-in-place
- 7. Binders:
 - a. Polyurethane binder
 - b. No Toluene Diphenyl Isocyanate (TDI) shall be used
 - c. No plasticizers or heavy metals
 - d. **Designed and approved by Manufacturer for high humidity and extreme heat**
- 8. Thickness: As recommended by Manufacturer in a consistent thickness to pass the Critical Fall Height Laboratory and Field Tests to meet or exceed the critical height rating of the highest piece of installed playground equipment. For example, if the highest fall height is associated with a climber that has a fall height of 8 feet, then 8 feet is the drop point from which the entire playground surfacing must meet the impact attenuation performance criterion.
- 9. Minimum Colors: Manufacturer shall offer at least four solid colors and at least three blends.
- 10. Sub-base: Aggregate, grass, concrete or asphalt as approved by Manufacturer and County.

C. Warranty

- 1. **Manufacturer shall provide a minimum 3-year warranty guaranteeing that the product will be free from defects in materials, quality of work and will maintain the intended impact attenuation.**
- 2. Contractor is responsible for registering the product with the Manufacturer and providing such proof to the County.

PART 3 - EXECUTION

3.1 SUB-BASE

- A. The base shall be cleared, leveled and compacted at the required depth below the finished surface height.
- B. Prepare substrates to receive surfacing products according to Manufacturer's written instructions and details.
- C. Contractor to verify the established elevations of the sub-base and ensure elevations meet the intended design.
- D. If installing over a concrete base, Contractor shall verify the concrete has cured and that all concrete curing compounds and other deleterious substances that may affect adhesion of the surfacing.
- E. If installing over asphalt, curing time requires a minimum of 14 calendar days and will be dependent upon the site and weather conditions. Pressure-wash the asphalt before surfacing installation. Flood the pad to ensure proper slope and

tolerances.

- F. Verify that substrates are sound and without high spots, ridges, holes, and depressions that could result in defects or puddling.
- G. Verify that sub-surfacing drainage meets or exceeds the drainage per the Drawings and calculations.
- H. The entire surface shall be clean and free from any foreign and loose material.

3.2 DELIVERY, STORAGE AND HANDLING

- A. Store products in a secure and covered location to protect from the elements; store the products so that they are elevated above the ground and to allow for full air circulation around the materials to prevent puddling, mold, decay and insects.
- B. Deliver the products on the day of installation.
- C. Keep products in manufacturer's unopened packaging until ready for installation.

3.3 INSTALLATION

- A. Comply with manufacturer's recommended procedures and installation sequence as well as final, County approved shop drawings.
- B. Refer to the quality assurance section above and Division 1 for minimum qualifications of the manufacturer and installer.
- C. Any variations from the shop drawings and survey must be approved, in writing, by the Consultant or County Project Manager.
- D. Install when the weather meets the Manufacturer's recommendations.
- E. Install surfacing over the area indicated on the plans and in the thicknesses needed to comply with the HIC and G-max requirements of the playground equipment.
- F. Surface slope not to exceed 2% in any direction.
- G. Mix the surfacing components on site in a tumbler or as instructed by Manufacturer.
- H. For locations up to 2,000 square feet, install the surfacing in one single pour on the same day. When a second pour is required, step the seam and fully coat the step of the previous work with a primer binder to ensure 100% bonding between the old and new pours.
- I. Fill all holes and depressions.
- J. Additional requirements recommended by the Manufacturer shall be enforced.
- K. Confirm slope and drainage are correct and as intended.
- L. Edging shall be flush with the adjacent curbing and walkway.
- M. Protect installed products until completion of project.
- N. Immediately remove any product on adjacent surfaces such as sod, playground equipment, site furnishings, etc.
- O. Repair or replace damaged products before Substantial Completion.
- P. Finished surfaces shall be cleaned after installation and be left free of imperfections. Use of a broom can result in debris being pushed into porous areas.

3.4 LABORATORY AND FIELD TESTING

- A. Testing includes both a Laboratory Test and Field Test to demonstrate that the surfacing passes both tests for the Critical Fall Height for the highest equipment as detailed above as well as for ADA accessibility and drainage. Field testing will be provided by the County.
- B. Contractor shall arrange a date and time and notify all required attendees. Provide no less than two business days' notice of testing. Meeting should be scheduled to coincide with the playground safety inspection Attendees should include:
 - 1. Contractor
 - 2. Manufacturer's certified Installer
 - 3. County provided CPSI
 - 4. Park Manager, Park safety personnel or designee
 - 5. Local representative of the surfacing manufacturer
 - 6. County Inspector
- C. Manufacturer provided test data must be based upon, and representative of, the installed products and associated installation details.
- D. Remove a circular or oval portion and replace installations where test results indicate that the surfacing system does

not comply with these requirements.

- E. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work.
- F. Make all corrections as noted in the Field Tests(s).

3.5 FINAL PAYMENT AND FINAL COMPLETION

- A. Release of final payment and attainment of final completion requires a CPSI impact attenuation testing report certifying that the surfacing meets or exceeds the minimum design standards and is in accordance with the impact attenuation testing requirements above.
- B. Confirmation from the CPSI that Contractor and its Installer have made all corrections as noted in the of the Field Test(s).
- C. Proof of product registration per the warranty section above.

END OF SECTION

SECTION 32 18 16.2 PLAYGROUND PROTECTIVE SURFACING (POURED-IN-PLACE EPDM)

PART 1 - GENERAL

1.1 SUMMARY OF WORK

- A. Provide and install permeable, poured-in-place, two layer surfacing system (EPDM or hybrid over cushion layer) over a compacted sub-base and with curbing at all edges for playgrounds and other Park areas. **Unit price includes all labor including manufacturer's certified installer(s), tools, equipment, delivery and incidentals necessary to complete the installation and as detailed below. Field tests are not included in the unit price. Field tests are not included in the unit price as they will be completed by the County.**
- B. The sub-base of crushed aggregate, sod, concrete or asphalt is **not included** in the line item pricing for the surfacing. See Division 31 and Drawings for earthwork requirements.
- C. Permitting, geotechnical testing and surveying may be paid for as a pass-thru line item or may be completed by County.

1.2 ADDITIONAL DEFINITIONS

- A. Certified Playground Safety Inspector (CPSI): Offered by the National Recreation and Park Association and National Certification Board, this individual is certified to inspect playgrounds for safety issues and to ensure playgrounds meet current national industry standards developed by the ASTM and CPSC. www.nrpa.org.
- B. Critical Height: Standard measure of shock attenuation. According to the U.S. Consumer Product Safety Commission (CPSC) *Public Playground Safety Handbook*, this refers to the approximate fall height below which a life-threatening head injury would not be expected to occur. This rating should be greater than or equal to the fall height of the highest piece of playground equipment.
- C. Critical Fall Height: The height from which a critical injury can occur.
- D. EPDM: Ethylene propylene diene monomer.
- E. Fall Height: According to ASTM F1487, "the vertical distance between a designated play surface and the protective surfacing beneath it." Note: The highest designated play surface used to define the fall height is defined by ASTM F1487 for play structures of specific types.
- F. Field Test: According to ASTM F2223, "performance testing of the playground surface in the field."
- G. G-max: Measure of the maximum acceleration (shock) produced by an impact.
- H. Head Injury Criteria (HIC): According to ASTM F2223, this is a measure of impact severity that considers the duration over which the most critical section of the deceleration pulse persists as well as the peak level of deceleration.

1.3 ADDITIONAL REFERENCES

- A. Provide surfacing complying with or exceeding requirements in the **latest** editions of the following:
 - 1. ADA Accessibility Guidelines for Buildings and Facilities including Play Areas.
 - 2. ASTM F1951 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.
 - 3. ASTM D2859 Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.
 - 4. ASTM F2223 Standard Guide for ASTM Standards on Playground Surfacing.
 - 5. ASTM F355 Standard Test Method for Impact Attenuation of Playing Surface Systems, Other Protective Sport Systems, and Materials Used for Athletics, Recreation and Play.
 - 6. ASTM F1292 Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment when installed in a playground use zone.
 - 7. ASTM F1487 Standard Consumer Safety Performance Specification for Playground Equipment for Public Use; this standard will determine the minimum fall height for playground equipment such as swings, spring rockers and climbers.
 - 8. ASTM F2479 Standard Guide for Specification, Purchase, Installation and Maintenance of Poured-In-Place Playground Surfacing
 - 9. U.S. Consumer Product Safety Commission (CPSC) No. 325, Public Playground Safety Handbook.
- B. Surfacing shall be IPEMA certified to meet Section 4.2 of ASTM F1292-18 or more current. A list of certified products can be viewed from the IPEMA website at www.ipema.org.
- C. Refer to Division 1 section for additional references such as FBC, Division 31 for earthwork and Division 11 for

playground equipment.

1.4 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- B. Manufacturer's Qualification: Shall have been manufacturing the applicable product for at least three years. If offering a product other than one of the approved products listed, at least one South Florida installation is required to determine how the product has survived the extreme environmental conditions. A site visit to that location by County staff may be required to determine whether the product is approved for use by the County and Contractor.
- C. Installer Qualifications: An experienced company or person regularly engaged in installation of products specified in this specification. All of the approved manufacturers require its own certification of the Installer and may require inspection by a manufacturer's representative.
- D. Coordination: Contractor shall coordinate delivery and installation with other work, such as the playground installation, to avoid delay.
- E. The playground surfacing shall meet or exceed the critical height rating of the highest piece of playground equipment.

1.5 SUBMITTALS

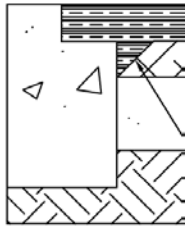
- A. Submit under provisions of Division 1 sections.
- B. Product Data: Submit manufacturer's detailed technical data for materials, fabrication, and installation.
- C. Shop Drawings: Provide the following, at a minimum, to the County Project Manager for approval:
 - 1. Name of manufacturer and model number including all binders and urethanes.
 - 2. Permeability coefficient results.
 - 3. Flammability (PILL) test results or equivalent test results per ASTM D2859.
 - 4. Installation details and notes including sub-base, curbs, ramps and playground slides.
 - 5. Location of drainage accessories.
 - 6. Governing building codes and edition.
 - 7. Concrete curbing with details, dimensions and plans.
 - 8. Material test reports including permeability, flammability (PILL test), G-max and HIC in accordance with above references.
 - 9. Accessibility report, including slopes, per ASTM F1951.
 - 10. Warranty.
 - 11. Maintenance and repair instructions from the Manufacturer.
 - 12. Installer's certification from the manufacturer and qualifications and experience with installation of the surfacing product.
 - 13. Results of the Manufacturer's Laboratory Test in accordance with ASTM F1292, latest edition.
- D. Samples: Submit to County Project Manager one sample to indicate the color and texture. Pictures or scans will not be accepted.
- E. Additional requirements for the substitution/approved equals in accordance with Division 1, if applicable.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Provide one of the approved products:
 - 1. GT Impax™ Poured-in-Place Rubber by GameTime www.gametime.com
 - 2. Playsafer RubberBond by RubbeRecycle, LLC <https://rubberecycle.com/>
 - 3. TotTurf Standard EPDM by Robertson Recreational Surface (Basis of Design) www.totturf.com
 - 4. Vitriturf Poured in Place and V-10 by Hanover Specialties, Inc. www.vitriturf.com
- B. Product Requirements
 - 1. All products and materials provided shall be recommended by the surfacing manufacturer for their intended

- use and shall be compatible with each other.
2. Passing rating of the Critical Fall Height Laboratory Test per ASTM F1292 Section 4-2 requiring the following:
 - a. G-max: Less than 200
 - b. HIC: Less than or equal to 1,000
 3. Passing rating of the Critical Fall Height field test per ASTM F1292 Section 4, Performance of Installed Playground Surfaces, requiring the following:
 - a. G-max: Less than 200
 - b. HIC: Less than or equal to 1,000
 4. Flammability per ASTM D2859: Passes.
 5. Wear Surface
 - a. EPDM or SBR granules with binder
 - b. Porous
 - c. Minimum thickness: 3/8 inch
 - d. No foam shall be allowed
 - e. Poured-in-place
 - f. Edges shall be flush with adjacent area and tapered to provide a safe transition as well as reduce the risk of separation and shrinking; see Detail B.



Detail B: Wear surface tapered edge at concrete border

6. Impact or Cushion Layer
 - a. Porous and flexible
 - b. Consists of styrene-butadiene rubber (SBR) bonded mat (no granules) or bonded mulch
 - c. Wire-free
 - d. Lead-free
 - e. Thickness will vary depending upon the application and fall zone
7. Binders
 - a. Polyurethane, SBR or shredded tire material binder
 - b. Shall not contain Toluene Diphenyl Isocyanate (TDI)
 - c. Shall not contain plasticizers or heavy metals
 - d. **Specifically designed and approved by Manufacturer for high humidity and extreme heat**
 - e. Aromatic binders are preferred over aliphatic due to flexibility, longevity and durability; only use aliphatic when the color selected requires an aliphatic binder (such as blues and purples)
8. Thickness: As recommended by Manufacturer in a consistent thickness to pass the Critical Fall Height Laboratory and Field Tests to meet or exceed the critical height rating of the highest piece of installed playground equipment. For example, if the highest fall height is associated with a climber that has a fall height of 8 feet, then 8 feet is the drop point from which the entire playground surfacing must meet the impact attenuation performance criterion.
9. Minimum Colors: Manufacturer shall offer at least four colors to choose from.
10. Sub-base: Aggregate, grass, concrete or asphalt as approved by Manufacturer and County.



Detail A: Top layer: poured-in-place or wear surface; second layer is the impact or cushion layer; third layer is the sub-base; bottom layer is earth

C. Warranty

1. **Manufacturer shall provide a minimum 5-year warranty guaranteeing that the product will be free from defects in materials, quality of work and will maintain the intended impact attenuation.**
2. Contractor is responsible for registering the product with the Manufacturer and providing such proof to the County.

PART 3 - EXECUTION

3.1 SUB-BASE

- A. The base shall be cleared, leveled and compacted at the required depth below the finished surface height.
- B. Prepare substrates to receive surfacing products according to Manufacturer's written instructions and details.
- C. Contractor to verify the established elevations of the sub-base and ensure elevations meet the intended design.
- D. If installing over a concrete base, Contractor shall verify the concrete has cured and that all concrete curing compounds and other deleterious substances that may affect adhesion of the surfacing.
- E. If installing over asphalt, curing time requires a minimum of 14 calendar days and will be dependent upon the site and weather conditions. Pressure-wash the asphalt before surfacing installation. Flood the pad to ensure proper slope and tolerances.
- F. Verify that substrates are sound and without high spots, ridges, holes, and depressions that could result in defects or puddling.
- G. Verify that sub-surfacing drainage meets or exceeds the drainage per the Drawings and calculations.
- H. The entire surface shall be clean and free from any foreign and loose material.

3.2 DELIVERY, STORAGE, AND HANDLING

- A. Store products in a secure and covered location to protect from the elements; store the products so that they are elevated above the ground and to allow for full air circulation around the materials to prevent puddling, mold, decay and insects.
- B. Deliver the products on the day of installation.
- C. Keep products in manufacturer's unopened packaging until ready for installation.

3.3 INSTALLATION

- A. **At high use zones, provide a denser, smaller granule product such as TotTurf Supreme (insert), at no additional cost. A 4 feet x 4 feet insert is required at each slide landing and a 4 feet deep insert is required around the entire swing bay and swing area. The insert shall be porous for drainage purposes.**
- B. Comply with Manufacturer's recommended procedures and installation sequence as well as final, County approved shop drawings.
- C. Refer to the quality assurance section above and Division 1 for minimum qualifications of the manufacturer and installer.
- D. Any variations from the shop drawings and survey must be approved, in writing, by the Consultant or County Project Manager.
- E. Install when the weather meets the Manufacturer's recommendations.
- F. Install surfacing over the area indicated on the plans and in the thicknesses needed to comply with the HIC and g-max requirements of the playground equipment.
- G. Surface slope not to exceed 2% in any direction.

- H. Mix the surfacing wear course and binder on site in a tumbler or as instructed by Manufacturer.
- I. Pour-in-place by means of screeding, hand troweling or similar process as recommended by Manufacturer to maintain a seamless, smooth, consistent application.
- J. Apply adhesive in small quantities and before adhesive starts to set.
- K. When a second pour is required, step the seam and fully coat the step of the previous work with a primer binder to ensure 100% bonding between the old and new pours. See Detail B below.



Detail B: Stepped seam detail

- L. Fill all holes and depressions.
- M. Additional requirements recommended by the Manufacturer shall be enforced.
- N. Confirm slope and drainage are correct and as intended.
- O. Edging shall be flush with the adjacent curbing and walkway.
- P. Protect installed products until completion of project.
- Q. Immediately remove any product on adjacent surfaces such as sod, playground equipment, site furnishings, etc.
- R. Repair or replace damaged products before Substantial Completion.
- S. Finished surfaces shall be cleaned after installation and be left free of imperfections. Use of a broom can result in debris being pushed into porous areas.

3.4 LABORATORY AND FIELD TESTING

- A. Testing includes both a Laboratory Test and Field Test to demonstrate that the surfacing passes both tests for the Critical Fall Height for the highest equipment as detailed above as well as for ADA accessibility and drainage. Field testing will be provided by the County.
- B. Contractor shall arrange a date and time and notify all required attendees. Provide no less than two business days' notice of testing. Meeting should be scheduled to coincide with the playground safety inspection. Attendees should include:
 - 1. Contractor
 - 2. Manufacturer's certified Installer
 - 3. County provided CPSI
 - 4. Park Manager, Park safety personnel or designee
 - 5. Local representative of the surfacing manufacturer
 - 6. County Inspector
- C. Manufacturer provided test data must be based upon, and representative of, the installed products and associated installation details.
- D. Remove a circular or oval portion and replace installations where test results indicate that the surfacing system does not comply with these requirements.
- E. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work.

3.5 FINAL PAYMENT AND FINAL COMPLETION

- A. Release of final payment and attainment of final completion requires a CPSI impact attenuation testing report certifying that the surfacing meets or exceeds the minimum design standards and is in accordance with the impact attenuation testing requirements above.
- B. Confirmation from the CPSI that Contractor and its Installer have made all corrections as noted in the of the Field Test(s).
- C. If not previously provided, provide maintenance and repair instructions from the Manufacturer.
- D. Proof of product registration per the warranty section above.

END OF SECTION

SECTION 32 18 23 SYNTHETIC TENNIS COURT SURFACING

PART 1 - GENERAL

1.1. SUMMARY OF WORK

- A. The work to be performed under this section and included in the unit price consists of the complete surfacing and resurfacing system with line painting as specified herein. Posts and netting are a separate line item.
- B. Unit price also includes the repair of minor cracks and depressions in the existing asphalt or concrete subbase. Unit price excludes the costs for the asphalt or concrete subbase.

1.2. ADDITIONAL REFERENCES

- A. American Sports Builders Association (ASBA).
- B. International Tennis Federation (ITF).
- C. United States Tennis Association (USTA).

1.3. QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- B. Applicator Qualifications: An experienced company or person regularly engaged in installation of products specified in this Section. Manufacturer may require its own certification of the Applicator or may require inspection by a manufacturer's representative.
- C. Coordination: Contractor shall coordinate delivery and installation with other work, such as the playground installation, to avoid delay.
- D. All materials used shall be from a single manufacturer that has regularly engaged in the manufacturing of these products and which meets the product specifications attached.
- E. Surfacing and layout shall conform to ASBA guidelines for planarity.
- F. Layout shall conform to USTA guidelines.

1.4. SUBMITTALS

- A. Submit under provisions of Division 1 sections.
- B. Product Data: Submit manufacturer's detailed technical data for materials and installation.
- C. Shop Drawings: Provide the following, at a minimum, to the County Project Manager for approval:
 - 1. Name of manufacturer and product.
 - 2. Installation details and notes.
 - 3. Governing building codes and edition.
 - 4. Required layout with details, dimensions and plans.
 - 5. Warranty.
 - 6. Maintenance instructions from the Manufacturer.
 - 7. Applicator's certification from the manufacturer (if required) and qualifications and experience with installation of the surfacing product.
 - 8. Material certificates provided by the Manufacturer.
- D. Samples: Submit manufacturer's standard color choices to County Project Manager for selection.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

- A. Provide one of the following approved products:
 - 1. Plexipave Tennis Surface System by California Sports Surfaces www.plexipave.com
 - 2. Or approved equal.

2.2. MATERIAL AND SYSTEM REQUIREMENTS

- A. 100% acrylic, all-weather surface suitable for outdoor applications; no vinyl or vinyl combination systems will be approved.
- B. Asbestos free.
- C. Designed for installation over both asphalt and concrete subbases.
- D. Can be used for multiple sports courts such as basketball and on walkways.
- E. Allows for surfaces to breathe.
- F. Acrylic Resurfacer shall be 100% acrylic resin without any vinyl copolymerization constituents.
- G. Crack Filler shall be 100% acrylic resin filled with sand.
- H. Court Patch Binder shall be 100% acrylic resin blended with Portland cement and silica sand.
- I. Coating surface primer and adhesive shall be 100% acrylic resin without any vinyl copolymerization constituents.
- J. Color Base shall be 100% acrylic resin without any vinyl copolymerization constituents and no more than 65% rounded silica sand.
- K. Line Paint shall be 100% acrylic resin without any alkyds or vinyl constituents. Texturing shall be rounded silica sand. All surfacing materials shall be non-flammable. Local sands are not acceptable in the color playing surface. Sands must be incorporated at the manufacturing location to insure quality and stability.

2.3. WARRANTIES

- A. All surfacing products and installation shall be warranted for a period of no less than one year from date of substantial completion.

PART 3 - EXECUTION

3.1. COUNTY RESPONSIBILITIES

- A. Contractor shall notify County staff no less than two business day prior to requesting the County to mow and hedge landscaping at the perimeter of the court.
- B. Contractor shall confirm with County staff that any nearby sprinkler heads are turned off during the Work.

3.2. DELIVERY, STORAGE AND HANDLING

- A. Do not store the product outdoors.
- B. Deliver the products on the day of installation, or store in a secured and covered location,
- C. Keep products in manufacturer's unopened packaging until ready for installation.

3.3. INSTALLATION

- A. Comply with manufacturer's recommended procedures and installation sequence as well as final, County approved shop drawings. Products and installation will be dependent upon the subbase (asphalt or concrete) of the court or walkway.
- B. Applicator shall wear protective clothing, safety glasses and gloves.
- C. Refer to the quality assurance section and Division 1 for minimum qualifications of the manufacturer and Applicator.
- D. Finished surfaces shall be cleaned after installation and be left free of imperfections.
- E. Any variations from the shop drawings and survey must be approved, in writing, by the Consultant or County Project Manager.
- F. Install when the weather conditions meet the Manufacturer's recommendations. Do not install when rain is imminent.
- D. Contractor shall confirm with County staff that any nearby sprinkler heads are turned off during the Work.
- E. Clean surfaces of loose dirt, dust, mud, oil, grease, leaves, and other debris in strict accordance with manufacturer's directions. Flood the surface and locate all depressions Pressure washing will be necessary to adequately clean areas to be coated. Any areas previously showing algae growth shall be treated with bleach to kill the organisms and then be properly rinsed.
- F. When applied over concrete subbase, the concrete surface must be etched with a concrete preparer solution.
- G. Flood the existing surface and locate all depressions greater than the thickness of a nickel. Fill with court patch binder in accordance with Manufacturer's recommendations. A tack coat may be necessary.
- H. Cracks and holes shall be cleaned and a suitable soil sterilant, as approved by the County, shall be applied to kill all vegetation no more than 14 calendar days prior to use of a court patch binder according to Manufacturer's specifications.

