

UPDATED: June, 2016

The University of West Florida defines its design priorities in terms of plans and specifications that:

1. **Meet the University program requirements**, incorporate information technology in spaces, and comply with state codes and federal laws. It must be recognized that changing curricula and modifications of spaces are frequent occurrences in a University operation. As such, flexibility should be a consideration in any plan to accommodate anticipated as well as unanticipated changes and future growth. A sound, functional plan is the single most important factor in obtaining an acceptable solution to the requirements of the building program. Therefore, careful listening, planning, and preparation of space relationships must occur with Users prior to design submittal.
2. **Result in low maintenance, long-life buildings** free of structural, material, and operating defects. The standards and requirements presented in this document are based upon University expectations with materials and construction methods resulting in the fewest problems for operation and maintenance. It is further supplemented by the statement of “no pioneering with new products or systems” and expecting us to be in the **forefront of proven technology**. Uniformity in the use of materials and equipment throughout campus limits the range of cleaning and maintenance products, and reduces the variety of parts and materials that must be inventoried for repairs as well as providing a continuity of aesthetics and functional user-experiences.
3. **Meet, and not exceed, the U.S. Green Building Council Leadership with Energy and Environmental Design (L.E.E.D.) “Silver” certification rating**. This standard maximizes a facility’s lifecycle and minimizes environmental impact towards healthier, more enjoyable living-learning spaces. As a U.S. Green Building Council member, we expect to partner with architectural, engineering, and construction firms having L.E.E.D. experience. Refer to Florida Statute 255.253; FL Energy Conservation and Sustainable Buildings Act, 2008.
4. **Create and develop visual and architectural attractiveness within the context of preferred University architecture**. There are certain architectural elements that are expected in future buildings that include exterior masonry banding and masonry veneer consistent with the Science & Engineering or the College of Business Education Center buildings colors. The exterior masonry color will be compatible with either of these buildings and will be examined very carefully with each project to ensure selected components are incorporated consistently.
5. **Use State of Florida and all other fund types judiciously considering life-cycle costs**. Selections of systems, materials, and equipment must be made considering the best value during the component’s expected life. New systems, materials, and equipment, when proven sound, may justify changes from these standards. Basis for these standards are derived from the philosophy of experimenting with known products; however, **avoid pioneering**.

Dr. James R. Barnett
Associate Vice President
Facilities Development & Operations

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INTRODUCTION

The Building Design and Construction Standards described in this document are for the use of architects, engineers, designers, and construction personnel and are intended to be utilized as a checklist for coordinating and understanding the desired construction standards required by the University of West Florida. They are presented to assist the professional in the selection of materials, the design, construction, and long-term maintenance of building projects at the University of West Florida by providing minimum quality standards acceptable by the University Office of Facilities Development and Operations and the Board of Trustees.

The information contained in this document is organized in the CSI format and is based on sound architectural and engineering principals as well as the University's experience. These construction standards are neither completely inclusive nor totally exclusive. If a situation develops which is contradictory to these standards or, if the design professional can demonstrate evidence of a more advantageous solution, the University will welcome suggestions, upon approval of the University Project Manager. Questions or comments regarding this document can be addressed to the Office of Facilities Development and Operations.

It is intended that the construction standards checklist become a requirement of each project milestone review process. Those items of the construction standards not followed will be discussed and approval/disapproval given by the University prior to proceeding to the next design stage. Failure for designers, architects, and engineers to meet stated standards and/or to work with University personnel to reach agreement on deviations from these construction standards will result in appropriate action.

Other related web sites:

- Environmental Health and Safety <http://uwf.edu/envhs/>
- Facilities Development and Operations <http://uwf.edu/facilities/>
- Facilities Maintenance <http://uwf.edu/maintenance/>
- Utilities & Environmental Sustainability <http://uwf.edu/utilities/>
- Facilities Planning & Construction <http://uwf.edu/offices/facilities-development-operations/planning-maintenance-construction/facilities-planning-construction/>

DEFINITIONS

AA –The Aluminum Association, Inc.

AAMA – American Architectural Manufacturing Association

ACI – American Concrete Institute

ADA – Americans with Disabilities Act

A/E – Architectural/Engineering Consultant

ANSI – American National Standards Institute

ARB – Architectural Review Board, City of Pensacola

Facility Planning and Construction – The department at the University of West Florida responsible for all capital planning, design and construction; space analysis and management; and general project management for all projects.

ASHRAE – American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

ASTM – American Society for Testing and Materials

AWI – Architectural Woodwork Institute

CMU – Concrete masonry unit

Design and Survey Records – A unit of Facilities Planning and Construction, which provides services in regards to electronic drawings for campus documentation of space, systems, and ownership; planning/estimating and design; infrastructure documentation; surveying/GPS/GIS; and, O&M manuals and project completion documentation library.

Environmental Health and Safety – The department at