All cracks 1/8 inch or greater in width shall be cleaned out and filled with acrylic crack filler. All repaired areas shall be flush with surrounding surface. If not, they shall be ground or rolled as needed to make them flush and even.

- I. Mix the ingredients thoroughly using industry accepted mixing devices.
- J. All water used in mixtures shall be fresh and potable.
- K. Courts require a minimum of 1% slope to allow for water drainage.
- L. Locate and mark playing lines in accordance with ASBA and/or USTA guidelines. Lines shall be painted with textured acrylic paint, using a product approved by the surface court manufacturer, at a continuous width of 2 inches unless otherwise instructed in the plans. Playing lines shall be taped to ensure crisp paint lines, and applied by brush or roller as instructed by the Manufacturer.
- M. Protect installed products until completion of project. Erect temporary barriers and signage to protect coatings during drying and curing and to prevent usage by the public.
- N. Repair or replace damaged products before Substantial Completion.
- O. For resurfacing projects, remove existing net posts from the sleeves.
- P. Follow the netting and net post manufacturers' guidelines for installation.

END OF SECTION

SECTION 32 31 13 CHAIN LINK FENCES AND GATES (PVC COATED)

PART 1 GENERAL

1.1. SUMMARY

- A. The work described in this section consists of furnishing all labor and materials to complete all work in reference to polymer-coated fencing. Provide a top rail and a tension wire along the bottom, unless a bottom rail is specified or required. Provide a center rail for fabric heights greater than 6 feet.
- B. Unit price includes the concrete footings and documents signed and sealed by a State of Florida registered Professional Engineer confirming that the fencing complies with wind load requirements and other Florida Building Code requirements.
- C. Contractor shall verify areas to receive fencing are completed to final grade.

1.2. SUBMITTALS

- A. Materials: Submit product data and certification that materials meet specified requirements.
- B. Shop Drawings: Submit fabrication drawings for fencing, gates and backstop and plans and details illustrating fence height, location and sizes of posts, rails and braces.
- C. Sample of fencing material with manufacturer's tag detailing the product name and qualities.
- D. Color Chart.

PART 2 PRODUCTS

2.1. MANUFACTURERS AND WARRANTY

- A. Materials specified are for clarity of description and as a standard of comparison. The basis of design is Master Halco Inc. (www.masterhalco.com) Permafused II polyolefin Class 2b framework. Permafused is a durable polymer coating that is thermally fused and bonded to galvanized steel wire, framework, and accessories. This bonding protects the fencing from corrosive chemicals and moisture.
- B. Extruded vinyl-coated chain link fencing shall not be accepted.
- C. Manufacturer shall provide a minimum 10-year limited warranty on the fencing.

2.2. CHAIN LINK FABRIC

- A. Permafused polyolefin (or equivalent) fused and adhered to zinc-coated steel wire per ASTM F668 Class 2b for thermally fused and bonded wire. Two inch mesh, No. 9 gauge core wire (0.148 inch core diameter) with 10 mil thick polyolefin elastomer (or equivalent) coating.
- B. Alternate (if specified): Permafused polyolefin (or equivalent) fused and adhered to zinc-coated steel wire per ASTM F668 Class 2b thermally fused and bonded. Two-inch mesh, No. 6 gauge core wire, 0.192 inch core (before coating) wire diameter with 10 mil thick polyolefin (or equivalent) elastomer coating.
- C. Selvage Edges: Knuckle fabric at top and bottom selvage (KK or KT). KK shall be used for heights of 72 inches or greater.
- D. Color: If not specified, color shall be black.
- E. For fences containing windscreens or privacy slats, all fences greater than 12 feet in height and fences 8 feet in height using one inch or smaller mesh, will require a wind load force analysis for post sizing and spacing. Analysis in accordance with the Florida Building Code, latest edition, Chapter 16, and signed and sealed by a Florida registered Professional Engineer.

2.3. FRAMEWORK

- A. Material to be Type/Class 2b polymer-coated, 10 mils minimum thickness, over galvanized steel, ASTM F1043, Group 1C, with minimum yield strength of 50,000 psi. Protective coating per ASTM F1043, external coating Type B, zinc with organic overcoat, 0.9 ounce/square foot minimum zinc coating with chromate conversion coating and verifiable polymer film. Color-coated fittings to be polymer-coated with 6 mils minimum thickness over hot-dipped galvanized steel.
- B. Framework sections shall conform to the following sizes and weights unless shown otherwise on the plans.

C. Post sizes:

<u>Use</u>	<u>Outside Diameter (Inches)</u>	<u>Weight (lb/ft)</u>	<u>Wall Thickness (Inches)</u>
End, corner and pull posts			
Fabric height 6 feet and over	2.875	4.64	0.160
Fabric height under 6 feet	2.375	3.12	0.130
Line Posts			
Fabric height under 6 feet	1.90	2.28	--
Rails and braces	1.660	1.83	0.111
	-		
Gate Posts (for width of single leaf)	-		
Less than 6 feet			
Gate Frames			
Fabric height under 6 feet	1.660	1.830	0.111

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2.4. GATES

- A. Frames: Material same as color-coated fence framework welded at all corners. Provide a horizontal center rail on all frames 6 feet and over in height. Provide a vertical brace on all gate leaves over 8 feet in width. Provide additional horizontal, vertical or diagonal bracing as needed so that the outer member shall not sag in excess of the lesser of 1% of the gate leaf width, or 2 inches. Paint welds with zinc-based paint.
- B. Fabric: To be the same as used in the fence construction. Secure to gate frame on all sides with color-coated tension bars and fasteners at intervals not exceeding 15 inches.
- C. Polymer-Coated Galvanized Hinges: To be of adequate strength for the gate and with large bearing surfaces for clamping in position. The hinges are not to twist or turn under the action of the gate. The hinges shall allow the gate to swing a full 180 degrees.
- D. Polymer-Coated Galvanized Latches, Stops and Keepers: Provide for all gates. Latches to have a plunger-bar arranged to engage the center stop, except that for single gates of openings less than 10 feet wide a forked latch may be provided. Arrange latches for locking from either side. Center stops are to consist of a device arranged to be set in concrete and to engage a plunger-bar of the latch of double gates. No stop is required for single gates. Keepers are to consist of a mechanical device for securing the free end of the gate when in the full open position.
- E. Single gates shall be supplied with a galvanized steel latch mechanism capable of securing the gate with a padlock accessible from both sides of the gate. Double gates shall have a galvanized drop rod to hold inactive leaf and a latch mechanism capable of securing the gate with a padlock accessible from both sides of the gate. Provide drop receiver to engage center drop rod.

2.5. POLYMER-COATED ACCESSORIES

- A. All in accordance with ASTM F626. All accessories shall be provided with a minimum 6 mil thick polymer coating over hot-dipped galvanized steel.
- B. Post Cap/Top: Pressed steel, malleable iron or aluminum alloy weathertight closure cap for tubular posts. Provide cap/top to permit passage of top rail. Provide one cap for each post.
- C. Rail and Brace Ends: Galvanized steel per ASTM F626 or malleable iron.
- D. Tension (Stretcher) Bar: Galvanized steel one piece length equal to 2 inches less than the full height of fabric with a minimum cross section of 3/16 x 3/4 inches per ASTM F626. Provide where chain link fabric is secured to the terminal post.
- E. Tension Wire: Minimum 7 gauge steel conforming to ASTM A-824.
- F. Truss Rod: Galvanized steel, minimum 5/16 inch diameter with knuckle or other equivalent provision for adjustment.
- G. Wire ties: Minimum 9 gauge galvanized steel wire for attachment of fabric to line posts and rails.
- H. Carriage Bolts and Nuts: Commercial, heavy duty, galvanized steel.

PART 3 EXECUTION

3.1. INSPECTION

- A. Examine the conditions under which the fence and gates are to be installed and correct unsatisfactory conditions before proceeding with the work.

3.2. INSTALLATION

- A. Do not begin fence installation and erection before the final grading is completed, with finish elevations established, unless otherwise allowed.
- B. Post spacings in each run shall be uniform and no further apart than 10 feet on center. Posts shall be carefully aligned and plumb in every direction. Post settings in earth shall consist of concrete footings with the diameter of the hole to be 4 times the width of the post, but never less than 12 inches.
- C. Posts shall extend a minimum of 36 inches into concrete footings below finished grade, and set 6 inches above bottom of concrete footing, unless shown otherwise on the plans. Concrete footing shall be a 1-

- 2-4 mixture, minimum 28 days compressive strength of 3,000 psi. All foundations shall extend approximately 1 inch above grade, sloping away from post to provide proper drainage, troweled smooth.
- D. Fabric: Top of fabric shall be flush to top rail and bottom of fabric shall be 1 inch or held as uniformly close as is practicable and possible above finished grade. Fabric shall be stretched tightly to eliminate sags and buckles and securely fastened to framework members. Install with the twist and barbs at bottom. The chain link fabric shall be securely fastened to all terminal posts using Tension Bars and tension bands. There shall be one (1) band for each foot in the height of fence. The fabric shall be fastened to all intermediate posts with 9 gauge core wire ties, spacing not to exceed 12 inches apart. Fabric shall be tied to top and center rails with 9 gauge core wire ties, spacing not to exceed 24 inches.
 - E. Tension Wires: Tension Wire to be stretched taut from terminal post to terminal post, then securely fastened to the chain link fabric with 11 gauge (or stronger) hog rings spaced a minimum of 24 inches on center and per ASTM F626. Bottom tension wire is not required if a bottom rail is specified.
 - F. Top Rail: Top rail is to pass through the line post tops and form a continuous brace from end to end of each stretch of fence. The top rail is to be securely fastened to end posts by brace bands and malleable rail end connections.
 - G. Brace Assembly: Provide for each gate, corner, pull and end post for use when top rail is omitted or with fabric 6 feet or more in height. Assembly shall consist of a round tubular brace extending to each adjacent line post at approximately mid height of the fabric, and a truss rod from the line post back to the gate, corner, pull, or end post. Truss rods may be eliminated in any line of fence where there is a continuous center rail. Fasten braces to posts with brace bands and malleable brace ends.
 - H. Bottom Rail (if required): Set bottom rail one inch above finish grade. Securely fasten to posts with boulevard clamps or brace bands and malleable rail ends, if called for by the County Project Manager. The price of a bottom rail is included in the line item cost.
 - I. Center Rail: Securely fasten to posts with boulevard clamps or brace bands and malleable rail ends, if called for by the County Project Manager or Consultant.

3.3. ELECTRICAL GROUNDS

- A. Provide at least one electrical ground for each 1,000 feet. of installed fence, located near the center of the run. Provide additional grounds directly under the point where power lines pass over the fence. Vertically drive or drill in the grounding rod until the top of the rod is approximately 6 inches below the top of the ground. Connect a No. 6 solid copper conductor to the rod and to the fence by a UL-listed method so that each element of the fence is grounded.

END OF SECTION

SECTION 32 31 19 DECORATIVE METAL FENCES AND GATES

PART 1 - GENERAL

1.1 SCOPE

- A. Contractor shall provide ornamental steel picket fencing, gates, channels, rails, posts, caps, pickets and accessories (fence system) per the Drawings. Unit price also includes the concrete footings and documents signed and sealed by a State of Florida registered Professional Engineer confirming that the prefabricated fence system complies with wind load requirements and other Florida Building Code requirements.
- B. Prior to commencing the work, Contractor shall be responsible for applying for and obtaining all necessary permits from all authorities having jurisdiction.

1.2 RELATED DOCUMENTS

- A. Refer to Drawings for layout and components.
- B. Refer to Division 1 section for additional references and definitions.
- C. Refer to other Divisions such as 3 and 31 of the Project Manual.

1.3 ADDITIONAL REFERENCES

- A. Florida Building Code (FBC) as detailed in Division 1
- B. ASTM A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- C. ASTM A653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- D. ASTM F2408, Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Installers shall be properly trained, qualified and experienced with the Florida Building Code, approved by the manufacturer for installation and in accordance with the references portion of Division 1.

1.5 SUBMITTALS

- A. Prior to issuance of a purchase order or Notice to Proceed, provide the following to the County Project Manager:
 - 1. Written documentation, signed and sealed by a State of Florida registered Professional Engineer, confirming that the prefabricated steel fencing system complies with wind load requirements and other FBC requirements.
 - 2. Installer's qualifications.
 - 3. Manufacturer's catalog cuts, documentation, plans, elevations, section, details, attachments, and materials compliance.
 - 4. Manufacturer's standard colors for County's selection.

1.6 WARRANTY

- A. Provide a minimum 10-year warranty from the date of time of substantial completion that the fence system will be free from defects in material and quality including cracking, peeling, blistering, and corroding.
- B. Warranty cannot be voided or reduced if the fence system is installed near saltwater.

1.7 PRE-INSTALLATION MEETING

- A. A pre-installation meeting may be held to review site preparation and access, coordination, scheduling, site limitations, existing landscaping, utility coordination and other details.
- B. Contractor or County Project Manager shall arrange a date and time and notify all required attendees.
- C. Attendees should include:
 - 1. Contractor
 - 2. Installer
 - 3. County Project Manager
 - 4. Park Manager, Parks Naturalist or designee
 - 5. County Inspector

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Fence system shall be prefabricated by a single manufacturer.
- B. Fence system shall be the Aegis II (Majestic style) by Ameristar Perimeter Security USA Inc. or approved equal.

2.2 PRODUCTS

- A. Pickets:
 - 1. Square/tubular steel
 - 2. Minimum 3/4 inch, minimum 16 gauge
 - 3. Minimum 45,000 psi yield strength
 - 4. Maximum spacing of 4 inches on center (o/c)
 - 5. Hot-dip galvanized finish and G90 zinc coating
- B. Posts:
 - 1. Square/tubular steel
 - 2. Minimum 2-1/2 inches, minimum 14 gauge
 - 3. Minimum 45,000 psi yield strength
 - 4. Hot-dip galvanized finish and G90 zinc coating
 - 5. Post cap style to be chosen by County from manufacturer's standard choices
- C. Rails:
 - 1. 1-3/8 to 1-1/2 inch, minimum 14 gauge
 - 2. U-channel
 - 3. Minimum 45,000 psi yield strength
 - 4. Hot-dip galvanized finish and G90 zinc coating
- D. Fence System Finish:
 - 1. Minimum 2 mils thick base coat followed by a minimum 2 mils thick TGIC polyester powder coat finish
 - 2. Color to be chosen by County based on manufacturer's standard colors
- E. Hardware:
 - 1. All hardware, including brackets, shall be corrosion-resistant with a galvanized coating.
 - 2. All exposed components to receive a finish to match the fence system.
- F. Setting materials:
 - 1. Provide in accordance with Drawings.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

- A. Inspect all components upon delivery and prior to assembly to ensure that no components are damaged and that all components are received.
- B. Store materials in accordance with manufacturer's recommendations and Division 1 requirements.

3.2 EXAMINATION

- A. Notify the County Project Manager concerning any surface or subsurface feature, such as a utility, encountered during excavation or site clearing. Proceed only after unsatisfactory conditions have been corrected.
- B. Contractor shall verify areas to receive fencing are completed to final grades and elevations.
- C. Contractor shall ensure property lines and legal boundaries of work are clearly established.

3.3 INSTALLATION

- A. All installations shall be laid out by the Contractor and Installer in accordance with the survey and approved drawings.
- B. Install in compliance with manufacturer's written instructions and recommendations.
- C. Any modification to the prefabricated fence system is strictly prohibited without written instructions from the manufacturer.
- D. Any variations from the drawings and survey must be approved, in writing, by the Consultant or County Project Manager.
- E. Install components in sequence as recommended by manufacturer.
- F. Space posts uniformly to accommodate proper installation of the fence sections.
- G. When setting posts in concrete, drill hole in firm, undisturbed, or compacted soil. Holes shall have diameter four times greater than nominal outside dimension of post, and depths approximately 6 inches deeper than the post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36 inches (or per Drawing) below surface within firm, undisturbed soil. Place concrete around post in a continuous pour. Trowel finish around posts and slope to direct water away from posts. Set keepers, stops, sleeves and other accessories into concrete.
- H. Check each post for vertical and top alignment and maintain in position during placement and finishing operations.
- I. Align fence panels between posts. Firmly attach rail brackets to posts with hardware, ensuring panels and posts remain plumb.
- J. Surface mount (wall mount) posts with mounting plates where indicated. Fasten with hot-dip galvanized lag bolts and shields.
- K. Install gates plumb, level and secure for full opening without interference. Attach hardware by means which will prevent unauthorized removal.
- L. Adjust hardware for smooth operation.
- M. Install all post caps and other accessories to complete the fence system as intended.
- N. Clean fence system so it is free from latent dirt, dust, debris and splattering of concrete, stucco and paint.

END OF SECTION

SECTION 32 84 23 UNDERGROUND SPRINKLERS

PART 1 - GENERAL

1.1 SUMMARY OF WORK

- A. The work included in this Section consists of furnishing all labor, equipment and materials and in performing all operations necessary for the construction or installation of all piping, valves, valve boxes, spray heads, controllers ~~and~~, appurtenances, **and irrigation pump stations** for the irrigation system, complete and ready for operation as specified herein.
- B. All high voltage electrical work shall be provided by Contractor or its electrical subcontractor. All low voltage wiring for the control and operation of the system shall be provided and installed by the Contractor or its irrigation subcontractor.
- C. All landscaped areas to receive 100% coverage with 50% overlap.
- D. Scope shall include capping and removal of existing branch irrigation pipes located under the proposed building, walkways, pavement, etc. Re-locate main lines and valves so they are not under the proposed Project site.
- E. After the proposed developments are constructed, install new valves, new branch lines, and new irrigation heads so all landscape areas receive 100% coverage with 50% overlap. Locate, space and aim irrigation heads so there is no overspray on buildings, walks, or pavement areas.
- F. Repair any existing irrigation lines damaged during the construction

1.2 QUALITY ASSURANCE

- A. Design Requirements: Cover on pipe shall be 24 inches, for main lines, and 12 inches for lateral lines, except as otherwise indicated on the Drawings.
- B. Pipe Inspection: The Contractor shall obtain from the pipe manufacturer a certificate of inspection to the effect that the pipe and fittings supplied for this Contract have been inspected at the plant and that they meet the requirements of these specifications. All pipe and fittings shall be subjected to visual inspection at time of delivery, also just before they are lowered into the trench to be laid, and joints or fittings that do not conform to these specifications will be rejected and must be removed immediately by the Contractor. The entire product of any plant may be rejected when, in the opinion of the County or Consultant, the methods of manufacture fail to secure uniform results, or where the materials used are such as to produce inferior pipe or fittings.
- C. Responsibility for assuring Quality Work: All work and materials shall meet or exceed the specifications and standards of the latest edition of the Florida Irrigation Society (FIS) "Minimum Standards and Specifications Manual".
- D. The Contractor's Irrigation Superintendent shall be well versed in FIS standard plumbing procedures, PVC assembly procedures, blueprint reading and coordination with other performing contracts on this project.
- E. All irrigation installers shall be experienced as defined in the reference standards section.
- F. The Contractor shall be responsible for maintaining the quality of the material on the job throughout the duration of its responsibility.
- G. Changes or substitutions of equipment, material or sizes shall commence only when written approval has been obtained from the Consultant or County Project Manager. The burden of proof of products to be considered as equal is completely the responsibility of the Contractor. No items or parts discontinued from manufacturing shall be accepted.
- H. **The pumping system shall be either a low-pressure clock system or pressure demand start system. The irrigation pumping system shall be a fabricated skid mounted unit with all equipment, controls, valves and attached hardware as part**

of the skid assembly. All of the pumps, electrical motors, control equipment and other related equipment included under pumps, motors, and all controls, shall be furnished by a single pump system fabricator.

1.3 SUBMITTALS

- A. Shop Drawings: The following shop or data drawings shall be submitted for approval:
1. Test certificate of PVC pipe.
 2. All irrigation equipment.
 3. All valve and valve boxes.
 4. Electrical supply information: wiring schematic, breaker sizes, locations, etc.
 5. New irrigation pump station with control panel, motors, valves, gauges, pipes, manifolds, suction and discharge lines, controllers, electrical wires, dimensions and other appurtenances.
 6. Concrete pad for the new irrigation pump station, if applicable.
- B. U.L. certifications and literature regarding the irrigation pump, if applicable.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Manufacturer of Irrigation Supplies and Components: Subject to compliance with requirements, provide products from the following:
1. Rain Bird Corporation (Rain Bird)
 2. The Toro Company (TORO)
 3. LASCO Fittings, Inc. (LASCO)
 4. Hunter Industries (Hunter)
 5. NIBCO
 6. Val-matic Valve & Manufacturing Corporation (Val-matic)
 7. Weathermatic
 8. LEEMCO, Inc.
 9. Irritrol
 10. WeatherTrak by HydroPoint
 11. Victaulic
 12. Data Industrial Corp.
 13. Or Approved Equal
- B. Pipe:
1. Polyvinyl chloride (PVC) lateral pipe 3 inches and smaller in diameter shall conform to the requirements of ASTM Designation D 2241, Class 1120 or 1220 for a minimum pressure rating of 160 psi at 73.4 degrees Fahrenheit (°) for unthreaded pipe. Schedule 80 pipe shall be provided for threaded connections.
 2. Main Line (PVC) pipe shall conform to the requirements of ASTM Designation D 241, D 1784, Class 1120 or 1220 for a minimum pressure rating of 200 psi at 73.4° for unthreaded pipe. Rubber rings shall conform to ASTM D-1869 and F-477. Schedule 80 pipe shall be provided for threaded connections.
- C. Fittings:
1. Fittings for lateral line PVC pipe 3 inches and smaller on city water and pump station supplied irrigation systems and main line 4 inches and smaller on city water meter supplied irrigation systems shall be Schedule 40 PVC with solvent weld joints and conform to the requirements of ASTM Designation D 2465 and D 2468 respectively, as manufactured by Dura Plastic Products, Inc. or equal.
 2. Main Line fittings on irrigation systems supplied by a pump station shall be epoxy-coated steel manufactured by the Pierce Corporation or equal.

D. Joints:

1. Solvent weld joints shall be solvent in accordance with the recommendations of the pipe manufacturer using the solvent welding compound, cleaner and primer furnished with the pipe.
2. Main Line PVC pipe that is not solvent welded shall have provisions for expansion and contraction provide in the joints. All joints shall be designed for push-on makeup connection. A push-on joint may be a coupling manufactured as an integral part of the pipe barrel consisting of a thickened section with an expanded bell with a groove to retain a rubber sealing ring of uniform cross section similar and equal to Johns-Manville Ring Tite or Davis Meter Dav-Tite, ~~and~~ **or** may be made with a separate twin gasketed coupling similar and equal to Certainteed Fluid-Tite.

E. Sleeving and Conduit: Sleeving and conduit (conduit as required) PVC Schedule 40 with UL label on conduit.

F. Galvanized Steel Pipe: Galvanized steel pipe for pipe casings shall be Schedule 40 and conform to the requirements of ASTM Designation A 120.

1. Electrical Remote Control: RainBird or approved equal.
2. Valve boxes for remote control valves shall be manufactured by Carson Industries, or equal, rectangular plastic boxes as detailed.

G. Gate Valves & Isolation Valves:

1. Gate valves 3 inches and smaller used for manually operated sprinkler heads and in conjunction with electric solenoid valves shall be non-rising stem solid wedge disc full opening bronze gate valves with threaded ends, 200 psi working pressure.
2. Isolation valves shall be iron body resilient seat gate valves with modified wedge disc non-rising stem (NRS) type with slip-on joint ends, 200 psi working pressure. Install with thrust blocks.

H. Control Cable and Electrical Wire and Connections:

1. Control Cable: all electrical control and ground wire shall be irrigation control cable. All wiring to be used for connection of the automatic remote control valve to the automatic controllers shall be Type "UF", 600-volt, 12 gauge, solid copper, single conductor wire with PVC insulation and bear UL approval for direct underground burial feeder cable.
2. Insulation shall be 4/64-inch thick minimum covering of an approved thermoplastic compound for positive waterproof protection of sizes AWG size 18 through and including AWG size 10. AWG size 8 through AWG size 00 shall be insulated with 5/64-inch of the approved thermoplastic compound. Insulation shall be color coded for ease of identification. Install a minimum of eight different colors. Verification of wire types and installation procedures shall be checked to conform to local codes.

I. Electrical Wire Connections: Wire connections to remote control electric valves and splices of wire in the field shall be made using wire connectors and sealing cement. Wires in the controller cabinet shall be permanently labeled with the station number.

J. Irrigation Heads and Risers: shall match existing unless otherwise specified.

K. Sprinkler Heads: Manufacturer's standard unit designed to provide uniform coverage over entire area of spray shown on drawings at available water pressure, as follows:

1. Flush Surface: Fixed pattern, with screw-type flow adjustment.
2. Bubbler: Fixed pattern, with screw-type flow adjustment.
3. Shrubbery: Fixed pattern, with screw-type flow adjustment.
4. Pop-up Spray: Fixed pattern, with screw-type flow adjustment and stainless steel retraction spring.
5. Pop-up Rotary Spray: Gear drive, full circle and adjustable part circle type.
6. Pop-up Rotary Impact: Impact drive, full circle and part circle as indicated.
7. Above Ground Rotary Impact: Impact drive, full circle and part circle as indicated.

- L. Irrigation Controller: If the existing controller is to remain, Contractor shall tie all new valves to existing controller. At each site, verify the controller location with the County.
- M. Pump: If the existing pump is to remain, Contractor shall tie all new valves to main lines. At each site, verify the pump and main line location with the County.
- N. **Irrigation Pump Station: The following shall be included and installed with the irrigation pump station:**
1. **Pump station skid or structural support: Shall be welded steel then hot-dipped galvanized or welded aluminum which will support all station components. This support, complete with pump, shall be delivered to the site complete and tested and then bolted by the fabricator to a concrete slab (by others) with four stainless steel, minimum 3/8-inch diameter bolts and stainless steel anchors. The following items shall be an integral part of the base:**
 - a. **Sub-Frame: A structural galvanized steel or aluminum base suitable for supporting all parts of the pumping complex.**
 - b. **Mounting Pedestals: A raised portion of the base with provisions for mounting and securing pumps and the control panel. Pumps shall be mounted on a galvanized steel or aluminum plate and shall operate without undue vibration.**
 2. **Pump enclosure: Hinged to the pump station skid shall be a single, one piece, fiberglass enclosure covering all station components including the irrigation controller, the electrical control panel, the pump and the motor.**
 3. **Butterfly Isolation Valve: A lug style butterfly isolation valve shall be provided for all pumps to allow for pump removal, repair and other maintenance considerations without disrupting the integrity of the overall pump station.**
 4. **Flow Meters: The flow meter by Data Industrial Corp. or approved equal shall communicate effectively with the controller inside the pump station.**
 5. **Check Valve: Included with the pump station is a cast iron with bronze disc swing check valve with grooved or flanged galvanized fittings with gaskets and galvanized bolts and 30 inches, Schedule 40 PVC nipples, all preassembled and tightened. Valve and nipples shall be sized for a maximum velocity of 5 feet per second of the pump system maximum specified flow. This assembly will be installed by the Contractor or its fabricator. The check valve shall be attached to the suction line closest to the pump and shall be accessible by an irrigation box with cover.**
 6. **Suction Line: Install the suction line from the well to the pump at a minimum of 4 degrees slope where the lateral portion of the suction line is at a lower elevation at the well than the pump end. The line will reduce to the pump intake volute size using a galvanized steel eccentric reducing fitting.**
 7. **Discharge Line: Furnish and install a Schedule 40 galvanized steel pipe sized for a maximum of 7.5 feet per second at the pump system maximum specified velocity will enter the ground and leave the station. When the steel line clears the concrete pad, it will end in a bolting flange or Victaulic style coupling where a PVC flange will be attached to the irrigation system. Galvanized fittings may be used in place of welded joints. The line will then increase to the irrigation main line size and continue to the irrigation system.**
 8. **Remote Access: The pump station shall include a user interface that allows for remote access via computer, smart phone, or any web-enabled mobile device. The user interface shall be fully compatible with the irrigation controller.**
 9. **Control Transformer: A control transformer properly sized and fuse protected with a UL Class RK5 dual element fuses on both primary and secondary sides of the control transformer.**
 10. **Rain Sensor: Furnish and install with the pump station a rain sensor that is fully compatible with the controller. The rain sensor shall be a self-emptying tipping bucket rain gauge.**
- O. ~~N~~-Warranties: Contractor shall warrant each component and complete installation for a period of at least one year from substantial completion.
- P. ~~Q~~-Miscellaneous Items: Other items necessary for the complete installation and not specified herein shall conform to the details and notes shown on the Drawings. All minor items implied, usually included, or required for the construction of a complete operating system shall be installed whether shown on the detail drawings or not.

PART 3 - EXECUTION

3.1 PREPARATION

- A. All pipes and fittings, valves, and other material shall be subject to inspection and approval by the Consultant or County Project Manager after delivery and no broken, cracked, misshapen, or otherwise damaged or unsatisfactory material shall be used. During shipping, delivery, and installing pipe, sprinkler equipment, and accessories, they shall be handled in such a manner as to ensure a sound undamaged condition. When a defect is discovered, the injured portion shall not be installed.
- B. At threaded joints between PVC and metal pipes, the metal shall contain the socket end and the PVC side the spigot. A metal spigot shall not, under any circumstances, be screwed into a PVC socket.

3.2 INSTALLATION

- A. Underground Piping:
 - 1. Upon satisfactory excavation of the pipe trench, recesses for the pipe bells, or couplings, shall be excavated by hand digging. When the pipe is laid in the prepared trench, true to line and grade, the pipe barrel shall receive continuous uniform support and no pressure will be exerted on the pipe joints from the trench bottom.
 - 2. For all underground PVC irrigation supply piping where irrigation lines cross pavements, the lines shall be sleeved as shown on the Drawings for a distance of two (2) feet into the medians or parking islands and five (5) feet into the shoulders.
- B. Sleeves and Road Crossings:
 - 1. All pipes used for road crossing shall be Schedule 80 PVC or better. Pipe shall be placed in a PVC sleeve located in a minimum of 30 inches below grade and backfilled with clean sand. No rock is to be in contact with PVC pipe sleeves. Base for asphalt shall be compacted to meet asphalt paving specifications, by others (see detail).
 - 2. Sleeve Supply, placement and backfill is to be by installing sprinkler contractor who is responsible for excavation, location and placement to proper depth.
 - 3. The interior of the pipes shall be thoroughly cleaned of all foreign matter before being gently lowered into the trench and shall be kept clean during laying operations by means of plugs or other approved methods. During suspension of work for any reason at any time, a suitable stopper shall be placed in the end of the pipe last laid to prevent mud or other foreign matter from entering the pipe. Lines shall be laid straight and depth of cover shall be maintained uniform with respect to finish grade, whether grading is completed or proposed in direction or grade will be allowed. Any pipe found defective shall be immediately removed and replaced with sound pipe.
 - 4. The joints of all pipelines shall be made absolutely tight. The particular joint used shall be approved by the Consultant or County Project Manager prior to installation.
 - 5. Solvent weld joints shall be made in strict, complete compliance with the manufacturer's recommendations.
 - 6. After pipe has been laid, inspected, and found satisfactory, sufficient backfill shall be placed along the pipe barrel to hold the pipe securely in place during the conduction of the preliminary hydrostatic test. No backfill shall be placed over the joints until the preliminary test is satisfactorily completed, leaving them exposed to view for the detection of visible leaks.
 - 7. Upon satisfactory completion of the preliminary hydrostatic test, backfilling of the trench shall be completed.
- C. Above ground and Exposed Piping:
 - 1. Above ground and exposed pipe fittings, valves, and accessories shall be installed as shown or indicated on the Drawings.
 - 2. Piping shall be cut accurately to measurements established at the job site and shall be worked into place without springing or forcing, properly clearing all equipment access areas and openings. Changes in sizes shall be made with appropriate reducing fittings. Pipe connections shall be made in accordance with the details shown and

manufacturer's recommendations. Open ends of pipelines shall be properly capped or plugged during installation to keep dirt and other foreign material out of the system. Pipe supports and hangers shall be provided where indicated or as required to insure adequate support of the piping.

3. Flanged joints shall be made up by inserting the gasket between the flanges. The threads of the bolts and the faces of the gaskets shall be coated with a suitable lubricant immediately before installation.

D. Valves:

1. Valves shall be carefully inspected during installation; they shall be opened wide and then tightly closed and the various nuts and bolts shall be tested for tightness. Special care shall be taken to prevent any foreign matter from becoming lodged in the valve seat. Valves shall be set plumb at the locations indicated and in accordance with the details shown on the Drawings.

E. Sprinkler:

1. All sprinkler heads shall be installed as shown on the Drawings. Backfill around the sprinkler shall be free of rocks, roots, or foreign debris. If finished grade has not been established, the line shall be temporarily capped at the head and a stake marker placed. After the grade has been completed, the sprinkler head shall be set. The Contractor shall coordinate their operations with the various phases of the work.

F. Control Lines:

1. All electric control lines shall be installed in the same trench with the pipelines in a neat and orderly fashion. They shall be installed in the main and lateral trenching or in their own trenches, and where necessary, bundled together and taped every five feet.

G. Connections:

1. Any connections to existing piping systems shall be made after consultation and cooperation with authorities of the Owner. Meters shall be obtained from the utility company and paid for by the Contractor.

3.3 FIELD QUALITY CONTROL

A. Flushing:

1. All lines shall be flushed prior to any installation of automatic sprinkler valves or sprinkler heads to remove all sand and other foreign matter with the velocity of the flushing water not less than four (4) feet per second. Flushing shall be terminated at the direction of the Consultant or County Project Manager.
2. The Contractor shall dispose of the flushing water without causing a nuisance or property damage.
3. All lines shall be flushed just before testing.

B. Pressure and Leakage Testing:

1. All pumps, gauges, and measuring devices shall be furnished, installed, and operated by the Contractor and all such equipment and devices and their installation shall be approved by the Consultant or County Project Manager.

C. Pressure Tests for Lines:

1. Pressure piping installed under this Contract shall be subjected to a pressure test after the pipe has been installed and partially backfilled for underground installations. Each pressure test shall be maintained for at least one hour at 100 psi during which time all joints shall be examined for leaks.
2. Before application of test pressure, all air shall be expelled from the pipe. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks or fittings and valves at such points so the air can be expelled as the pipe system is slowly filled with water. After expulsion of air, the corporation cocks, or other blow off devices shall be closed and the test pressure applied.
3. All exposed pipe, fittings, valves, and joints shall be carefully examined for leaks. All cracked, broken, or defective pipe, fittings or valves discovered as a consequence of this pressure test shall be removed and replaced with sound

material. All leaking, or defective joints shall be repaired, replaced, or corrected. After all necessary replacements and corrections, the test shall be repeated until satisfactory to the Consultant and County Project Manager.

D. Leakage Testing for Pressure Piping:

1. After completion of satisfactory pressure tests of piping, the lines shall be subjected to leakage tests.
2. The duration of each leakage test shall be at least two hours and the pressures maintained during each leakage test shall be as specified above for the pressure tests.
3. Leakage is defined as the quantity of water that must be supplied into the newly laid pipe or any valve section thereof to maintain the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. The allowable limits for leakage of underground piping shall be determined by the following formula.

E. Allowable Limits for Leakage of Pressure Piping:

1. The hydrostatic pressure tests shall be performed as herein above specified and no installation, or section thereof, will be acceptable until the leakage is less than the number of gallons per hour as determined by the formula:

$$L = \frac{SD}{133,200} (P)^{1/2}$$

in which,

L = Allowable leakage, in gallons per hour

S = Length of pipe being tested in feet

D = Nominal pipe diameter; in inches

P = Average test pressure during the test, in psi gauge

2. Water shall be supplied to the line during the test period as required to maintain the test pressure as specified. The quantity used, which shall be compared to the above allowable quantity, shall be measured by pumping from the calibrated container.
3. Where leakage exceeds the allowable limit, as specified herein before, the defective pipe or joints shall be located and repaired. If the defective portions cannot be located, the Contractor shall remove and reconstruct as much of the work as is necessary in order to conform to the specified limits. No additional payment will be made for the correction of defective work, or to damage to other parts of the work resulting from such corrective work.

F. Balancing and Adjustment: ~~The Contractor shall~~ Balance and adjust the various components of the sprinkler system so the overall operation of the system is most efficient. This includes a synchronization of the controllers, part circle sprinkler heads, and individual station adjustments on the controllers.

G. **Pump Station Start-up and Testing: The factory authorized technician shall perform the start-up and calibration of all equipment. The complete pumping station shall operate without appreciable vibration throughout the range of operating conditions. The unit shall be given a running test of normal start and stop conditions under load. During such test, the pump shall demonstrate its general fitness for service and compatibility with all appurtenances.**

H. **Pump Station Training and Operation Manuals required prior to Final Completion:**

1. **Contractor shall provide to County both a complete and bound hardcopy and CD, DVD or flash drive of Installation and Operating Manuals including pump performance curves, electrical and structural drawings, individual component manuals and maintenance and troubleshooting information for the pump station. These manuals are included in the unit prices of the pump stations.**
2. **Contractor shall provide four pump enclosure key locks and four keys for locking the automatic controller door.**

I. ~~G.~~-Training of Maintenance Personnel in Operation and Maintenance of **Irrigation System and Pump Station: As a condition of attaining Final Completion,** Contractor shall provide **a factory authorized technician** for training ~~County~~

maintenance personnel in the operation ~~and~~, maintenance, **programming and adjustments** of the **pump station and/or irrigation** system. The **pre-scheduled** training ~~program~~ shall be conducted for a period of not less than ~~four hours~~ **one hour**. **This training is included in the unit price of the applicable line item(s).**

1. Responsibility prior to final acceptance: The Contractor shall be responsible for maintaining the system until final acceptance. The responsibilities include, but are not limited to, the following:
 - a. Repair of all damage to installed material and equipment.
 - b. Adjustment of all sprinkler heads with regard to height, arc coverage and radius.
 - c. Cleaning, repair and adjustment of all valves and other controls.
2. After testing, completion and adjustment of the system, the Contractor will instruct the County's maintenance personnel in the operations and maintenance of the system.

J. ~~H.~~ As-Built Drawings:

1. Prints of the plans prepared by the Consultant will be supplied to the Contractor for recording "As-Built" information. In addition, the Contractor shall have a set of prints of the shop drawings for recording "As-Built" information. ~~These prints shall be kept at the job site at all times.~~
2. Immediately upon installation of any work deviated from what is shown on the plans, ~~the sub-contractor~~ **Contractor or its irrigation subcontractor** shall clearly indicate such changes in red pencil on the prints. Such changes shall include, but not be limited to, changes in ~~(1)~~ material, ~~(2)~~ sizes of material, ~~(3)~~ location, and ~~(4)~~ quantities. Dimensions shall be used where required such as, but not limited to, underground utilities.
3. Upon completion of the work, the completed set of "As-Built" shall be provided as detailed in Division 1 ~~sections~~ **of the Project Manual**.

END OF SECTION

SECTION 32 90 00 PLANTING

I. GENERAL

A. SUMMARY

1. The work included in this section consists of furnishing all labor, supplies, equipment and materials necessary to complete the installation of all new landscaping including the installation of sod and seeding as shown, as well as all other related responsibilities as described in these specifications and drawings.
2. All plant materials included shall be of the specific size and quality indicated on the drawings and in these specifications and shall be installed in strict accordance with sound nursery practices and shall include maintenance and watering for all work outlined on the drawings and specifications until final acceptance.
3. Quantities and Locations: The County reserves the right to adjust the number and locations of the designated types and species to be used at any of the locations to provide for any modifications which might become necessary. Changes in quantity will reflect on the purchase order.
4. Sodding requirements are included in a separate section.

B. QUALITY ASSURANCE

1. Contractor's Installer shall be well versed in Florida plant material, planting practices, understanding landscaping drawings, and in field coordination with other trades on the project.
2. Contractor's Installer shall provide competent employees who are skilled in this field work and properly overseen as they execute their work. Contractor shall assume responsibility for the quality of the plant material and quality of work. Installer should be supervised by a Florida registered Landscape Architect or Certified Arborist.
3. Correct Grade of Plants: In the event that it becomes apparent that any supplier supplying plants for this work has knowingly and consistently represented the grade of plants as being higher than their actual grades as determined under these provisions, all plants already delivered from such sources shall be removed from the job at the Contractor's expense, and no further plants will be accepted from such nursery until written evidence is submitted and confirmed that all material for delivery has been inspected and approved by inspectors of the State Plant Board as being of the grade as represented.
4. Authority for Nomenclature, Species, Etc.: All plant material shall conform to the names given in Hortus Third, latest edition. Names of varieties not included therein conform generally with names accepted in the nursery trade.
5. Grade Standards: All plant materials shall be nursery grown except where specified as collected material, and shall comply with all required inspections, grading standards and plant regulations as set forth by the Florida Department of Agriculture's "Grades and Standards for Nursery Plants" or with any superseding specifications that may be called for on the drawings or in the specifications. All plants not listed in the grades and standards for nursery plants shall conform to a Florida No. 1 as to: Health and Vitality, (2) Condition of Foliage, (3) Root System, (4) Freedom from Pest or Mechanical Damage, (5) Heavily Branched and Densely Foliated according to the accepted normal shape of the species, or sport, (6) Form and branching habit.
6. Balled and Burlapped (B&B) and Wire Balled and Burlapped (WB&B) Plants: These plants shall be properly protected until they are planted. The plant shall be handled only by the earth ball and not be the plant itself. Any B&B or WB&B plant which shows evidence of having been handled by a method other than the method outlined above, and resulting in a cracked or broken ball or of the roots being loosened within the ball shall be rejected. For plants grown in soil of loose texture, which does not readily adhere to the root system, (especially in the case of large plant material), WB&B plants may be specified. For WB&B plants, before plant is removed from the hole, sound hog wire shall be placed around the burlapped ball and looped and tensioned until the burlapped ball is substantially packaged by the tightened wire netting to prevent disturbing the loose soil around the roots during handling. Any wire, synthetic material or chemically treated material will be removed from the rootball at planting time, and all ties shall be removed from the rootball and around the trunk at planting.
7. Any Container Grown (CG) plants, which have become "pot bound" or for which the top system is out of proportion (larger) to the size of the container, will not be acceptable. With metal containers, unless the root-ball system slips easily and unbroken from the can, a nursery can- cutter shall be used to slit the can in such

a way that the can may be opened fully. CG plants shall not be removed from the can until immediately before planting, and with all due care to prevent damage to the root system.

8. Prior to issuance of NTP, submit to the County the names and locations of nurseries proposed as sources of acceptable plant material. The County reserves the right to visit the Supplier/Grower to inspect and/or select the specified material.
9. The County may be included in the hand selecting of any trees proposed for work under this contract.

C. DELIVERY, STORAGE AND HANDLING

1. Movement of nursery stock shall comply with all Federal, State, and local laws and regulations. Therefore, required inspection certificates shall accompany each shipment, and shall be submitted to the County. Wrap root balls with burlap. Wire wrap burlap if root ball is not sufficiently compacted. Palms will not require burlap wrapping if the following requirements are met:
 - a. Dug from marl or heavy soil that adheres to roots and retains shape without shattering.
 - b. Moistened material used to cover ball and roots not exposed to wind and sun.
 - c. Transport material on vehicles large enough to allow plants not to be crowded. Plants shall be covered to prevent wind damage and sun scald during transit and shall be kept moist, fresh and protected at all times. Such protection shall encompass the entire period which the plants are in transit, being handled, or are in temporary storage.
2. All plant material (other than sod) shall not remain on the job site longer than two calendar days prior to being installed.

D. SUBSTITUTIONS

1. Substitutions of plant types or change in the size of plant material will only be permitted upon submission of documented proof that the particular plant type and size specified is not obtainable. The Contractor must submit substitutions that meet project requirements for canopy, trunk diameter, species, height, setbacks, etc.
2. Where B&B or WB&B plants are specified, CG plants of the same species, etc., will not be accepted. Where a B&B or WB&B is not specified on a particular plant material, B&B, WB&B or CG plants may be used provided they meet all specifications.

E. GUARANTEE

1. All plant material shall be guaranteed for a minimum of one calendar year from the time of final acceptance, which will normally coincide with the Final Completion Certification at project completion.
2. The guaranteeing of plant material shall be construed to mean the complete and immediate replacement of plant material if:
 - a. It is not in a healthy growing condition; or
 - b. There is a question to its survival ability at the end of the guarantee period; or
 - c. It is dead despite proper and adequate watering and maintenance.
3. Replacement plant material shall be of the same species, quality and grade as that of the plant to be replaced. The size of the replacement shall not necessarily be the same size as the original specified plant at its initial planting but shall closely match specimens of the same species. Replacements shall be guaranteed for a period equal to the originally specified guarantee.
4. This guarantee period shall begin at time of plant replacement.
5. The guarantee shall be null and void for plant material which is damaged or dies as a result of acts of nature limited to hail, freeze, lightening, white fly infestation, hurricane force winds, and lethal yellowing, providing the plant was in a healthy growing condition prior to these acts of nature.

II. MATERIALS

A. PLANT MATERIAL

1. Florida No. 1: Except where another grade is specifically called for in the Drawings, all plant material shall

- be no less than Florida No. 1 at the time of final inspection immediately prior to the acceptance by the COUNTY.
2. Habit of Growth: All plant material shall have a habit of growth that is normal for that species and shall be sound, healthy, vigorous and free from insects, plant diseases, injuries, and dead limbs.
 3. Branching, Leafing, Measurements and Ball Sizes:
 - a. Trees and Shrubs: Requirements for the measurement, branching character, ball diameter, depth and other standards shall follow the Code of Standards recommended by the American Association of Nursery Stock, Bulletin Z-60.1 as revised.
 - b. Palms: Requirements for the measurement of clear trunk, clear wood and graywood ball diameter and depth shall comply with requirements as set forth by the Florida Department of Agriculture's "Grades and Standards for Nursery Plants, Part II for Palms and Trees".
 4. Die-Back and Leaf-Drop: Plant material showing signs of die-back or leaf-drop will not be accepted and must be removed from the job site immediately if so directed by the County. Therefore, any plant material with tendencies toward leaf-drop or die-back must be root pruned early enough to provide a sound network of hair roots prior to relocation to the job site.
 5. Mechanical Destruction of Foliage: Mechanical destruction of foliage resulting from root pruning shall not effect more than 10% of the total foliage prior to planting on the job site. Loss of foliage caused by seasonal change will be accepted.
 6. Spanish Moss: If Spanish Moss (*Tillandsia usneoides*) exists on plant material, it shall be completely removed prior to planting on the job site.
 7. Palms: See above for requirements related to wrapping of root balls:
 - a. Remove a minimum of fronds from the crown of the palms to facilitate transporting and handling.
 - b. Palms with burn marks, nail holes, and frond boots on trunk shall not be accepted.
 - c. Using untreated burlap strip or untreated cotton twine, tie Sabal Palmetto buds and leave in place until Palmetto is established. Tying shall be as set forth in Florida Department of Agriculture's "Grades and Standards for Nursery Plants". Tying of other palms shall be at the option of the Contractor.
 - d. To reduce head volume, palm fronds may be taper trimmed by not more than one-third (1/3).
 - e. Palm trees showing cable or chain marks and equipment scars shall be rejected by County.
 8. Chlorosis: The allowable level of Chlorosis in foliage shall be as set forth in the Florida Department of Agriculture's "Grades and Standards for Nursery Plants".

B. PLANTING SOILS

1. General Type: All plant material with the exception of Sabal Palmetto shall be planted with planting soil mixed with 50% original soil, if the soil is of good quality, as determined by the County. The planting soils shall be sandy loam (50% sand, and 50% muck) typical of the locality. The soil must be taken from ground that has never been stripped, with a slight acid reaction (5.5 to 6.5 ph) and without an excess of calcium or carbonate.
2. Soil shall be delivered in a loose friable condition.
3. Special Type: Planting soil for palms shall be a good grade of salt free sand, which is free of all weeds.

C. WATER

1. Water shall be potable, from municipal water supplies or other sources which are approved by the local public health department.

D. MULCH

1. Mulch shall be Eucalyptus mulch or other approved non-native tree bark mulch; Cypress mulch will not be accepted. It must be uniformly shredded and be free from large pieces of bark, foreign matter, weed seeds and any other organic or inorganic material. Submit sample to County for approval.
2. Contractor shall apply one application at initial installation and a second application prior to final acceptance.

E. FERTILIZER

1. New Plant Material: Trees, palms and shrubs, fertilize with Agriform (or equal) planting tablets, 20-20-5 formula, 21 grams.
2. New Ground Covers: Fertilize with an approved fertilizer of fifty percent (50%) or greater organic 6- 6-6 or 8-8-8 with minor elements including, but not limited to, iron zinc and manganese.
3. Composition of Quality: All fertilizer shall be uniform in composition and dry. Granular fertilizer shall be free flowing and delivered in manufacturer's standard container with name of material, weight and guaranteed analysis printed on container. Tabletized fertilizer shall be delivered in unopened and labelled containers or boxes. All bags, containers or boxes shall be fully labeled with the manufacturer's analysis. Submit labels to County for approval prior to placement of fertilizer.
4. Mixing and application shall comply with the State of Florida and federal fertilizer regulations.

F. INTEGRATED PEST MANAGEMENT (IPM)

1. The Environmental Protection Agency's definition of IPM is "an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment. IPM takes advantage of all appropriate pest management options including, but not limited to, the judicious use of pesticides. IPM is not a single pest control method but, rather, a series of pest management evaluations, decisions and controls."
2. This Contract shall incorporate the IPM approach to pest management. Pest control shall be implemented on an as-needed basis, only as part of an IPM. The Contractor shall inspect all areas of the landscape at least once per month for early detection. The Contractor shall accurately identify any pest and shall determine if treatment is necessary.
3. Spraying of pesticides can only be performed during daylight hours. Payment of these areas shall be made per treated area.
4. Restricted-use pesticides shall not be used under this Contract.
5. Application of Herbicides and Insecticides: The Contractor and its IPM Applicator shall inspect all landscaped areas at each site visit for indications of pest problems and advise the County of such problems. The Contractor and its IPM Applicator shall identify the product to be used to correct the deficiency and when the product will be applied.
6. The IPM Applicator shall apply pesticides to the grass, groundcover, shrubbery and trees to control any pest which includes weeds, chinch bugs, army worms, sod web worms, mole crickets, ant hills, and other pests. Any negligence shall result in the Contractor paying for replacement of landscape material.
7. It is essential that all safety requirements in dispersing insecticides be carefully followed. Contractor should obtain copies of instructional material on pesticide application.
8. Insecticide application must be performed by a properly licensed IPM Applicator whom is thoroughly familiar with its contents for personal and public safety. Refer to the State of Florida Dept. of Agriculture and Consumer Services for information regarding application.
9. Provide County Project Manager or Consultant with a copy of the Applicator's State license.
10. When applying any pesticide or insecticide, the Contractor shall post alerts of pesticide application (spray application warning flags to be used to designate said areas in clear sight).

G. PRUNING PAINT

1. Pruning Paint shall be commercial tree paint, which is waterproof, antiseptic, adhesive, elastic and free of kerosene, water, cresol and any other substances harmful to plant material.

H. VEGETATIVE ROOT INHIBITOR

1. A vegetative root inhibitor shall consist of a polypropylene fabric with root control time release modules of Trifluralin or approved equal with a recommended effective life of 100 years.
2. Vegetative root inhibitor shall be Bio-Barrier as manufactured by Reemay, Inc. or approved equal.

3. Furnish as instructed in the drawings and these specifications.

III. EXECUTION

A. INSPECTION

1. The location and existence of utilities (overhead and underground) shall be thoroughly investigated and verified by the Contractor before the work begins in the area of said utilities.
2. The Contractor shall exercise care in digging and work so as not to damage existing utilities in said areas, such as underground pipes, cables, wires, etc. Should such overhead or underground obstructions be encountered which interfere with planting, the County shall be consulted immediately in order for a decision on the relocations of plant material to clear such obstruction.
3. The Contractor shall be responsible for the immediate repair of any damage to utilities caused by landscaping work.

B. PREPARATION

1. Prior to planting, mark all planting beds and locations of new trees, shrubs and site furnishings as shown in the drawings with a bright orange colored spray paint. Obtain County's approval to proceed with the installation.
2. Contact Sunshine State One Call for location services.
3. Shrub beds located next to another bed, walkway, structure, etc., shall have the plants along the perimeter spaced so that the plants can mature properly without growing into the other bed, walkway, structure, etc.
4. Excavation of plant holes shall be roughly cylindrical in shape with the sides approximately vertical. The County reserves the right to adjust the size and shape of the plant hole and the location of the plant in the hole to compensate for unanticipated structures or unanticipated factors. All plant holes shall be sufficiently deep to allow the rootball to set on existing soil and have root collar at grade level. Plants shall be centered in the holes with the tree trunk locations scaled from existing permanent structures as shown on the drawings. Plants shall be set straight or plumb in locations. All plant holes to accommodate plants with ball sizes less than 24 in diameter shall be at least 18 in. greater than the diameter of the ball. All plant holes to accommodate plants with ball sizes 2 feet and larger in diameter shall be at least twice the diameter of the ball. The excavated material from the plant holes may not be used to back-fill around the plant material. Such material shall be disposed of either on the project site or off the site as directed by the County. Plant holes for shrub material planted in mass shall meet all requirements listed above for plant holes. However, they shall not be individual holes but one continuous hole or excavation. Plant holes for hedge material shall also meet all requirements listed above for plant holes, however, a continuous trench shall be used in lieu of individual holes.

C. INSTALLATION

1. Setting of Plants:
 - a. Center the plant within the hole.
 - b. When lowered into the hole, the plant shall rest on the prepared hole bottom such that the roots after settlement are level, or slightly above the level of its previous growth condition and the final level of the ground around the plant shall conform to the surrounding grade. The plants shall be set straight or plumb or normal to the relationship of their growth prior to transplanting. The County reserves the right to realign any plant material after it has been set.
 - c. Palms of the Sabal species may be set deeper than the depth of their original growth condition in order to lessen the necessity for support or bracing. For such deeper planting however, it will be required that the underlying soil be friable and that the clear trunk requirements set forth in the plant list be maintained from the finished grade and not from the previous grade of the palm trees before it was transplanted.
 - d. Plant material of the shrub category and smaller must be handled by the ball only. Plant material too large for hand handling, if moved by winch or crane, must be thoroughly protected from chain, rope or cable marks, girdling, bark slippage, limb breakage and any other damage that might occur by improper handling or negligence.
 - e. All palm trees handled by the trunks must be wrapped with burlap and wood battens, held in place

by banding strips as called for in the details.

2. Backfilling: Use planting soils specified above. Backfill to the bottom two thirds of the planting hole and firmly tamp and settle by watering as backfilling progresses. After having tamped and settled the bottom two-thirds (2/3) of the hole, thoroughly puddle with water and fill remaining one-third (1/3) of the hole with planting soil, tamping and watering to eliminate air pockets.

3. Application of Fertilizer:

- a. Fertilize New Planting (Trees, Palms and Shrubs) as follows:

Specified Container Size	Application Rate
1 gallon container	1 tablet
3 gallon container	2 tablets
5 gallon container	3 tablets
7 gallon container	5 tablets

- b. Large tubs or boxes and B&B material shall receive one (1) tablet for each 1/2 in. of trunk diameter (measured 3 feet above ground). For large shrubs, one tablet for each one foot of height or spread.
4. Within 24 hours after planting, planting areas must be mulched as called for in these specifications. The mulch shall be uniformly applied to a depth of 2 inches over all shrub, tree and groundcover areas and any areas indicated on the drawings.
5. Staking and Guying shall be installed within 24 hours. Staking includes plastic, rubber or other flexible strapping materials to support the plants to stakes or ground anchors that will allow for slight movement. Do not use rope.
6. Initial Watering: Initially, water the plant material to develop uniform coverage and deep water penetration of at least 6 inches. Avoid erosion, puddling, and washing soil away from plant roots.
7. Hand Watering: Provide hand watering of plant material as necessary subject to weather conditions, to maintain healthy growing conditions until final acceptance. This shall be in addition to water received from irrigation system, if any.
8. Pruning:
 - a. The amount of general pruning shall be limited to the minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of roots as a result of transplanting operations. Pruning shall be done in such a manner as not to change the natural habit of shape of a plant, and in accordance with National Arborist Association standards for pruning.
 - b. All broken or damaged roots shall be cut off smoothly. The tops of all trees shall be pruned in a manner complying with standard horticultural practices. All cut surfaces of 1/2 inch or more in diameter above ground level shall be treated with an approved commercial tree paint.
9. Weeding: In the event that weeds or undesirable vegetation becomes prevalent to such an extent that they threaten plant material, they shall be removed as directed by the County. If necessary, the plant material and/or planting soil shall be replaced as needed to eliminate the weeds at the expense of the Contractor.

D. CLEANING AND PROTECTION

1. All debris and other objectionable material created through planting operations and landscape installation shall be removed completely on a daily basis from the job or as directed by the County; see Division 1. Excess soil shall be disposed of as directed by the County.
2. The Contractor shall be responsible for all damage to property whether it is accidental or necessary for the completion of this contract.
3. Contractor is responsible for protection against mechanical damage shall include providing protection from vehicles and providing warning signs and barricades as might be necessary; Contractor shall repair, restore and replace any planting areas which become damaged as a result of any negligence of the Contractor in complying with these requirements. Coordination shall be with the County.
4. Contractor's responsibility prior to Final Acceptance:

- a. Maintenance shall begin immediately after each plant is planted and continue until final acceptance, which shall coincide with the Final Completion Certification.
- b. **Plants shall be watered by hose, soaking thoroughly each day for the first 14 calendar days and every other day for the following 14 calendar days. Soaking then shall continue on a twice weekly basis for another period of three weeks for material over 5 feet in height, amounting to a total of 28 calendar days after installation of planting under five feet and a total of 45 calendar days for plants over 5 feet. All watering is required without regard to an irrigation system.**
- c. Plant maintenance shall include watering, weeding, cultivating, mulching, tightening and repairing of guys, stakes, braces, etc., replacement of sick or dead plants, resetting plants to proper grades or upright position and maintenance of the watering saucer, and all other care needed for proper growth of the plants. Plant material rejected during the course of the construction shall be removed and replaced before the inspection for final completion.
- d. During the maintenance period and up to the issuance of Certificate of Final Completion, the Contractor shall provide all seasonal spraying and/or dusting of all planting. The materials and methods shall be in accordance with the highest standard nursery practices and as recommended and approved by the County prior to implementation.
- e. Planting areas and plants shall be protected against trespassing and damage. If any plants become damaged or injured they shall be treated or replaced, as directed and in compliance with this specification.
- f. No work shall be done within or over planting areas or adjacent to plants without proper safeguards and protection.

END OF SECTION

SECTION 32 92 23 SODDING

I. GENERAL

A. SCOPE

The work included in this section consists of furnishing of sod, topsoil and subsoil, fertilizer and maintenance as shown on the drawings and as indicated in these specifications as well as other Division 1, 31 and 32 sections of the Project Manual.

B. ADDITIONAL DEFINITIONS

1. Pallet: Equal to 450 square feet.
2. Plants: Living plants specified in this Section and as described in ANSI Z60.1- Nursery Stock.
3. Weeds: Includes, but not limited to, Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

C. QUALITY ASSURANCE

1. Sod Supplier /Grower Qualifications
 - A. Contractor's Supplier/Grower shall be regularly engaged in, and specialized in the production and harvesting of the specified materials and certified by the State of Florida Department of Agriculture to do so. Refer to References section for further requirements and experience.
 - B. Contractor's Installer shall be well versed in Florida grass material, planting practices, understanding landscaping drawings, and in field coordination with other trades on the project.
 - C. Contractor's Installer shall provide competent employees who are skilled in this field work and properly overseen as they execute their work. Contractor shall assume responsibility for the quality of the grass material and quality of work. Installer should be supervised by a Florida Certified Landscape Contractor, Florida registered Landscape Architect or Certified Arborist.
2. Source Quality Control
 - A. All plant materials to be certified by the Florida Department of Agriculture to be free of disease and hazardous insects.
 - B. All sod is to be grown in a recognized nursery in accordance with good horticultural practices. Material shall be healthy with vigorous vegetative and root growth, free of weeds, disease, insects, and sun-scald. County may request to visit the source for inspection and approval of material prior to delivery.
 - C. Where applicable, shipment of materials requiring Certificates of Inspection, certification, or validation as to species or quality will be provided by the Contractor through its supplier.
 - D. Discrepancies or questionable quality or species of grass material will be submitted to, and judged by, approved inspectors of the State Plant Board or local County Agricultural Agent. Provide the County with such verification.
 - E. If the quality or species represented by the supplier is higher than the actual quality or species provided, the County reserves the right to request that all grass material provided be removed from the job site and be replaced with acceptable material at the Contractor's expense.
 - F. Standard package product analysis of materials used on the project will be requested by the County. If not available, and if requested by the County, provide a material analysis as prepared by a recognized independent laboratory acceptable to the County.

3. Plant Inspections

If the quality of grass material is in accordance with these specifications, County cannot reject the material. Where quality, vigor, damage, or improper planting techniques are found, the County will identify and reject such material for removal from the job site. Remove unacceptable material from the site immediately and replace with acceptable material at the Contractor's expense.

D. SUBMITTALS

1. Submit to County all copies of certificates of inspection as required by governmental authorities, and manufacturer's or vendors certified analysis for soil amendments and fertilizer materials.
2. Submit to County the sod certification for grass species and location of sod Supplier/Grower.
3. Submit to County instructions recommending procedures to be established and/or followed by the County's maintenance personnel. These instructions are to assist the material in growing into maturity.
4. Submit to County guarantee for grass material.

E. PRODUCT DELIVERY STORAGE AND HANDLING

1. Transporting and Handling
 - a. **Deliver sod in quantities capable of being installed within forty-eight (48) hours of cutting.**
 - b. Notify the County Project Manager or Consultant at least one business day prior to delivery so that Consultant or County staff can be available for inspection of the product.
 - c. Sod shall not be delivered more than 24 hours prior to installation.
 - d. **All rolled sod shall be unrolled within 24 hours of delivery.**
 - e. Deliver sod on pallets. Protect sod against dehydration, contamination and heating during transport and delivery. Sod transported to the Project in open vehicles shall be covered with tarpaulins or other suitable covers securely fastened to the body of the vehicle to prevent injury to the sod material and to protect root system from exposure to wind and sun. Closed vehicles shall be adequately ventilated to prevent overheating of the sod. Evidence of inadequate protection against drying out in transit shall be cause for rejection.
 - f. Deliver packaged materials in containers showing weight, analysis, and name of manufacturer.
 - g. Sod shall be kept moist, fresh, and protected at all times, under shade or covered with moistening burlap. Such protection shall encompass the entire period during which the sod is in transit, being handled, or in temporary storage. Do not pile sod more than 2 feet deep.
 - h. Upon arrival at the job site, sod shall be inspected by Installer and Contractor for proper shipping procedures. Should the roots be dried out, County reserves the right to reject the sod. When sod has been rejected, the Contractor shall remove it immediately from the area of the work and replace it at no cost to the County.
 - i. Avoid stretching, breaking, tearing and dropping the sod.
 - j. Provide County Project Manager or Consultant with a legible invoice for the delivered products including species and variety of sod, location of Sod Supplier/Grower and certificate of inspection.
2. Digging
 - a. Do not dig sod at the nursery or other approved source until ready to transport sod to the Project site or approved storage location.
 - b. Before stripping sod, mow to a uniform height of 2 inches.
 - c. Cut sod to specified thickness and to standard width and length desired.

F. JOB CONDITIONS

1. Protection
 - A. Underground Utilities: Investigate and verify the location and existence of underground utilities and other obstructions in the field. Protect existing utilities and structures from damage.
 - B. Protect all material from mechanical damage, and, if required, provide protective barriers and signage as may be deemed necessary.
2. Scheduling and Installing
 - A. Coordinate sod installation to follow the completion of all landscaping and irrigation work.
 - B. Do not install product when ambient temperatures may drop below 35 degrees Fahrenheit or reach 90 degrees Fahrenheit or higher.
 - C. Do not install when winds are expected to exceed 30 miles per hour.

G. GUARANTEE

1. Sod shall be uniform in color, leaf texture, leaf and root density, and free from weeds, diseases, and other visible imperfections at substantial completion.
2. Guarantee all grass material for a period of 90 calendar days from the date of County's acceptance of the installed product.
3. Replacement of grass material under guarantee means the complete and immediate replacement of the material if:
 - A. It is dead despite proper and adequate watering and maintenance.
 - B. There is a question as to its ability to survive beyond the guarantee period.
 - C. It is not in a healthy growing condition.

II. MATERIALS

A. GRASS MATERIALS

1. Provide sod of firm texture having a compacted growth and good root development. Sod cannot contain any weeds or undesirable native grasses and shall be free from fungus, vermin, insects and diseases.
2. Sod shall be nursery grown on cultivated mineral agricultural soils. Sod shall have been mowed regularly and carefully and otherwise maintained until harvest.
3. Provide sod capable of growth and development when planted (viable, not dormant).
4. Sod shall be free of disease, nematodes, and soil borne insects and pests. State Nursery and Plant Laws require that all sod be inspected and approved for sale. The inspection and approval must be made by the State Department of Agriculture and/or Office of the State Entomologist.
5. Sod shall be one of the following species; refer to Drawings or purchase order for required species.
 - A. St. Augustine used in drought-tolerant and shaded areas
 - B. Certified Tifway 419 Bermuda Grass for athletic fields and heavy trafficked areas
 - C. Argentine Bahia used in full sunlight and wet locations
 - D. Pensacola Bahia used in drought-tolerant and shaded areas

B. TOPSOIL FOR CERTIFIED TIFWAY 419 BERMUDA GRASS ONLY

1. Required composition of the top soil mix is 70% silica sand and 30% organics. Silica sand gradation requirements: 100% passing the #4 sieve and less than 10% passing the #140 sieve. The organic soil cannot contain any stones, weeds, or other debris and must have a high organic content and a sandy

- loam texture.
- 2. Offsite premixing of the sand and organic soil is required.
- 3. Subgrade shall be damp when topsoil is spread.

C. FERTILIZER

- 1. All fertilizer is to comply with State and federal fertilizer regulations.
- 2. Fertilizer shall be uniform in composition and dry. Granular fertilizer to be free-flowing and delivered in unopened containers or boxes.
- 3. Manufacturer's labels and analysis breakdowns must be visible on all fertilizer containers.
- 4. Furnish starter fertilizer upon installation of sod.

III. EXECUTION

A. INSPECTION

- 1. Examine the sub-grade, verify the elevations and observe conditions under which work is to be performed. If unsatisfactory conditions exist, notify the County prior to proceeding with the work.

B. PREPARATION

- 1. Apply County approved herbicide in accordance with manufacturer's directions to remove all weeds, grasses and undesirable vegetation. Certify that herbicide and application technique will not damage plant material prior to application and replace or repair damage to any plants injured by herbicide application at no cost to the County.
- 2. Install a minimum 6 inches thick layer of top soil at all areas to receive grass.
- 3. Finish grade the area to the desired smoothness using box grader. Float as many times as necessary to produce a smooth even surface without hills and valleys acceptable to the County.
- 4. Remove all debris and other extraneous matter.
- 5. Apply 180 pounds of 24-5-11 fertilizer per acre.
- 6. Apply one inch of water to the prepared area before planting. Allow surface moisture to dry.

C. SODDING

- 1. Lay sod to form a solid mass with tight-fitting joints. Butt ends and sides of sod strips. Do not overlap. Stagger strips to offset joints in courses. In soft subgrade soils, hand rake and level prior to laying sod. Tamp or roll to ensure contact with subgrade and to remove or reduce clods and uneven turf surfaces. Fill minor cracks between pieces of sod with sifted soil.
- 2. Begin sodding at the bottom of slopes.
- 3. Do not lay sod inside of tree saucers. Keep and maintain a mulch area of 24 to 36 inches in diameter.
- 4. Where necessary to prevent slippage of newly installed sod, at the Contractor's discretion, peg or pin sod securely using 1 x 1 x 6 inches wood pegs driven flush with top of sod.
- 5. Do not stretch or overlap rows.
- 6. Water sod thoroughly with a fine spray immediately after installation.
- 7. Any pieces of sod which, after placing show an appearance of extreme dryness, shall be removed and replaced by fresh, uninjured pieces.
- 8. The County reserves the right to require top dressing of any sod area not deemed acceptable at no additional cost to the County.
- 9. Immediately after top dressing thoroughly water to a depth sufficient that the underside of the new sod strips and the soil immediately below the sod are thoroughly wet, or a minimum of 6 inches.
- 10. Provide an adequate supply of water to and during transplanting of the sod.
- 11. **Initially, water the sod to develop uniform coverage and deep water penetration of at least 6 inches. Avoid erosion, puddling, and washing soil away from plant roots.**
- 12. **Hand Watering: Provide hand watering of sod to maintain healthy growing conditions until Final Acceptance. This shall be in addition to water received from existing irrigation system, if any. Refer to Drawings for further information.**

D. SUBSTANTIAL COMPLETION

1. **Contractor shall be held responsible for maintenance of sodded area, including watering, weeding, mowing, insect control, and replacement as necessary, to establish a uniform lawn until final acceptance of the project unless otherwise noted.**
2. Sod and seed areas will be accepted as substantially complete when in compliance with the following conditions:
 - a. Roots are thoroughly knit to the soil;
 - b. Absence of visible joints; and
 - c. All areas show a uniform stand of the specified grass in a healthy condition.
3. The work may be accepted in parts when it is deemed to be in the County's best interest to do so, and when permission is given to the Contractor in writing to complete the work in parts.
4. Acceptance and use of such areas by the County shall not waive any other provisions.

END OF SECTION

SECTION 32 93 33 SHRUBS

I. GENERAL

A. SCOPE

1. Provide the following are a list of shrubs, grasses, ferns and groundcover that are included in this contract. Pricing will be based on the container size: 1, 3 and 7 gallons as listed below.
2. Refer to other Divisions 31 and 32 of the Project Manual as well as the pricing sheet for additional instructions.
3. Refer to Division 1, References section, for definition of “provide”.

II. MATERIALS

A. Shrubs Price Group A includes the following:

1. *Blechnum serrulatum* (Swamp Fern), 1 Gallon
2. *Licania michauxii* (Gopher Apple), 1 Gallon
3. *Baccharis halimifolia* (Eastern Baccharis or Saltbush), 3 Gallon
4. *Callicarpa americana* (Beautyberry), 3 Gallon
5. *Cephalanthus occidentalis* (Button Brush), 3 Gallon
6. *Chamaecrista fasciculata* (Partridge Pea), 3 Gallon
7. *Chrysobalanus icaco* (Cocoplum), 3 Gallon
8. *Coccoloba uvifera* (Sea Grape), 3 Gallon
9. *Conocarpus erectus* (Buttonwood, silver or green), 3 Gallon
10. *Cordia globosa* (Bloodberry), 3 Gallon
11. *Flaveria linearis* (Narrowleaf Yellowtop), 3 Gallon
12. *Forestiera segregata* (Florida Privet), 3 Gallon
13. *Muhlenbergia capillaris* (Muhly Grass), 3 Gallon
14. *Myrica cerifera* (Wax Myrtle), 3 Gallon
15. *Nephrolepis exaltata* (Boston Fern), 3 Gallon
16. *Psychotria nervosa* (Wild Coffee), 3 Gallon
17. *Salix caroliniana* (Coastal Plain Willow), 3 Gallon
18. *Sambucus nigra canadensis* (Elderberry), 3 Gallon
19. *Sophora tomentosa* (Necklace Pod), 3 Gallon
20. *Spartina bakeri* (Cordgrass), 3 Gallon
21. *Tripsacum dactyloides* (Fakahatchee Grass), 3 Gallon
22. *Viburnum obavata* (Walters Viburnum), 3 Gallon

B. Shrubs Price Group B includes the following:

1. *Acrostichum danaeifolium* (Leather Fern), 3 Gallon
2. *Brysonima lucida* (Locustberry), 3 Gallon
3. *Chiococca alba* (Snowberry), 3 Gallon
4. *Diospyros virginiana* (Common Persimmon), 3 Gallon
5. *Erythrina herbacea* (Cherokee/Coral Bean), 3 Gallon
6. *Ilex glabra* (Gallberry), 3 Gallon
7. *Ilex vomitoria* (Ilex Schillings), 3 Gallon

8. *Morus rubra* (Red Mulberry), 3 Gallon
9. *Psychtria sulzneri* (Soft Leaf Wild Coffee), 3 Gallon
10. *Suriana maritime* (Bay Cedar), 3 Gallon

C. Shrubs Price Group C includes the following:

1. *Annona glabra* (Pond Apple), 7 Gallon
2. *Celtis laevigata* (Sugarberry), 7 Gallon
3. *Zamia pumila* (Coontie), 3 Gallon

III. NOT USED

END OF SECTION

SECTION 32 93 43 TREES

I. GENERAL

A. SCOPE

1. Provide the following trees. Refer to other Divisions 31 and 32 in the Project Manual as well as the pricing sheet for additional instructions.

II. LANDSCAPING TREES

- A. Pricing will be based on linear foot as listed below.
- B. There is no minimum quantity.
- C. Pricing is for an overall height of 10 to 16 feet and field grown when possible.
- D. Landscaping Trees Price Group A includes the following:
 1. *Chrysophyllum oliviforme* (Satinleaf)
 2. *Coccoloba diversifolia* (Pigeon Plum)
 3. *Conocarpus erectus* (Green buttonwood, standard or bush)
 4. *Conocarpus erectus* var. *sericeus* (Silver Buttonwood, Standard or Bush)
 5. *Taxodium* (Cypress, Bald or Pond)
- E. Landscaping Trees Price Group B includes the following:
 1. *Acer rubrum* (Red Maple)
 2. *Bursera simaruba* (Gumbo Limbo)
 3. *Ilex cassine* (Dahoon Holly)
 4. *Lysiloma latisiliqua* (Wild Tamarind)
 5. *Persea borbonia* (Red Bay)
 6. *Pinus elliotti* var. *Densa* (South Florida Slash Pine)
 7. *Sabal palmetto* (Sabal Palm), 12 feet or taller
 8. *Swietenia mahagoni* (Mahogany)
- F. Landscaping Trees Price Group C includes the following:
 1. *Cocos nucifera* (Coconut Palm)
 2. *Dictyosperma album* (Hurricane Palm)
 3. *Dypsis decaryi* (Triangle Palm)
 4. *Guapira discolor* (Blolly)
 5. *Hyophorbe verschaffelti* (Spindle Palm)
 6. *Myrcianthes fragrans* (Simpson Stopper)
 7. *Phoenix roebelenii* (Pygmy Date Palm)
 8. *Quercus virginiana* (Live Oak)
 9. *Simarouba glauca* (Paradise Tree)
- G. Landscaping Trees Price Group D includes the following:
 1. *Eugenia* spp (Stoppers; Red, White, Redberry, Spanish)
 2. *Krugiodendron ferreum* (Black Ironwood)
 3. *Roystonea* spp. (Royal Palm)

4. *Thrinax radiata* (Florida Thatch Palm)
- H. Landscaping Trees Price Group E includes the following:
1. *Bismarckia nobilis* (Bismark Palm)
 2. *Pseudophoenix sargentii* (Buccaneer Palm)
 3. *Thrinax morrisii* (Key Thatch Palm)

III. CONTAINER TREES AND PALMS

- A. Pricing will be based on the gallons listed below, 7 and 25 gallons.
- B. There is no minimum quantity.
- C. Container Trees and Palms Price Group A includes the following:
1. *Capparis cynophallophora* (Jamaican Caper), 7 Gallon
 2. *Citharexylum fruticosum* (Fiddlewood), 7 Gallon
 3. *Pithecellium guadalupense* (Blackbead), 7 Gallon
- D. Container Trees and Palms Price Group B includes the following:
1. *Citharexylum fruticosum* (Fiddlewood), 7 Gallon
 2. *Serenoa repens* (Saw Palmetto Palm), 7 Gallon
- E. Container Trees and Palms Price Group C includes the following:
1. *Ardisia escallonioides* (Marlberry), 7 Gallon
 2. *Bourreria ovata* (Bahama Strongbark), 7 Gallon
 3. *Calyptranthes pallens* (Spicewood), 7 Gallon
- F. Container Trees and Palms Price Group D includes the following:
1. *Acoelarrhaphe wrightii* (Paurotis Palm), 25 Gallon

END OF SECTION

SECTION 32 96 43 TREE TRANSPLANTING

I. GENERAL

A. SUMMARY OF SERVICES TO BE PROVIDED

1. Prepare and relocate trees and palms designated for relocation within the project boundaries, to include all aspects of preparation, relocation, protection and maintenance.
2. Protection and care of existing trees and palms to remain within the project boundaries, to include all aspects of protection, pruning, fertilization and watering.
3. Install and operate temporary irrigation system and hand water as required by these specifications.
4. Labor, equipment, materials and services required to complete all preparation, relocations and protection work as indicated on the drawings, as specified herein, or both.

B. QUALITY ASSURANCE

Contractor shall submit the following to the County Project Manager prior to issuance of work for tree relocation:

1. List of references for Contractor's Class "A" tree Trimmer and a project list of tree relocations that the trimmer has successfully completed.
2. List of all equipment to be utilized during tree preparation and transplanting.
3. Proposed sequence of events from start to finish in writing. This shall include schedule by day as to how many units can be dug and relocated to specified areas.
4. Literature and proposed application rates for specified wetting agents, fertilizers and soil conditioners.
5. Verification of all required licenses and memberships.
6. All tree relocation shall be completed by Contractor's licensed Broward County Class "A" tree trimmer.

C. APPLICABLE STANDARDS AND SPECIFICATIONS

Contractor shall comply with the following standards and specifications for all materials, methods and work unless otherwise noted:

1. Codes and Standards of the American Association of Nurserymen.
2. Codes and Standards of the International Society of Arboriculture (ISA).
3. ANSI-300 Standards, as amended.
4. Broward County Ordinances and Codes.

D. PERMITS

Contractor shall secure all permits required in order to complete all of this work.

E. DESCRIPTION

1. Trees to relocate on site are designated on the drawings or as directed by the County.
2. Existing trees to be relocated shall be crown pruned, root pruned, treated with soil amendments and watered on a schedule approved by the County prior to relocation.
3. Existing trees to be relocated or to remain shall be protected with barricades during construction/relocation. Trees or shrubs designated to remain which are scarred or destroyed shall be replaced with the same species, size and quality at no cost to the County.
4. All trees subject to encroachment into the root zone due to proposed construction shall be root pruned 18 inches from the proposed pavement edge or trench as indicated on the drawings and to provide a root barrier approved by the County.
5. Tree pits resulting from relocated material shall be backfilled with clean, stable fill, and brought flush with surrounding grade and sodded with specified sod as detailed in other Division 26, 31 and 32 sections.
6. Contractor and its tree trimmer shall call for and attend an inspection of existing conditions by the County prior to commencing work, including but not limited to, identification of trees and potential obstructions to the relocation work.
7. Contractor shall prepare a report of existing conditions as a matter of record, which shall also include photographs. Contractor shall accept the existing conditions as a reference point for condition of trees and the site. Existing conditions shall then become the responsibility of the Contractor to be kept intact.

F. GUARANTEES

Contractor shall guarantee all work according to the following minimum requirements:

1. Any tree or palm that dies or is deemed in unacceptable condition for one year (365 calendar days) following the project completion date shall be removed by the Contractor, including root ball and backfilling the pit, at no cost to the County. Contractor shall provide a comparable specimen at no additional cost to the County.
2. The guarantee shall be enforced if it is deemed by the County's Landscape Architect, the County's Landscape Inspector or County's Horticulturist that the tree or decline is a product of negligence by the Contractor.
3. Contractor shall maintain automatic temporary irrigation in operating order for all relocated trees and palms to remain within the project area until permanent irrigation system is operable.

II. PRODUCTS

A. SOIL AND AMENDMENTS

Soil amendments and soil for transplanting shall be as specified in other sections of Divisions 31 and 32.

B. EQUIPMENT

1. Soil amendments shall be injected into the soil by means of a spray apparatus utilizing mechanical agitation to keep powdered amendments suspended where applicable.
2. Root pruning equipment shall be designed for this task and shall produce clean cuts of root without damage to the resulting root ball.
3. Relocation equipment shall be capable of lifting and transporting trees or palms without damage.

C. WATER

It shall be the responsibility of the Contractor to provide the necessary clean and potable water to the site.

D. MULCH

Mulch shall be as shall be as specified in other sections of Divisions 31 and 32 of the Project Manual.

E. BRACING AND STAKES

All bracing and stakes shall be constructed of pressure treated pine. Compression bands shall be constructed of stainless steel.

F. BARRICADES

Barricades shall be constructed of chain link fence or other barricades as approved by the County.

III. EXECUTION

A. PREPARATION FOR RELOCATION OF TREES AND PALMS WITHIN THE SITE

1. Clean blades and trimming equipment between uses so as not to spread any diseases.
2. Crown Pruning
All trees and palms shall be crown pruned prior to relocation. The County shall be notified at least two business days in advance of all pruning activities to allow for observation.
 - A. Broadleaf Trees
 - 1) All trees to be trimmed by thinning the crown only. Trimming shall conform to ANSI-300 and ISA standards, including the removal of dead wood.
 - 2) Contractor shall repair any existing injuries to trees including cavities and machinery marks.
 - B. Sabal Palms
 - 1) Remove all seed pods and fronds as in a hurricane cut. Trim all boots to a clean, regular pattern, no more than 3 inches out from the trunk.
 - C. Coconut Palms

- 1) Remove all fruits and seed pods, and all but seven of the youngest fronds.
- D. All trees and palms to be relocated shall be pruned on a schedule that maximizes acclimation time prior to relocation. Pruning schedule shall be reviewed and approved by the County Landscape Architect or designee.
3. Fertilization and Watering
- A. Preparation: Clear the rootball area of all foreign material, trash, debris etc., to expose undisturbed soil.
- B. Application / Schedule:
- 1) All trees and palms to be relocated shall be treated with the specified root stimulant at the time of root pruning. The specified root stimulant shall be applied at the concentration and application rates recommended by the manufacturer and approved by the County.
 - 2) All trees and palms to be relocated shall be deep injection fertilized at the time of transplant. Specified fertilizer shall be used and applied at the concentration and application rates recommended by the manufacturer and approved by the County.
 - 3) All trees and palms to be relocated shall be treated with the specified wetting agents, fertilizers and soil conditioners at the time of relocation. Soil amendments shall be mixed to produce a single fluid with each component included at the manufacturer's recommendation and approved by the County. Injection shall be into the root zone within the limits of the proposed root ball at the rate of 50 gallons fluid per 1,000 square feet of tree canopy, using only approved injection equipment.
 - 4) All trees and palms to be relocated shall be treated with the specified endo and ectomycorrhizal transplant inoculant at the time of transplant. The specified transplant inoculant shall be applied at the concentration and application rates recommended by the manufacturer and approved by the County.
 - 5) Form and maintain an earth berm 6 inches high outside the proposed root ball prior to watering and apply 3 inches of approved mulch within saucer. Water application shall saturate the root ball to its entire depth.
4. Root Pruning
- A. Watering
- 1) All trees and palms to be relocated are to be provided with a temporary automatic irrigation system which provides two bubbler heads fed by PVC pipe to each tree and palm prior to root pruning, if practicable.
 - 2) Contractor shall verify a source of water and provide for a temporary meter to operate the irrigation system.
 - 3) Contractor shall provide an irrigation timer or battery powered valve to water trees and palms to be relocated. Hand watering shall be performed to avoid lapses should the automatic system be inoperable for more than 24 hours.
- B. Barricades
- 1) Contractor shall barricade all existing trees and palms with a chain link fence or other barricade approved by the County.
 - 2) Barricades shall be installed at an offset distance two feet outside the tree drip line/edge of tree canopy prior to the commencement of any construction activity.
- C. Root Pruning Techniques
- 1) All trees shall be excavated by digging a trench a minimum of 48 inches deep by 6 inches wide, either by hand or with a trenching machine designed for this purpose. Hand cut broadleaf tree roots after trenching to produce clean cuts with no splints or tears.
 - 2) Trees to be root pruned shall have a minimum root ball size of 10 inches per 1 inch of caliper, 4 feet for broadleaf trees, and 3 feet for palms. Root balls are to be formed with all trenches being equal distance from the trunk.

D. Timing

- 1) All broadleaf trees to be relocated shall be maintained for a minimum of 12 weeks after root pruning and prior to relocation.

B. RELOCATION OF TREES AND PALMS

1. Preparation

- A. Trees and palms shall be thoroughly soaked to the full depth of the root ball daily for seven consecutive days prior to relocation.
- B. Contractor shall accurately locate position and elevation where all trees are intended to be planted for verification by the County's Landscape Architect or designee. The Contractor shall verify that no overhead or underground utilities, existing or proposed, conflict with the proposed locations. The Contractor shall ascertain that all proposed paths for machinery are clear of utilities and other obstructions.

2. Excavation of Tree Pits

- A. The Contractor shall notify and coordinate with the County prior to the excavation of tree pits.
- B. The Contractor shall dig all pits as shown in the drawings. Backfill in accordance with other sections.
- C. The Contractor shall be responsible for repairing any damage to existing utilities.

3. Digging and Handling of Broadleaf Trees

- A. The Contractor shall notify the County in writing at least two business days in advance of each relocation to allow for observation of procedures.
- B. The Contractor shall determine the line of previous root pruning and excavate around root mass to leave area 12 inches out from the line of root pruning undisturbed. Digging shall be accomplished so as to produce clean cuts on all roots without tearing or splitting. Trenching shall be a minimum of 48 inches deep.
- C. Trees shall be handled in such a way as to avoid damage to bark and limbs subject to support cables or chains. Attach support cables or chains at multiple points where possible. Alternatively, tree trunks may be drilled and doweled for broadleaf trees. The County reserves the right to require doweled in lieu of lifting straps.
- D. Root balls shall be undercut prior to lifting. Do not force tree from ground prior to undercutting. Ball depth to be determined upon assessing conditions at time of trenching to keep the entire root ball intact.
- E. Trees shall be properly wrapped during moving so trunks will not be scarred and damaged and to avoid broken limbs. Broken limbs or scarred trunks shall cause tree to be unacceptable and be rejected by the County.
- F. The Contractor shall transport plant material on vehicles of adequate size to prevent overcrowding, broken limbs, foliage damage or root ball damage.
- G. Root balls and foliage shall be kept moist during all phases of relocation.
- H. Place tree on a stable platform at the correct elevation so that the top of the root ball is 1 inch above proposed grade.
- I. Rotate tree prior to final setting to achieve best positioning relative to adjacent trees and viewing angles.

4. Backfilling

- A. Flood root ball as planting soil is backfilled to insure removal of all air pockets.
- B. Construct a saucer as shown on drawings to retain water.
- C. Flood root ball as planting soil is backfilled to insure removal of all air pockets.

5. Bracing

- A. Support tree with machinery until bracing is complete.
- B. Buttresses may support separate trunks on multiple trunk trees.
- C. Maintain braces until completion of project. Removal of braces shall be by others.
- D. Stake Installation:

- 1) Drive stakes perpendicularly, 3 feet into ground at edge of root ball. Do not drive stake through root ball, soil separator or drainage gravel if present.
 - 2) Number of stakes shall be as shown in drawings.
6. Tying and Cross - Bracing:
 - 1) For trees over 4 inches in caliper: stake and tie firmly with nylon strapping as shown in drawings.
 - 2) For trees less than 4 inches in caliper: tie nylon strapping to vertical stakes.
7. Irrigation
 - A. Install temporary bubbler heads at all trees and palms and mist head risers at oaks. Connect each tree's system immediately into the water source. The irrigation timer is to be operable prior to the time of transplanting; alternatively, battery powered valves may be utilized. The temporary irrigation system shall be maintained for a period of 90 calendar days, or as practicable, and shall be maintained in addition to the permanent irrigation should the permanent system be operable during this time.
 - B. Lateral lines to be buried 18 inches and marked for identification.
 - C. Set time to run daily to provide 6 inches of water per week for 30 calendar days, then reduce to 3 inches per week.
 - D. Removal of mist heads from oaks shall be at the direction of the County's Landscape Architect or designee.

C. PROTECTION AND CARE OF EXISTING TREES AND PALMS TO REMAIN

1. Barricade all existing trees and palms with orange safety fence or other barricade approved by the County.
2. Barricades shall be installed at an offset distance of 2 feet outside the tree drip line/edge of tree canopy prior to any construction activity.

END OF SECTION

SECTION 33 10 00 WATER UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. All applicable provisions of the Contract Documents and the Broward County Water and Wastewater Services (WWS) Minimum Design and Construction Standards (available at the following link: <http://www.broward.org/WaterServices/Engineering/Pages/MinimumDesignandConstructionStandards.aspx>) shall govern the work under this Section.

1.2 WORK INCLUDED

- A. Provide all labor, materials, tools, necessary equipment and services to complete the water systems work, as indicated on the drawings, as specified herein or both.
- B. Furnish and install all water piping systems shown and specified, in accordance with the requirements of the Contract Documents. Each system shall be complete with all necessary fittings, hangers, supports, anchors, expansion joints, flexible connectors, valves, accessories, heat tracing, insulation, lining and coating, testing, disinfection, excavation, backfill and encasement, to provide a functional system.
- C. The piping shown is intended to define the general layout, configuration, routing, method of support, pipe size, and pipe type. Develop the details necessary to construct all mechanical piping systems, to accommodate the specific equipment provided, and to provide and install all spools, spacers, adapters, connectors, etc., for a complete and functional system.
- D. Provide all tools, supplies, materials, equipment, and labor necessary for furnishing, epoxy coating, installing, adjusting, and testing of all valves and appurtenant work, complete and operable, in accordance with the requirements of the Contract Documents. Where buried valves are shown, furnish and install valve boxes to grade, with covers, extensions, and position indicators.

1.3 EXISTING UTILITIES

- A. Furnish temporary support, adequate protection and maintenance of all underground and surface utility structures, drains, sewers, and other obstructions encountered in the progress of the work.
- B. Where the grade or alignment of the pipe is obstructed by existing utility structure such as conduits, ducts, pipe branch connections to main sewers, or main drains, the obstruction shall be permanently supported, relocated, removed, or reconstructed in cooperation with the owners of such utility structures. No deviation shall be made from the required line or grade except as directed in writing by Consultant or County Project Manager.

1.4 SUBMITTALS

- A. Submit complete shop drawings and certificates, test reports, affidavits of compliance, of all piping systems as specified in the individual sections. The shop drawings shall include all necessary dimensions and details on pipe joints, fittings, fitting specials, valves, appurtenances, design calculations, and material lists. The submittals shall include detailed layout, spool, or fabrication drawings which show all pipe spools, spacers, adapters, connectors, fittings, and pipe supports necessary to accommodate the equipment and valves provided in a complete and functional system.
- B. Submit as part of the shop drawings a certification from the pipe fabricator stating that all pipes will be fabricated subject to a recognized Quality Control Program.

1.5 MATERIAL DELIVERY, STORAGE, AND HANDLING

- A. All piping materials, fittings, valves, and accessories shall be delivered in a clean and undamaged condition and stored off the ground, to provide protection against oxidation caused by ground contact. All defective or damaged materials shall be replaced with new materials.

1.6 CLEANUP

- A. After completion of the work, all remaining pipe cuttings, joining and wrapping materials, and other scattered debris, shall be removed from the site. The entire piping system shall be handed over in a clean and functional condition.

PART 2 - PRODUCTS

2.1 PIPE

- A. All pipe shall have a minimum working pressure of 200 psi unless otherwise noted.
- B. Ductile iron pipe shall conform to ANSI/AWWA C151/A21.51. Pipe shall be cement-lined and seal-coated.
 - 1. Unless otherwise indicated, all ductile iron pipe shall be factory lined and coated.
 - a. Lining: All pipe shall be cement mortar lined in accordance with AWWA Standard C104.
 - b. Coating: Unless specified otherwise, all pipe shall be coal-tar enamel coated outside to a dry film thickness of at least 1 mil.
 - c. Repair: Anywhere that the coating is removed purposely or accidentally, the area shall be cleaned of any rust, grease and dirt and recoated to a minimum dry film as specified for the individual piece.
- C. All water main pipe, including fittings, shall be color coded or marked using blue as a predominant color to differentiate drinking water from reclaimed or other water. Underground plastic pipe shall be solid wall blue pipe.

2.2 FITTINGS

- A. The pressure rating shall be 200 psi for fittings unless otherwise noted.
- B. Fittings shall be cast iron or ductile iron.
- C. Fitting must be cement lined and seal coated.
- D. Ductile iron fittings shall conform to ANSI/AWWA C110-A21.10.

2.3 JOINTS

- A. BELL AND SPIGOT CONNECTIONS:
 - 1. Joints in bell and spigot pipe shall be push-on, mechanical, or restrained mechanical joints in accordance with ANSI/ANWA C-111/A21.11, latest revision.
- B. FLANGED CONNECTIONS:
 - 1. Flanges shall be in accordance with ANSI Specification B16.1 for Class 125 flanges. Bolts shall comply with ANSI B18.2.
 - 2. Flanged pipe shall be faced and drilled to the American Standard drilling, unless special drilling is called for or required. Where tap or stud bolts are required, flanges shall be tapped. Flanges shall be accurately faced and drilled smooth and true, at right angles to the pipe axis and shall be covered with zinc dust and tallow or a rust preventive compound immediately after facing and drilling.
 - 3. Flanged joints shall be made with bolts or stud bolts and nuts. Bolts, stud bolts, and nuts shall conform to American Standard heavy dimensions, semi-finished with square or hexagonal heads and cold punched hexagonal nuts, meeting the requirements of ASTM Designation A-307.

2.4 HYDRANTS

- A. Fire hydrants shall have a 5-1/4 inch main valve opening. Pumper nozzle is to be eighteen (18) inches from finish grade. All hydrants are to be installed with anchoring tee and control valve. Fire hydrant shall comply with ANSI/AWWA C502-85 (or latest revision). Hydrants shall be painted in accordance with the requirements of County.
- B. Fire hydrants installed that have not been placed into service shall have a "Not in Service" tag to indicate that they are out of service.

2.5 WATER TAPS

A. Tapping Existing Pipelines.

1. Cast iron tapping sleeve or tapping cross shall have mechanical joint connections. The flanged end for tapping valve shall include a recess to provide positive alignment of the tapping valve.
2. Tapping valves shall conform to AWWA C509 and C500 standards. An Affidavit of Compliance shall be furnished for the valves.
3. Tapping valves sixteen (16) inch and smaller shall be designed for operation in a vertical position with a vertical operating shaft. Tapping valves over sixteen (16) inch shall be designed for operation in a horizontal position and shall have a vertical operating shaft.

2.6 VALVES

- A. General: Furnish all valves, gates, valve-operating units, stem extensions, and other accessories as shown or specified. All valves and gates shall be new and of current manufacture. All shut-off valves, 6-inch and larger, shall have operators with position indicators. Where buried, valves shall be provided with valve boxes and covers containing position indicators, and valve extensions.
- B. Gate Valves: All gate valves shall be resilient seat gate valves and shall be manufactured to meet or exceed the requirements of AWWA C509. The valve body, bonnet, and bonnet cover shall be ductile iron (DI) and comply with ASTM A536. The valves shall be non-rising stem with the stem made of manganese bronze as specified in AWWA C509.
- C. Check Valves: Valves shall be iron body, bronze mounted, stainless steel hinge pin, outside lever and spring operated, single disc swing non-slam type, and equipped with removable inspection covers and shall meet the requirements of AWWA C508. The ends shall be one hundred twenty-five (125) pound ANSI B16.1 flanges.
- D. Butterfly Valves: Valves shall be cast or ductile iron body that conforms to ASTM A126, Class B. All retaining segments and adjusting devices shall be of corrosion resistant material. The valve shall be fitted with a 360 degree 18-8 stainless steel seat offset from the shaft and mechanically retained in the body or on the disc of the valve. Mechanical retention shall not be affected by the mating flange. The valve disc shall be cast iron or ductile iron. The valve disc or valve body shall be fitted with a resilient seat of synthetic rubber as set forth in AWWA C504 for Rubber Seated Valves Class 150B, retained with an 18-8 stainless steel clamp ring and stainless bolting.
- E. Ball Valves: Ball valves shall conform to ANSI/AWWA Standard C507 latest revision for 150 psi pressure classes. The valve body shall be cast iron or ductile iron. The valve and operating mechanism shall be designed so that the plug is held rigid when in any position to prevent chatter or vibration. The valves shall be of the double seat type with either corrosion resistant metal or rubber seats.
- F. Corporation and Curb Stops: Units shall be 5/8 inch, 1 inch, 1-1/2 inch, or 2 inch brass, equipped with connections compatible with the connecting service pipe type, threaded in accordance with AWWA C800 and C901. Curb stops shall be sized to match the meter size and conform to AWWA C800 and C901. Fittings shall be brass, cast and machined in accordance with AWWA C800 and C901, with compatible polyethylene tubing connections.

2.7 WATER SERVICES

- A. Water services shall be copper tubing K type or polyethylene tubing, unless otherwise noted on Drawings.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Exercise care in unloading and handling pipe, valves, fittings, and all other material. Dropping pipe from trucks and allowing pipe to roll against other pipe will not be permitted.
- B. Pipe line trenches shall be excavated to required depth as shown on the drawings. In general, water distribution lines shall have a minimum of 30 inch cover for DIP pipe except where installed within any 70 -200 feet right-of-way which shall have a minimum of 36 inch cover. If rock is encountered, excavation shall be carried a minimum of 8 inches below bottom of pipe, and trench backfilled with sand or earth and thoroughly tamped. Width of trench shall be sufficient to allow workers to perform all operations incidental to constructing the pipe line. Hand dug bell holes shall be provided to permit proper joint making. No section of pipe shall bear on rock or on placed blocking.
- C. Work shall be properly braced where necessary. Where wood sheeting or certain designs of steel sheeting are used, the sheeting shall be cut off at a level two feet above the top of the installed pipe and that portion below that level shall be left in place. If interlocking steel sheeting of a design approved by County is used, it may be removed

providing removal can be accomplished without disturbing the bedding or alignment of the pipe. Any damage to the pipe bedding, pipe or alignment of the constructed main caused by removal of sheeting shall be cause for rejection of the affected portion of the work.

3.2 PIPE

- A. All installation of pipe shall conform to AWWA Standards. Pipe shall not be rolled or pushed into the trench from the bank. Before pipe is lowered into the trench, it shall be thoroughly inspected, as necessary, to insure sound conditions and eliminate the possibility of leakage or bursting under test pressure.
- B. Water mains shall be laid at least 10 feet horizontally from any existing or proposed sewer mains. A vertical distance of at least 18 inches should be maintained when a sewer pipe crosses under a water main. If this is not possible, then the sewer pipe must be of water main quality with 20 foot lengths of pipe centering on the point of crossing. If a crossing where the sewer is laid above a water line is unavoidable, then the above mentioned precautions shall be observed regardless of the distance of vertical separation between water mains and sewer piping.
- C. Pipes and valves, fittings, and all other materials showing defects shall not be used for construction. All such defective materials shall be removed from the construction site immediately. Before pipe is lowered into the trench, it shall be swabbed or brushed to insure that no dirt or foreign matter will be in the finished line.
- D. Pipe shall be laid on a flat bottom trench and backfill tamped to 6 inches above the top to the pipe. Pipe installation shall conform to "Type B Method" as adopted by Committee A-21 of the American Standards Association. A firm even bearing shall be provided throughout the length of each section of pipe. Pipe shall not bear on any unyielding structures, nor shall it support any other structures. All dead ends shall be plugged or capped, anchored and held in place with restrained joints as required. Except while work is in progress, all pipe openings shall be suitably plugged to prevent entrance of water or any foreign matter. Material deemed unstable for providing adequate support for pipe shall be removed and replaced by suitable material. Adequate backfill shall be deposited on the pipe to prevent floating. Any pipe which has floated shall be removed from the trench and reinstalled.
- E. All joints shall be suitable for the type of pipe being jointed and shall be made in accordance with manufacturer's recommendations.
 - 1. Mechanical joints: Mechanical joints shall be of the stuffing box type. The gland, followed by the rubber gasket, shall be placed over the plain end of the pipe which is inserted into the socket. The gasket is then pushed into position so that it is evenly seated in the socket. The gland shall be moved into position against the face of the socket, bolts inserted and made finger-tight. Bolts shall be tightened by a ratchet wrench suitable for the size of pipe being connected alternately, bottom, then top, etc., until the joint is completed.
 - 2. Compression Pipe joints: Compression joints shall be a rubber seal joint, made pressure tight by a molded rubber gasket and lubricated to facilitate assembly. The joint shall be made tight by inserting the plan end into the bell after lubrication. Joints shall be made up as recommended by the manufacturer.
 - 3. Flanged joints: Flanged joints shall be made with rubber gaskets. Bolts shall have rough square heads and hexagonal nuts and made to American Standard rough dimensions and shall be recommended size trimmed. Bolts shall be the recommended size for the diameter of the pipe being jointed and shall be tightened as to distribute evenly the stress in the bolts and bring the pipe into alignment.
 - 4. Threads shall be neatly cut with sharp tools and the jointing procedure shall conform with best practices. Before jointing, all scale shall be reamed. All pipe shall be screwed with an application of graphite and engine oil or other approved pipe compound applied to the threads. This application shall be thoroughly wiped off the inside of every joint.

3.3 INSTALLATION OF FITTINGS

- A. Applicable portions of these specifications shall apply to installation of fittings. Reaction of restrained joints shall be applied at bends and tees and where changes in pipe diameter occur at reducers or in fittings.

3.4 INSTALLATION OF FIRE HYDRANTS

- A. All hydrants shall stand plumb and burial line shall be set at finished grade. The pumper nozzle shall be set at 18 inches above finished grade. (Note: break-away flange to be 3 to 6 inches above finished grade.)

3.5 INSTALLATION OF VALVES

- A. General: All valves, gates, operating units, stem extensions, valve boxes, and accessories shall be installed in accordance with the manufacturer's written instructions and as shown and specified. All gates shall be adequately braced to prevent warpage and bending under the intended use. Valves shall be firmly supported to avoid undue stresses on the pipe.
- B. Access: All valves shall be installed to provide easy access for operation, removal, and maintenance and to avoid conflicts between valve operators and structural members or handrails.
- C. Valve Accessories: Where combinations of valves, sensors, switches, and controls are specified properly assemble and install these various items so that all systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on shop drawing submittals.
- D. All valves shall stand plumb unless otherwise shown on the plans. The operation of installing tapping sleeves and valves shall be done by an experienced entity having been engaged in this type of work not less than one year with a representative list of successful installations.

3.6 PRESSURE TESTS

- A. After pipe has been adequately backfilled all laid pipes shall be subjected to a hydrostatic pressure test. The duration of the pressure test shall not be less than two (2) hours. Test sections shall be limited to a maximum length of 2,000 feet. Care shall be taken to insure that all air has been removed from the pipe previous to pressure tests. Provide such means of venting the pipe as are required. Any material or installation proving defective shall be replaced.

3.7 LEAKAGE TEST

- A. After the main has been brought up to test pressure, it shall be held at this pressure and make up water shall be carefully measured by use of displacement meter or by pumping water from a vessel of known volume. The pipe line shall be walked and all visible joints inspected for leakage and movement of pipe. All visible leaks shall be repaired. Should any section of pipe line disclose joint leakage greater than that permitted, the leak shall be located and repaired at the defective joints until leakage is within the permitted allowance.
- B. The leakage test shall be conducted in accordance with AWWA C-600, latest revision. Leakage shall be less than the number of gallons per hour as determined by the formula:

$$L = \frac{SD P^{1/2}}{148,000}$$

L equals the allowable leakage in gallons per hour, S is the pipe length in the main tested, D is the nominal diameter of the pipe in inches, and P is the average test pressure during the leakage test, in pounds per square inch, gauge. Length of test shall not be less than two (2) hours. Average test pressure shall not be less than 200 psi.

3.8 BACKFILL

- A. No trenches or excavations shall be backfilled until the trench and installation has been inspected and approval given by County. All backfill shall be carefully placed to avoid movement of the pipeline. Backfill shall be free from rock, large stones, boulders, brush, or other unsuitable material. It shall be placed in the trench uniformly on both sides of the pipe for full width of the trench and to the horizontal diameter of the full length of the pipe. This backfill shall be thoroughly tamped to provide support free from voids.
- B. Additional backfill shall then be placed between joints to an average depth of 12 inches over the top of the pipe where pipe is of 8 inches and smaller diameter, and 24 inches over larger pipe. Pipe joints shall remain exposed until completion of the pressure and leakage tests.
- C. On completion of pressure and leakage tests, the exposed joints shall be backfilled to a depth of 12 inches above the top of the pipe. Backfill shall be carefully compacted until 12 inches of cover exists over the pipe. The remainder of the backfill shall then be placed and compacted thoroughly by puddling and tamping as required. Where directed, puddling and tamping may be omitted, and backfill shall be neatly rounded over the trench to a sufficient height to allow for settlement to grade after consolidation.

3.9 STERILIZATION OF COMPLETE PIPELINE

- A. Before the final acceptance of complete pipeline, all requirements of the County and the State of Florida health departments shall be satisfied. Satisfactory bacteriological test results from the agencies shall be forwarded to County upon completion.
- B. Prior to chlorination of mains, all dirt and foreign matter shall be removed by high velocity flushing through fire hydrants or other approved blow-offs. The main shall then be filled with a chlorine solution of at least 50 parts per million of chlorine and retained in the pipe not less than twenty-four (24) hours. Chlorine residual after retention period shall be not less than 30 parts per million. After chlorination, the mains shall be thoroughly flushed with potable water and required samples taken for bacteriological analysis. Sampling is to be witnessed by County Project Manager or Consultant.

3.10 CONNECTION TO EXISTING SYSTEM

- A. Make proper arrangements for compliance with the regulations for connection to any existing distribution system with the owner of that system. Tap in and connection will be made in strict accordance with County.

END OF SECTION

SECTION 33 30 00 SANITARY SEWERAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. All applicable provisions of the Contract Documents and Broward County Water and Wastewater Services (WWS) Minimum Design and Construction Standards (available at the following link: <http://www.broward.org/WaterServices/Engineering/Pages/MinimumDesignandConstructionStandards.aspx>) shall govern the work under this Section.

1.2 WORK INCLUDED

- A. Provide all labor, materials, tools, necessary equipment and services to complete the sanitary sewer systems work, as indicated on the drawings, as specified herein or both.

1.3 EXISTING UTILITIES

- A. Furnish temporary support, adequate protection and maintenance of all underground and surface utility structures, drains, sewers, and other obstructions encountered in the progress of the work.
- B. Where the grade or alignment of the pipe is obstructed by existing utility structure such as conduits, ducts, pipe branch connections to main sewers, or main drains, the obstruction shall be permanently supported, relocated, removed, or reconstructed in cooperation with the owners of such utility structures. No deviation shall be made from the required line or grade except as directed by County.
- C. Obtain a Sunshine Certification number at least 48 hours prior to beginning any excavation.
- D. Contractor is responsible for damage to any existing utilities for which he fails to request locations from the utility owner. Contractor is responsible as well for damage to any existing utilities which are properly located.
- E. If upon excavation, an existing utility is found to be in conflict with the proposed construction or to be of a size or material different from that shown on the plans, immediately notify County.

1.4 SHOP DRAWINGS AND SUBMITTALS:

- A. Furnish manufacturers' literature and data for all materials to be installed under this section. These submittals must be stamped "Approved" by County prior to installation.
- B. Complete "As-Built" information relative to cleanouts, services, fittings, pipe size, pipe material, length of pipe, and the like, shall be accurately recorded and submitted to County prior to final acceptance of the work. All horizontal and vertical information shall be taken by an independent Registered Surveyor and included in the final As-Built information. Final approval of the project is subject to the final review and approval of the As-Built information furnished to the regulatory agencies.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery and Handling:
 - 1. During loading, transporting and unloading, exercise care to prevent damage to materials.
 - 2. Do not drop pipe or fittings. Avoid shock or damage at all times.
 - 3. Take measures to prevent damage to the exterior surface or internal lining of the pipe.
- B. Storage:
 - 1. Do not stack pipe higher than recommended by the pipe manufacturer.
 - 2. Store gaskets for mechanical and push-on joints in a cool, dry location out of direct sunlight and not in contact with petroleum products.

1.6 APPLICABLE CODES

- A. General: All construction and materials shall conform to the current Broward County WWS Minimum Design and Construction Standards and all local codes where applicable.
- B. Construction Safety: All construction shall be done in a safe manner, specifically, the rules and regulations of the Occupational Safety and Health Administration (OSHA) and the Manual of Uniform Traffic Control Devices (MUTCD) shall be strictly observed.

PART 2 - PRODUCTS

2.1 SEWER PIPE AND FITTINGS

- A. All sewer pipe and fittings shall be non-pressure polyvinyl chloride (PVC) pipe conforming to ASTM D 3034, SDR 35, with push-on rubber gasket joints.
- B. All fittings and accessories shall be as manufactured or supplied by the pipe manufacturer or approved equal.
- C. In addition to the above cited specification, all PVC sewers shall conform to the following additional requirements:
 - 1. The PVC sewer piping shall be of a product having a dimension ratio (DR) of 35 and minimum pipe stiffness (PS) of 46 psi.
 - 2. Joints: The integral bell gasketed joint is designed so that when assembled, the elastomeric gasket inside the bell is compressed radially on the pipe spigot to form a positive seal. The joint shall be so designed to avoid displacement of the gasket when installed in accordance with the manufacturer's recommendation.
 - 3. Joining of the pipe shall utilize lubricants as recommended by the manufacturer. No solvent cement joints shall be accepted. The jointing of the pipe on the job shall be done in strict accordance with the pipe manufacturer's instructions and shall be done entirely in the trench unless otherwise directed by County.
 - 4. Gaskets: All gaskets shall be molded in a circular form or extruded to the proper section and then spliced into circular form, and shall consist of a properly vulcanized high grade elastomeric compound. The basic polymer shall be natural rubber, synthetic elastomer or a blend of both. The gaskets shall be manufactured of materials resistant to domestic sewage and shall be as recommended by the manufacturer. The gasket shall provide an adequate compressive force so as to affect a positive seal under all combinations of joint tolerance. The gasket shall be the only element depended upon to make the joint flexible and water tight.
 - 5. Pipe and Fittings: The pipe shall be made of PVC plastic having a cell classification of 12454-B or 12454-C or 13364-B (with minimum tensile modulus of 500,000 psi) as defined in specification D 1784. The fittings shall be made of PVC plastic having a cell classification of 12454-B, 12454-C or 13343-C as defined in specification D 1782. Compounds that have different cell classifications because one or more properties are superior to those of the specified compounds are also acceptable. Clean rework material generated by the manufacturer's own production may be used so long as the pipe or fittings produced meet all the requirements of the specification.
 - 6. The pipe and fittings shall be homogenous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties. PVC pipe and fittings which show signs of ultra-violet degradation will not be allowed.
 - 7. Pipe Marking: Each standard and random length of pipe in accordance with this standard shall be clearly marked per the following example at intervals of 1.5 meters (5 feet) or less:
 - a. Manufacturer's name or trademark
 - b. Nominal pipe size
 - c. The PVC cell classification
 - d. The Legend "Type P# DR 35 PVC Sewer Pipe"
 - 8. Fittings Marking: The fittings in compliance with this standard shall be clearly marked per the following example:
 - a. Manufacturer's Name or Trademark
 - b. Nominal Size
 - c. The Material Designation PVC-PSM.

9. Adapters: Adapters as required by the field conditions shall be as approved by County.
10. Plugs: Service plugs shall be flexible virgin polyvinyl chloride.

PART 3 - EXECUTION

3.1 EXCAVATIONS

- A. Trenches shall be kept as nearly vertical as possible and if required, shall be properly sheeted and braced. Where in the opinion of County, damage could result from withdrawing sheeting, the sheeting shall be left in place.
- B. Except in rock, water-bearing earth, or where a granular or concrete base is to be used, mechanical excavation of trenches shall be stopped above the final grade elevation so that the pipe may be laid on a firm, undisturbed native earth bed. If overdigging occurs, all loosened earth shall be removed and the trench bottom brought back to grade with granular material.
- C. Excavations and trenches in rock shall be carried to a depth of not less than 4 inches below the pipe bottom. This space shall be filled with granular material or washed rock.
- D. Width of trenches shall be such as to provide adequate space for placing and jointing pipe properly, but in every case the trench shall be kept to a minimum width.
- E. Any unstable soil encountered shall be removed and replaced with gravel, crushed rock, or rock and sand suitably compacted.

3.2 DEWATERING

- A. Provide adequate equipment for the removal of storm or surface water which may accumulate in the excavation areas. If subsurface water is encountered, utilize approved means to adequately dewater the excavation so that it will be suitably dry for working, form setting, concrete pouring, and pipe installation. A well point system or other approved equipment shall be installed if necessary to maintain the excavation in a dry condition for such operations.

3.3 PREPARATION OF TRENCH BOTTOM

- A. Water shall not be allowed in the trenches while the trench bottom is being prepared or while pipe is being installed, unless directed by County.
- B. A continuous trough shall be shaped to receive the bottom quadrant of the pipe barrel. Bell holes shall be excavated so that after placement, only the barrel of the pipe receives bearing pressure from the trench bottom.
- C. Preparation of the trench bottom and placement of the pipe shall be carefully made so that when in final position, the pipe is true to line and grade.
- D. When sand, crushed rock, gravel or pea rock are used to support the pipe, such material shall be placed in the trench bottom a minimum of 4 inches below the bottom of the pipe, and a trough as described above shall be formed to uniformly support the bottom quadrant of the pipe barrel.

3.4 INSTALLATION OF SEWER PIPE

- A. Sewer pipe shall be installed in accordance with ASTM D 2321 and the Uni-Bell Plastic Pipe Association's "Recommended Practice for the Installation of PVC Sewer Pipe".
- B. Pipe shall be protected during handling against impact shocks and free falls. Pipe shall be kept clean at all times and no pipe shall be used that does not conform to the specifications.
- C. The laying of the pipe shall be commenced at the lowest point, with spigot ends pointing in the direction of flow. All pipe shall be laid with ends abutting and true to line and grade. They shall be carefully centered, so that when laid, they will form a sewer with a uniform invert. Pipe shall be laid in accordance with manufacturer's requirements.
- D. Pipe shall be laid accurately to the line and grade as designated on the Drawings. Prior to making pipe joints, all surfaces of the portions of the pipe to be jointed or of the factory-made jointing material shall be clean and dry. Lubricant, primers, adhesives, etc., shall be used as recommended by the pipe or joint manufacturer's specifications. The jointing materials or factory fabricated joints shall then be placed, fitted, joined and adjusted in such a manner as to obtain a watertight line. As soon as possible after the joint is made, sufficient backfill material shall be placed along each side of the pipe to prevent movement of pipe off line and grade.
- E. The exposed ends of all pipe shall be suitably plugged to prevent earth, water or other substances from entering the pipe when construction is not in progress.

- F. Construct laterals from the wye (Y) branch to a terminal point as designated on the drawings or as required to maintain existing service. Install an approved watertight plug, braced to withstand pipeline test pressure thrust, at the termination of the lateral. Install a temporary marker stake extending from the end of the lateral to one foot above finished grade.

3.5 BACKFILLING TRENCHES

- A. All trenches and excavations shall be backfilled immediately after pipe is laid unless otherwise directed. Under no circumstances shall water be permitted to rise in unbackfilled trenches after pipe has been placed.
- B. Trenches shall be backfilled with approved material free from large clods, stones or rocks larger than one inch in diameter, and carefully deposited in layers, not to exceed 6 inches, until enough fill has been placed to provide a cover of not less than 12 inches above the pipe. Each layer shall be placed, then carefully and uniformly tamped, so as to eliminate the possibility of pipe displacement. The remainder of backfill material shall then be placed, moistened, and compacted, to 95% of AASHTO Specifications T-180 in landscaped areas and 100% of maximum density in paved areas.
- C. Whenever the trenches have been improperly filled, or if settlement occurs, they shall be refilled, compacted, smoothed off, and made to conform to grade. Unless otherwise directed, or shown on the plans, backfill in trenches in or through roadways shall be made as specified above, except that the entire fill above one inch over the pipe shall be deposited in layers not to exceed 12 inches in thickness, moistened, and compacted to density equal to greater than that of adjacent material so that pavement can be placed immediately.

3.6 CONCRETE ENCASEMENT OF SEWER PIPE

- A. Trenches in which encasements for pipe are to be placed, may be excavated completely with mechanical equipment. Prior to formation of the encasement, temporary supports consisting of timber, wedges or masonry, shall be used to support the pipe in place. Temporary supports shall have minimum dimensions and shall support the pipe at not more than two places, one at the bottom of the barrel of the pipe adjacent to the shoulder of the socket, and the other near the spigot end.
- B. After jointing of the pipe has been completed, concrete shall be uniformly poured beneath and on both sides of the pipe. Sufficient concrete shall be used so that encasement is at least 4 inches thick at all points.

3.7 MAINTENANCE HATCHES

- A. Service laterals will not be permitted through maintenance hatch walls.

3.8 CROSSING OF WATER LINES WITH SEWERS

- A. Refer to the Drawings for separation between water and sewer lines.

3.9 INSPECTIONS

- A. Notify County Project Manager at least two business days prior to beginning construction in order to arrange inspection of the sanitary sewer.

3.10 RESTORATION OF SURFACES AND/OR STRUCTURES

- A. Restore and/or replace paving, curbing, sidewalks, fences, sod, survey points, or any other disturbed surfaces or structures to a condition equal to that before the work was begun and to the satisfaction of County and shall furnish all labor and materials incidental thereto. Restoration of surfaces and/or structures, shall comply with all requirements of the applicable governing agencies.

3.11 PROJECT RECORD DOCUMENTS

- A. Maintain accurate and complete records of work items completed.
- B. All "as-built" information submitted to County shall be sufficiently accurate, clear and legible to satisfy the County that the information provides a true representation of the improvements constructed.
- C. All "as-built" information for water and sewer lines shall be certified by a registered land surveyor and shall be submitted in a format acceptable to all local reviewing agencies.

SECTION 33 42 31 STORMWATER AREA DRAINS AND INLETS (PVC)

PART 1 - GENERAL

1.1 SUMMARY OF WORK

- A. PVC surface drainage inlets shall include the drain basin type as indicated on the drawing and referenced within these specifications.
- B. The ductile iron grates for each of these fittings are to be considered an integral part of the surface drainage inlet and shall be furnished by the same manufacturer.
- C. The surface drainage inlets shall be as manufactured by Nyloplast, a division of Advanced Drainage Systems, Inc., or approved equal.

1.2 MATERIALS

- A. The drain basins required for this contract shall be manufactured from PVC pipe stock, utilizing a thermoforming process to reform the pipe stock to the specified configuration.
- B. The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system.
- C. This joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals.
- D. The flexible elastomeric seals shall conform to ASTM F477.
- E. The pipe bell spigot shall be joined to the main body of the drain basin or catch basin.
- F. The raw material used to manufacture the pipe stock that is used to manufacture the main body and pipe stubs of the surface drainage inlets shall conform to ASTM D1784 cell class 12454.
- G. The grates and frames furnished for all surface drainage inlets shall be ductile iron for sizes 8, 10, 12, 15, 18, 24 and 30 inches and shall be made specifically for each basin so as to provide a round bottom flange that closely matches the diameter of the surface drainage inlet.
- H. Grates for drain basins shall be capable of supporting various wheel loads as specified by Nyloplast or approved equal.
- I. 12 and 15 inches square grates will be hinged to the frame using pins.
- J. Ductile iron used in the manufacture of the castings shall conform to ASTM A536 grade 70-50-05.
- K. Grates and covers shall be provided with a painted black finish.

1.3 INSTALLATION

- A. The specified PVC surface drainage inlet shall be installed using conventional flexible pipe backfill materials and procedures.
- B. The backfill material shall be crushed stone or other granular material meeting the requirements of class 1 or class 2 material as defined in ASTM D2321.
- C. Bedding and backfill for surface drainage inlets shall be well placed and compacted uniformly in accordance with ASTM D2321.
- D. The drain basin body will be cut at the time of the final grade. No brick, stone or concrete block will be required to set the grate to the final grade height.
- E. For load rated installations, a concrete slab shall be poured under and around the grate and frame.
- F. The concrete slab must be designed with local soil conditions, traffic loading, and other applicable design factors.
- G. For other installation considerations such as migration of fines, ground water, and soft foundations refer to ASTM D2321 guidelines.

END OF SECTION

**SAMPLE BACKGROUND SCREENING AFFIDAVIT
(PROVIDE ON CONTRACTOR'S LETTERHEAD)**

CONTRACT: *[Insert Contract No. and Name]*

CONTRACTOR'S NAME: *[Insert Contractor's legal name]*

DATE: *[Insert date of completion]*

By signing this form, I am swearing or affirming that all individuals providing services to COUNTY under this Contract have been background screened in accordance with the sexual predator and sexual offender background screening requirements for set forth in the Contract and have been deemed eligible by CONTRACTOR to provide such services as described in the Contract. The information contained in this Affidavit is up to date as of the date this Affidavit is furnished to the Contract Administrator per the requirements of the Contract.

All individuals providing services to COUNTY under this Contract are listed below under categories 1 and 2 below. Each individual shall be identified by company name, name, birth date and date deemed eligible and shall fall into one (1) of the following categories:

1. Initially screened and deemed eligible:

[Insert list of individuals] [Applicable only to first monthly Affidavit. Thereafter, only categories 2 and 3 must be completed.]

2. New individuals screened and deemed eligible:

[Insert list of individuals]

3. Individuals no longer providing services for CONTRACTOR under this Contract:

[Insert list of individuals]

Signature of Affiant

Title

Sworn to and subscribed before me this _____ day of _____, 20____.

My commission expires:

Notary Public, State of Florida

My signature, as Notary Public, verifies the Affiant's identification has been validated by

_____.



Broward County
Highway Construction & Engineering Division
1 N. University Drive, Box B300
Plantation, FL 33324

Phone: (954) 357-4555

Document 01250B – Change Order Request (Proposal)

To:

(Consultant or County Project Manager)

Contract No.:

Contract Title:

Change Order
Request No.: _____

Date: _____

(One Request
(Proposal) per form)

This Change Order Request (Proposal) contains an itemized quotation for changes in the Contract Sum and/or Time in response to proposed modifications to the Contract Documents based on Proposal Request No. ____ or other conditions which require this Proposal.

Description of Proposed Change:

☐ Attachments

Reason for Change:

Does Proposed Change involve a change in Contract Sum or Time? ☐ Yes ☐ No

If yes: Proposed Change in Contract Sum: _____

Proposed Change in Contract Time: _____

Attached Pages: ☐ Proposal Worksheet Summary

☐ Proposal Worksheet Detail(s)

Contractor:

By: (Signature)

☐ Attached is supporting information from:
List of attachments:

☐ Subcontractor

☐ Supplier

☐ Other

Distribution: 1. Consultant (if applicable) 2. County Project Manager/Contract File 3. Contractor



Document 01250E – Construction Change Directive

To:

(Contractor)

Directive No.: _____

Date: _____

Contract No:

Contract Title:

(One Directive per form)

Description of Directed Change:

You are hereby directed to make the following change(s) in this Contract:

Proposed Adjustments

1. The Proposed basis of adjustment to the Contract Sum or Guaranteed Maximum price is:

- ☐ Lump Sum ☐ Increase ☐ Decrease of \$ _____.
☐ Unit Price of \$ _____ per _____.
☐ As provided in Specification regarding Contract Modifications.
☐ As follows:

2. The Contract Time is proposed to ☐ be adjusted ☐ remain unchanged. The proposed adjustment, if any, is an

- ☐ increase of _____ days.
☐ decrease of _____ days.

When signed by the Consultant and the Owner and received by the Contractor, this document becomes effective immediately as a Construction Change Directive and the Contractor shall proceed with the change(s) described above.

Signature by the Contractor indicates the Contractor's Agreement with the Proposed Adjustments in Contract Sum and Contract Time as set forth in this Construction Change Directive.

Consultant

Owner

Contractor

By:

By:

By:

Date

Date

Date

Distribution: 1. Consultant (if applicable) 2. County Project Manager/Contract File 3. Contractor



Broward County
Highway Construction & Engineering Division
1 N. University Drive, Box B300
Plantation, FL 33324

Phone: (954) 357-4555

Document 01250F – Supplemental Instructions

To:

(Contractor)

Contract No:
Contract Title:

Instruction No.:

Date:

You are hereby notified that the Work shall be carried out in accordance with the following supplemental instructions issued in accordance with and reasonably inferable from the Contract Documents without change in Contract Sum or Contract Time. Prior to proceeding with these instructions, indicate your acceptance of these instructions for a minor change to the Work as consistent with the Contract Documents and return a copy to the Consultant.

Description of Interpretation or Minor Change: (Written description of the Work)

Attachments: (List attached documents that support description):

Issued	Accepted
Name, Title:	Contractor:
By: (Signature) _____	By: (Signature) _____
	Date: _____

Distribution: 1. Consultant (if applicable) 2. County Project Manager/Contract File 3. Contractor



Broward County
Highway Construction & Engineering Division
1 N. University Drive, Box B300
Plantation, FL 33324

Phone: (954) 357-4555

Document 01310A: Contractor's Request for Information

To:
(Consultant)

Attn:

Contract No.:
Contract Title:

RFI No.: _____ Date: _____

(One RFI item per form)

Subject: _____

Category:

- ☐ Information not shown on Contract Documents
- ☐ Interpretation of Contract Documents
- ☐ Conflict in Contract Document requirements
- ☐ Coordination

Reference:

- ☐ Drawing Reference
- ☐ Spec/Project Manual reference
- ☐ Other:

Spec No.	Section Title	Paragraph Reference	Drawing Sheet No.	Detail Reference

Request:

Contractor:
Retain copy for Project Files

By: (Signature)

Contractor:

Replies to RFI's will be made through the Owner on the County's standard Supplemental Instructions form for those requests that are not directly or obviously inferable from the Contract Documents.

Distribution: 1. Consultant (if applicable) 2. County Project Manager/Contract File 3. Contractor



Broward County
Highway Construction & Engineering Division
1 N. University Drive, Box B300
Plantation, FL 33324

Phone: (954) 357-4555

Document 01320C: Non-Conforming Work Notice

To:

(Contractor)

Contract No:

Contract Title:

Notice No.: _____ Date: _____

(One Notice per form)

Contract Document Reference:

Para:

Drawing Ref:

Detail:

Nature of Non-Conformance:

By: (Signature)

Date:

Date Response Needed:

☐ Attachments:

Distribution: 1. Consultant (if applicable) 2. County Project Manager/Contract File 3. Contractor

Proposed Correction (Response):

Contractor:

By: (Signature)

Date:

Date Response Needed:

☐ Attachments:

Distribution: 1. Consultant (if applicable) 2. County Project Manager/Contract File 3. Contractor



Broward County
Highway Construction & Engineering Division
1 N. University Drive, Box B300
Plantation, FL 33324

Phone: (954) 357-4555

Document 01330A: Transmittal Form

To:
(Consultant or
County Project
Manager)

Contract No.:
Contract Title:

Submittal No.:

Date:

☐ Resubmittal

(One Submittal item per form)

We hereby submit:

Qty	Reference Number	Title/Description/ Manufacturer	Spec Section Title, Paragraph/ Drawing Detail Reference

- ☐ Submitted for Review and Approval.
☐ Resubmitted for Review and Approval.

- ☐ Complies with contract requirements.
☐ Will be available to meet construction Schedule.
☐ Reviewed, coordinated and approved by the Contractor.

Other remarks concerning submittal:

Contractor:
Retain copy for Project Files

By: (Signature)

Contractor:

To:
(Contractor)

**Date
Received:** ____

**Date
Returned:** ____

FROM:

Consultant or County Project
Manager

The referenced submittal has been/is:

- ☐ Approved
☐ Approved as Noted
☐ Disapproved/Resubmit
☐ Not Subject to Review
☐ Incomplete/Resubmit
- ☐ Provide file copy with corrections identified.
☐ Full Point by Point Comparative Data Required for Evaluation and Approval Process.
☐ Other:

By: (Signature)

Title:

Date:

Distribution: 1. Consultant (if applicable) 2. County Project Manager/Contract File 3. Contractor



Broward County
Highway Construction & Engineering Division
1 N. University Drive, Box B300
Plantation, FL 33324

Phone: (954) 357-4555

Document 01630A: Contractor's Substitution Request

To:

(Consultant or County Project
Manager)

Contract No:

Contract Title:

Request No.:

Date:

Date of NTP Receipt:

(One Substitution request per form)

We hereby submit for your consideration the following product instead of the specified item for the project identified above:

Specification Section: _____ Paragraph: _____ Specified Item: _____

Drawing Sheet Number(s): _____ Detail, Plan or Section Number(s): _____

Proposed Substitution: _____ in lieu of _____

Manufacturer

Company Name:

Phone:

Address:

City, State:

Required
Attachments:
(Refer to
Product
Substitution
Procedures and
Basic Product
Requirements
sections for more
Instructions)

1. Attach names and addresses of previous projects on which this product was utilized. Include project owner's contact and phone number.
2. Attach complete reason(s) for the proposed substitution.
3. Attach a side by side comparison between the salient characteristics of the basis of design and the requested substitution.
3. Attach all documentation as required of the Product Substitution Procedures.
4. Attach proposed compensation for the Consultant's time for changes to the drawings and permits caused by the product substitution.
5. Attach construction permit revisions caused by the proposed substitution, if applicable.
6. Attach details, drawings, specification necessary to show how the changes impact the design.
7. Check items submitted with this substitution request:

☐ Catalog ☐ Drawings ☐ Samples ☐ Tests/Reports

☐ Other:

Completion of the following information is required:

1. This substitution will result in a **saving or credit** to the Owner in the amount of:

	<u>Dollars</u>	<u>\$</u>
Written		Figures

2. Does the proposed substitution affect dimensions shown on the drawings or other specified clearances? Yes ☐ No ☐
3. Will the undersigned pay for changes to the building design, including the costs of all engineering, detailing, permitting and other administrative costs caused by requested substitution? Yes ☐ No ☐
4. Manufacturer's guarantees and warranties of the proposed and specified items are: ☐ The Same ☐ Different
5. What effect does the proposed substitution have on other trades? ☐ None ☐ Affects trades; details attached

The Undersigned states that this substitution request has been fully checked and coordinated with the Contract Documents, that all information is true and accurate, and that the undersigned shall bear full responsibility for impacts to the design, coordination, required schedule and costs of the project occasioned and impacted by this request if approved by the Owner.

Submitted By:

Company Name &
Address:

Phone:

Name and Signature

Title

DO NOT WRITE BELOW THIS LINE

FOR OFFICIAL USE ONLY

For Consultant's Use Only	For Owner's Use Only
<input type="checkbox"/> Recommend Approval <input type="checkbox"/> Not Recommended	<input type="checkbox"/> Recommend Approval <input type="checkbox"/> Not Recommended
<input type="checkbox"/> See Attached <input type="checkbox"/> Received Too Late	<input type="checkbox"/> See Attached <input type="checkbox"/> Received Too Late
By: _____ (Signature)	By: _____ (Signature)
Date: _____	Date: _____

Distribution: 1. Consultant (if applicable) 2. County Project Manager/Contract File 3. Contractor



Document 01770D: Inspection Punch List

Inspection Date:
☐ Full Project
☐ Designated Portion (Attach Description)

[illegible]



Broward County
Highway Construction & Engineering Division
1 N. University Drive, Suite 3600B
Plantation, FL 33324

Phone: (954) 357-4555

Document 01770E: Letter Establishing Substantial Completion Date

Instructions for Project Consultant's Use: Provide this completed letter to establish the Date of Substantial Completion of the Work or a designated portion thereof.

To:

(Contract
Administrator)

Contract No.:

Project Title:

Facility Name:

Contractor:

Contractor's

Request No.: _____ **Date:** _____

☐ Full Project

☐ Designated Portion (Attach Description)

On _____, we completed the Substantial Completion Inspection for the project, or designated portion thereof, listed above.

I hereby certify that the Contractor achieved Substantial Completion and the project, or designated portion thereof, was ready for beneficial occupancy on the following date:

The date of Substantial Completion is the ☐ last date of Substantial Completion for this project, or a ☐ designated portion thereof, requested by the Contractor pursuant to the request number listed above. Evidence is provided by our signatures below that the Consultant and Contractor agree that this project was ready for Beneficial Occupancy by the Owner for its intended purpose on the date of Substantial Completion listed above. You are advised to submit Standard Form 770 to advise the Risk Management Division of the required change of insurance for this completed portion of the Work.

By:

(Consultant)

Firm Name _____

By:

(Contractor)

Firm Name _____

Distribution

HCED Director /Contract Administrator
County Project Manager
Consultant
Contractor
Contractor's Surety (if applicable)

For County Use Only

☐ Date is acceptable; letter is hereby placed in Project Files as an official record.

County Project Manager



Broward County
Highway Construction & Engineering Division
1 N. University Drive, Suite 3600B
Plantation, FL 33324

Phone: (954) 357-4555

Document 01770G: Notification of Readiness for Final Completion Inspection

Instructions for Consultant's Use: Provide this completed letter to notify the Owner that the Work, or a designated portion thereof, is ready for the Owner's Final Completion Inspection.

To:

(County Project
Manager)

Contract No.:

Contract Title:

Contractor:

Contractor's

Request No.: _____ **Date:** _____

- ☐ Full Project
☐ Designated Portion (Attach Description)

I have completed a preliminary site visit as a result of the Contractor's Request for Final Completion Inspection and have found that:

- ☐ The work, or designated portion thereof, will be ready to receive a Final Completion Inspection as requested by the Contractor on:

_____ ,

- ☐ The work, or designated portion thereof, is not ready to receive a Final Completion Inspection. A listing of items which preclude Final Completion is attached to this letter.

Submitted By:

(Consultant)

Company Name &
Address:

Phone:

Signature, Date

Title

Distribution

Director of HCED
County Project Manager
Project File

Attachments:

Contractor's List of Deficiencies



Broward County
Highway Construction & Engineering Division
1 N. University Drive, Suite 3600B
Plantation, FL 33324

Phone: (954) 357-4555

Document 01770F: Contractor's Request for Final Completion Inspection

To:

(Consultant)

Contract No.:

Contract Title:

Request No.: _____ Date: _____

☐ Full Project

☐ Designated Portion (Attach Description)

I hereby certify that I am an Officer of the firm or corporation named herein and have been properly authorized to make the following statements concerning the project named above:

1. The above named project or designated portion thereof will be finally complete in accordance with the contract requirements and ready (including all punch list items) for inspection on:

2. The Date of Final Completion required by the Contract (as modified by any approved change orders affecting Contract Time) is:

3. I understand that I am to continue with insurance coverage and maintenance required by the Contract until the Owner's Final Acceptance of the Work. Additionally, I understand that I am to continue with liability coverage and maintenance required by the Contract until the Owner's Final Acceptance of the Work.
4. I have attached a time extension request/change order proposal for any delays related to work required for completion of the punch list.

Submitted By:

Company Name &

Address:

Phone:

Signature, Date

Title

Distribution

Consultant

County Project Manager

Contractor's Surety (if applicable)

Attachments:

Time Extension Request/Change Order Proposal
(if applicable)

Notice to Contractor

Neither the determination by the Project Consultant that the Work is finally complete, nor the acceptance thereof by the Owner, shall preclude subsequent claims against the Owner pursuant to portions of the Work not meeting the requirements of the Contract or for the Contract's provisions for the Contractor's warranty of the Work.



Broward County
Highway Construction & Engineering Division
1 N. University Drive, Suite 3600B
Plantation, FL 33324

Phone: (954) 357-4555

Document 01770H: Letter Establishing Final Completion Date

Instructions for Project Consultant's Use: Provide this completed letter to establish the Date of Final Completion of the Work or a designated portion thereof.

To:

(Contract
Administrator)

Contract No.:

Contract Title:

Contractor:

Contractor's

Request No.: _____

Date: _____

☐

Full Project

☐

Designated Portion (Attach Description)

On _____, we completed the Final Completion
Inspection for the project, or designated portion thereof, listed above.

I hereby certify that the Contractor achieved Final Completion and the project, or designated portion
thereof, was ready for beneficial occupancy on the following date:

_____,

The date of Final Completion is the last date of Final Completion for this project, or designated portion
thereof, originally requested by the Contractor. Evidence is provided by our signatures below that the
Consultant and Contractor agree that this project was Finally Complete on the date of Final Completion
listed above.

By:

(Consultant)

Firm Name _____

By:

(Contractor)

Firm Name _____

Distribution

HCED Director

County Project Manager

Consultant

Contractor

Contractor Surety (if applicable)

For County Use Only

☐

Date is acceptable; letter is hereby placed in Project
Files as an official record.

County Project Manager

CLOSEOUT FORM 007600-2: FINAL CERTIFICATE OF PAYMENT

Contract No. _____

Project (Name and Address): _____

To (COUNTY): _____

Consultant: _____

Contractor: _____

Notice to Proceed Date: _____

Consultant: _____

Date of Issuance: _____

All conditions or requirements of any permits or regulatory agencies have been satisfied. The documents required of the Contract, and the final bill of materials, if required, have been received and accepted. The Work required by the Contract Documents has been reviewed and the undersigned certifies that the Work, including minor corrective work, has been completed in accordance with the provision of the Contract Documents and is accepted under the terms and conditions thereof.

CONSULTANT

BY

DATE

COUNTY, through the Contract Administrator, accepts the work as fully complete and will assume full possession thereof at _____
(time)

(date)

BROWARD COUNTY BOARD
OF COUNTY COMMISSIONERS

By Contract Administrator

DATE

CLOSEOUT FORM 007600-3: FORM OF FINAL RECEIPT

[The following form will be used to show receipt of final payment for this Contract.]

FINAL RECEIPT FOR CONTRACT NO. _____

Received this _____ day of _____, 20_____, from Broward County,
the sum of _____ Dollars (\$_____) as full and final payment
to CONTRACTOR for all work and materials for the Project described as:

This sum includes full and final payment for all extra work and material and all incidentals.

CONTRACTOR hereby indemnifies and releases Broward County from all liens and claims
whatsoever arising out of the Contract and Project.

CONTRACTOR hereby certifies that all persons doing work upon or furnishing materials or
supplies for the Project have been paid in full. In lieu of this certification regarding payment for work,
materials and supplies, CONTRACTOR may submit a consent of surety to final payment in a form
satisfactory to COUNTY.

CONTRACTOR further certifies that all taxes imposed by Chapter 212, Florida Statutes (Sales
and Use Tax Act), as amended, have been paid and discharged.

[If incorporated sign below.]

CONTRACTOR

ATTEST:

_____	_____
Secretary	(Name of Corporation)
_____	By _____
(Print/Type Name)	President/Vice-President
_____	_____
(Corporate Seal)	(Type/Type Name and Title)
	____ day of _____, 20____.

[If not incorporated sign below.]

CONTRACTOR

WITNESSES:

_____	_____
(Signature)	(Business Name)
_____	By _____
(Print/Type Name)	(Signature)
_____	_____
(Signature)	(Type/Print Name and Title)
_____	____ day of _____, 20____.
(Print/Type Name)	

The following is are responses to bid questions and are part of the Contract

Question and Answers for Bid #PNC2120194B1 - Parks Construction and Improvements

Overall Bid Questions

Question 1

Is there an estimated budget? (Submitted: Apr 2, 2020 11:14:19 AM EDT)

Answer

- The three (3) year potential estimated budget for this contract is \$10,230,883. The anticipated usage is approximately \$2,000,000 per contractor for the initial term. (Answered: Apr 2, 2020 11:21:54 AM EDT)

Question 2

What is the amount to be used for the bid bond? (Submitted: Apr 7, 2020 11:19:02 AM EDT)

Answer

- A bid guaranty equal to 5% of the Total Price bid amount is required in accordance with the solicitation. (Answered: Apr 7, 2020 2:53:57 PM EDT)

Question 3

How can I see the unit prices from the previous contract, as well as the previous contract, are they available in BidSync? (Submitted: Apr 7, 2020 5:46:19 PM EDT)

Answer

- Previous Contract No. T1369306B1, Park Improvements and Construction Term Contract can be located in BidSync or a Public Records request can be submitted to PurchasingRecords@broward.org. (Answered: Apr 8, 2020 2:33:09 PM EDT)

Question 4

What happened to the pre-bid conference call that was supposed to happen today at 10AM. I called the number we were given #954-357-9743 and it didn't connect to anything. In fact, I was told I couldn't reach this Verizon number. When will this be rescheduled? (Submitted: Apr 8, 2020 10:47:29 AM EDT)

Answer

- A pre-bid conference was successfully held on April 8, 2020 at 10:00 am with the conference bridge line number that was provided in BidSync. A sign-in sheet will be uploaded, shortly. (Answered: Apr 8, 2020 2:33:09 PM EDT)

Question 5

Where you have "Line Items" pricing offers, exactly what is to be included in this pricing? In addition to the equipment cost, do we include: freight; installation; FL Engineer Signed & Sealed Drawings with Calcs; & Permitting? Please advise. (Submitted: Apr 8, 2020 10:51:27 AM EDT)

Answer

- Please carefully review the line item description as well as the referenced Division or Section of the Project Manual and Drawing as applicable. The definition of provide is included in Section 01 42 00 of the Project Manual. (Answered: Apr 8, 2020 2:33:09 PM EDT)

Question 6

Can you please provide the unit price in excel format? (Submitted: Apr 9, 2020 10:29:34 AM EDT)

Answer

- Please reach out to BidSync to obtain this information. (Answered: Apr 9, 2020 11:07:04 AM EDT)

Question 7

Is there a sign in sheet from the pre-bid conference? (Submitted: Apr 13, 2020 10:11:54 AM EDT)

Answer

- Yes. The sign-in sheet is located in the "Transcript" link in the solicitation of BidSync. (Answered: Apr 13, 2020 10:14:56 AM EDT)

Question 8

Please advise if the projects that will be solicited through this contract will be competitive bids or if they will be CM projects. (Submitted: Apr 14, 2020 3:01:29 PM EDT)

Answer

- As all line item costs will be fixed after award, projects will be assigned based on the anticipated quantities of the required line items at the contract prices. Further information is available in the Special Instructions to Vendors Paragraphs E and O. (Answered: Apr 15, 2020 9:25:02 AM EDT)

Question 9

Please advise the maximum budget of individual task orders that will be released through this contract (Submitted: Apr 14, 2020 3:01:47 PM EDT)

Answer

- There is no minimum or maximum project amount but the County does not anticipate any individual project to exceed \$1,000,000. (Answered: Apr 15, 2020 9:25:02 AM EDT)

Question 10

What is the process to have alternate products considered as equals? (Submitted: Apr 14, 2020 4:19:57 PM EDT)

Answer

- Throughout the Project Manual, the County has made its best efforts to name at least three approved equals (products or manufacturers) from which the awarded contractors can choose to incorporate into the project. Awarded contractors may submit substitution requests after award and in accordance with the Project Manual Sections 01 25 13, 01 42 00, 01 61 00, 01 62 00 as well as individual section of Divisions 2 through 33. (Answered: Apr 15, 2020 9:25:02 AM EDT)

Question 11

Based on the award scenario in the special instructions, won't the low bidder be issued all or most of the projects due to their unit prices? (Submitted: Apr 15, 2020 9:29:14 AM EDT)

Answer

- Although one of the contractors submitted the lowest Total Price bid, It is not likely this contract has the lowest

prices for all Divisions and line items. For instance, one of the awarded contractors may have the lowest unit prices for the prototype structures and the highest unit prices for FDOT pay items. Based on this information, this contractor would likely be assigned projects mainly involving prototype structures and not projects heavily involving FDOT pay items. (Answered: Apr 15, 2020 9:58:22 AM EDT)

Question 12

Manual Section 32 93 33 Shrubs - page 542 - Shrubs Price Groups A, Items 1 thru 22 how many of each item. Same question for groups B & C. (Submitted: Apr 15, 2020 4:11:20 PM EDT)

Answer

- On the Item Response Form of the bid, the quantities are listed for each Line Item with a description. (Answered: Apr 15, 2020 4:33:30 PM EDT)

Question 13

Bid packet - Section 32 93 43 Trees - Landscaping Trees Price group A items 1 to 5 how many of each? Same question for groups B,C,D,E as well Container Trees and Palms. (Submitted: Apr 15, 2020 4:14:33 PM EDT)

Answer

- On the Item Response Form of the bid, the quantities are listed for each Line Item with a description. (Answered: Apr 15, 2020 4:33:30 PM EDT)

Question 14

Please answer this question in a simple manner that even a regular laborer can understand:

Can a small company send a bid for only the few items that they can offer their services for (lets say 30 items maximum)? OR Is this bid meant for only huge companies that can offer every single line item at once (General Contractors, Large Builders Companies)?

I asked this question yesterday and the answer we received was not clear and easy to understand. Thanks.

(Submitted: Apr 16, 2020 12:04:07 PM EDT)

Answer

- Bidders must bid on all line items to be considered for award. Not bidding on all line items will deem a firm non-responsive to the solicitation. Subconsultants may reach out to Prime Contractors to work on bidding on certain items, for the Prime Contractor's bid offer. (Answered: Apr 17, 2020 1:11:36 PM EDT)

Question 15

The answer for 15 was unclear. If only bid certain items, my Total Price Bid (sum) will only be for the items I am supplying. Please clarify if I have to bid all items or if I can only bid on specific items. (Submitted: Apr 17, 2020 9:43:22 AM EDT)

Answer

- Bidders must bid on all line items to be considered for award. (Answered: Apr 17, 2020 1:11:36 PM EDT)

Question 16

What is the shipping information so that we can calculate freight costs? (Submitted: Apr 17, 2020 3:30:27 PM EDT)

Answer

- Shipping will be to any location within Broward County. For shipping purposes, you may want to use a zip code within Broward County such as 33301 which is downtown Fort Lauderdale. **(Answered: Apr 17, 2020 3:50:04 PM EDT)**

Question 17

The specifications request an NDL Warranty Level 4 from the manufacturer.

The cost of the warranty is .39/sq. ft. or a minimum of \$3,800.00.

We need assistance/guidance on how they want this cost to be submitted.

For example:

Prototype Small Picnic Shelter is ONLY approx. 600 sq. ft.

The only cost effective way to carry the \$3,900.00 cost is if all the structures are in one contract and they add up to approx. 9,700 total square feet of roofing. (9700 x .39)

Not knowing how many units of each prototype structure, or if all units will be under one contract, makes it difficult to provide a proper cost effective proposal. **(Submitted: Apr 20, 2020 8:44:37 AM EDT)**

Answer

- The No Dollar Limit roofing warranty applies only to certain items within the bid such as the Prototype Restrooms and Prototype Shelters. The costs for this roofing warranty shall be included in the bidder's unit price for EACH of the structures. It is not likely that all of the structures will be constructed in one park, by one contractor, in the same project. As for the Fabricated Engineered Structures such as the hexagonal shelters, the roof warranty is specified in Section 13 34 00 Paragraph 1.5. In regards to the Informational Kiosks, the roof warranty is specified in Section 10 18 00 Paragraph 1.5. **(Answered: Apr 20, 2020 10:04:37 AM EDT)**

Question 18

Can you please delay the bid for at least 2 weeks? I am running into problems getting my quotes back from manufacturers especially in states where COVID 19 has shut them down: Michigan (basically closed for several weeks) & Georgia (limited ability to respond ... everything delayed). I have multiple products specified in this Bid from companies I represent: Kiosk, Shelters, Shade structures, & Playground Equipment. Please delay the bid for 2 or 3 weeks. Thank you for your consideration in this matter. **(Submitted: Apr 22, 2020 10:39:47 AM EDT)**

Answer

- Refer to Addendum No. 1. **(Answered: Apr 22, 2020 12:42:46 PM EDT)**

Question 19

Bid Item # 04-01, Spec 10 18 00: which kiosk to bid; 2 post or 3 post? **(Submitted: Apr 22, 2020 1:49:15 PM EDT)**

Answer

- Contractor will charge the County the same unit price whether it is a 2 or 3 post. **(Answered: Apr 22, 2020 3:57:07 PM EDT)**

Question 20

Restroom with office plan page S-1; plan footer do not match scheduled footers. Please clarify. **(Submitted: Apr 22, 2020 1:49:47 PM EDT)**

Answer

- Please elaborate on this question to ensure a precise answer is provided. **(Answered: Apr 22, 2020 3:57:07 PM EDT)**

Question 21

Spec Section 01 22 00 / 1.1 / B excludes testing. Please confirm that density testing, existing soils compaction testing, materials testing and soil bearing cert. will be covered by allowance. (Submitted: Apr 22, 2020 1:56:29 PM EDT)

Answer

- Correct, these are all pass-thru allowances. (Answered: Apr 22, 2020 3:57:07 PM EDT)

Question 22

Prototype Structures, all: structural notes detail fill & density testing. Please confirm these are to be excluded from the lump sum price per spec. 01 22 00. (Submitted: Apr 22, 2020 1:58:37 PM EDT)

Answer

- These costs are excluded from the unit price and are pass-thru allowances. (Answered: Apr 22, 2020 3:57:07 PM EDT)

Question 23

Prototype Structures, all: is vapor barrier required and if so, what spec? (Submitted: Apr 22, 2020 1:59:04 PM EDT)

Answer

- Plastic vapor retarders aka barriers are required as detailed in Section 03 30 00 Paragraph 2.7. (Answered: Apr 23, 2020 12:32:26 PM EDT)

Question 24

Prototype Buildings: Question #1. please provide spec for stainless steel engineered flood vents, and Question #2. are these to be included in the bid (plan notes that they are location specific) (Submitted: Apr 22, 2020 2:00:39 PM EDT)

Answer

- Specifications in addition to those on Sheet G-1 of the Drawings has been added as Section 08 45 93 Flood Vents. Yes, engineered flood vents are included in the unit process for the restrooms as shown in the drawings. (Answered: May 1, 2020 11:01:30 AM EDT)

Question 25

Spec 22 42 00 refers you to division 12 spec. No division 12 spec provided. please provide division 12 spec. (Submitted: Apr 22, 2020 2:01:06 PM EDT)

Answer

- As stated, Division 12 Furnishings only applies if applicable to the scope. In this project, this is not applicable. (Answered: Apr 23, 2020 12:31:28 PM EDT)

Question 26

Restroom with office plan page M-2: should condensate drywell be included or would that be part of a project specific civil plan? (Submitted: Apr 22, 2020 2:01:34 PM EDT)

Answer

- The drywell as shown in the Prototype Restroom with Office Sheet M-2 Detail 4 is included in the unit price. (Answered: Apr 23, 2020 1:48:42 PM EDT)

Question 27

Material suppliers are informing us that due to the Corona Virus crisis and it's influence on supply and demand, currently quoted prices reflect a downward adjustment. In order to be competitive on this bid, we will bid the current pricing, understanding that pricing will likely rise again, and most probably during the initial 2 year term of this contract. How will the County address the potentially obsolete pricing bid and awarded in this contract, during the initial and extension terms of this contract? (Submitted: Apr 22, 2020 2:02:50 PM EDT)

Answer

- Vendors will each need to make their own business decisions as to how to price their line items in order to account for labor, materials, gas and other costs that escalate and de-escalate over the length of the contract. The only cost escalation or de-escalation will occur with contract renewal as stated in the bid. (Answered: Apr 23, 2020 1:48:42 PM EDT)

Question 28

Information flow has been affected by the Corona Virus crisis as it relates to the timely completion of this bid. Some suppliers and subcontractors are either declining to bid in the given time or asking for a delay. Will the County consider extending the bid by 2 or 3 weeks to insure proper competitive bids? (Submitted: Apr 22, 2020 2:08:56 PM EDT)

Answer

- Refer to answer provided for Question 18. (Answered: Apr 22, 2020 4:07:35 PM EDT)

Question 29

On all Pre-Fab Shelters, section 13 34 00, there are many extra's that you want available at an additional cost. Please confirm exactly what you want included in your quoted number for the Bid. (Submitted: Apr 22, 2020 2:22:31 PM EDT)

Answer

- Please refer to the referenced specification section, especially Paragraph 1.1 which states what is included and excluded in the unit price. In this particular section, additional cost items such as a concrete slab, testing and a low vented top will be paid for either through the pass-thru allowance or another line item and are not included in the unit price. (Answered: Apr 23, 2020 1:48:42 PM EDT)

Question 30

For section 11 68 13 Playground Equipment (Components), there are 8 different components in Group A from 4 different manufacturers, so how do we price this? In Group B there's 23 components ... pricing is arrived at how? In Group C there's 19 components, and again how do we arrive at pricing? And group D there's 6 components & how do we arrive at pricing? (Submitted: Apr 22, 2020 3:49:56 PM EDT)

Answer

- All components of playground equipment within a group are similar in price. Pricing for the component commodities can be obtained from the manufacturer's local authorized representative, in the latest manufacturer catalogs, etc. However, the unit price submitted by vendors includes providing as defined in the Contract as well as other requirements detailed in Section 11 68 13. (Answered: Apr 23, 2020 12:31:28 PM EDT)

Question 31

Items #13-38, 13-39, 13-40, 13-41 call for omni-directional amplifiers and refers to Division 32 of the project manual. No specs are found in Division 32 of the project manual, can the County please provide specs on these items? (Submitted: Apr 23, 2020 12:26:17 PM EDT)

Answer

- These line items were removed in Addendum No. 3. (Answered: May 1, 2020 11:00:00 AM EDT)

Question 32

Can the County provide a detail for the footing of the basketball standard (Item# 01-03)? (Submitted: Apr 23, 2020 6:03:14 PM EDT)

Answer

- Additional information is provided in the drawing titled Precast Concrete Basketball Standard Addendum 2. (Answered: May 1, 2020 11:00:00 AM EDT)

Question 33

Under Group D (Playground Equipment) Broward County has specified a Playcraft Systems Merry-Go-Round with a Speed Limiter. Their standard Merry-go-Round PC 2495 does not have a speed limiter, but their Inclusive Merry-Go Round does have the speed limiter. Which one do you want quoted for Group D? (Submitted: Apr 25, 2020 9:16:30 AM EDT)

Answer

- Playground Add-on Price Group D includes the Playcraft Systems Inclusive Merry Go Round and not the Standard Merry Go Round. (Answered: May 1, 2020 11:00:00 AM EDT)

Question 34

Reference bid item PNC2120194B1-12-15 Regular Excavation: Please clarify how the UOM can be 1 each? (Submitted: Apr 28, 2020 4:13:22 PM EDT)

Answer

- The unit of measure and quantity were revised in Addendum No. 3. (Answered: May 1, 2020 11:00:00 AM EDT)

Question 35

Reference bid items #PNC2120194B1- 12-30 and 12-31: please clarify how 12-30 UOM is SY and 12-31 is Ton? FDOT Section 334 states UOM to be Tons. (Submitted: Apr 28, 2020 4:34:45 PM EDT)

Answer

- As stated in Section 01 42 00 Paragraph 1.3, the County has revised some of the FDOT units of measure. We include both units of measure so that we have flexibility when ordering quantities significantly less than a ton. (Answered: Apr 29, 2020 9:54:46 AM EDT)

Question 36

Reference Q/A 35: In order to quote a SY price, a thickness spec must be provided, because the cost relates back to volume and thickness causes a variability in volume of material. (Submitted: Apr 29, 2020 12:03:11 PM EDT)

Answer

- Typically these are 1.5 to 2 inches thick but may vary slightly based upon the project requirements and conditions. (Answered: May 1, 2020 11:00:00 AM EDT)

Question 37

Spec 01 42 00 / 1.2 / W: Definition of Provide includes all daily site supervision. Spec 01 21 00 / 3.1 / A / 12 indicates that Daily Site Superintendence will be included in the allowance. Please clarify whether Site Supervision/Superintendence is to be included in the individual line items or not. (Submitted: Apr 30, 2020 3:05:28 PM EDT)

Answer

- A37. The majority of the line items require the Contractor to provide, and therefore daily project and site superintendence is included in those line item unit prices. For line items that are not to specifically to provide, such as those is the Labor and Equipment category and the allowance to Provide Miscellaneous Construction Materials, daily project and site superintendence is included and provided for in the General Conditions cost. (Answered: May 1, 2020 11:00:00 AM EDT)

Question 38

Reference Q/A #20: foundation plans for the restrooms identify footers as F1 (16') that scale at 24". Understanding full well that that we are not to scale the drawings, we will bid per the schedule. Just pointing out the discrepancy. (Submitted: Apr 30, 2020 3:20:05 PM EDT)

Answer

- Refer to Addendum 2. Please note that drawings should not be scaled and that written dimensions shall have precedence over scaled dimensions. (Answered: May 1, 2020 11:00:00 AM EDT)

Question 39

The project specs call for it to be federally funded and for Davis Bacon wages to be used, however no wage rates have been provided. Can the City please provide the Davis Bacon wage rates for this project? (Submitted: May 4, 2020 4:46:46 PM EDT)

Answer

- The contract will not include projects which will be federally funded and therefore, Davis Bacon wages will not apply. However, as stated in Section 01 11 00, Paragraph 1.12, although not all projects will be \$250,000 or greater, all unit pricing includes costs required to comply with the Broward County Prevailing Wage Ordinance. Prevailing Wage Rate tables are currently included in the bid (for Building and Heavy) . (Answered: May 7, 2020 11:11:07 AM EDT)

Question 40

In Division 11 under Play Components Price Group A, B, C & D I'm trying to understand exactly how you want the price calculated. For example, in Group B we have prices ranging from \$2,000 to \$4,000 per item. Your price list says 3 items. Exactly what you're looking for here? (Submitted: May 4, 2020 7:45:21 PM EDT)

Answer

- Vendors are to provide the County with a fixed price for each of the components within the Group from which the County can select ANY component from that Group. The unit price includes all requirements to provide the component, footings, safety compliance audit, all required signed and sealed drawings and wind load calculations completed by a State of Florida registered Professional Engineer as required for permitting. The four Playground Add-on Price Groups include play components that can be added to a pre-designed playground (Playgrounds A through J), used to create a custom playground, or added to an existing playground. (Answered: May 7, 2020 11:11:07 AM EDT)

Question 41

Under Division 32, for Synthetic Grass, you've called quantities of: 4,000 SF; 1,150 SF; & 1,000 SF. Is that the

Gross SF before the wasted materials are thrown away? Or is it the actual Net Playable SF for the playground area?

(Submitted: May 4, 2020 7:48:12 PM EDT)

Answer

- Estimated quantities included are for net playable area. Contractor will be paid for wasted material resulting from the play area layout as the layout affects seam placement, curves, etc. County reserves the right to keep the wasted materials. (Answered: May 7, 2020 11:11:07 AM EDT)

Question 42

Ref: Q/A #30 - Manufacturers reps are rejecting this answer, stating that there are pricing differentials among the items of several thousand dollars. These bidding item as currently stated allow for varying bidder and manufacturer interpretation that will create an uneven bidding environment. Please review this issue and provide clarification that provides uniformity. (Submitted: May 5, 2020 9:16:11 AM EDT)

Answer

- (Answered: May 7, 2020 11:11:07 AM EDT)

Question 43

PNC2120194B1--12-03 calls for 100 LF of temporary barrier but it does not give a time frame for how long the barricade will be in use, please provide a duration. (Submitted: May 6, 2020 4:51:09 PM EDT)

Answer

- The FDOT pay item is a one time fee and there are no time limitations. Refer to Addendum No. 4. (Answered: May 12, 2020 2:50:54 PM EDT)

Question 44

PNC2120194B1--12-03 calls for 100 LF of temporary barrier but does not provide a time frame for which the barrier will be used, please provide a duration to allow for more accurate pricing. (Submitted: May 6, 2020 4:53:25 PM EDT)

Answer

- Refer to answer for Question No. 43. (Answered: May 12, 2020 2:50:54 PM EDT)

PNC2120194B1--05-06 - Playground F

Question 1

I see there are multiple designs that are called out from 3 different companies. I saw a section in the bid that allowed for substitutions of various products. What is the process to offer substitute playgrounds from manufacturers other than the 3 companies listed. (Submitted: Apr 23, 2020 12:04:17 PM EDT)

Answer

- Refer to answer for Question 10. (Answered: Apr 24, 2020 11:56:31 AM EDT)

PNC2120194B1--11-49 - Shrubs Price Group A

Question 1

Am I able to bid only landscaping items? (Submitted: Apr 15, 2020 3:01:28 PM EDT)

Answer

- Based upon the solicitation's Basis of Award " it is the County's intent to award the contract up the three (3) low responsive, responsible bidders on a total price bid (sum of all items) basis." (Answered: Apr 15, 2020 4:33:30 PM EDT)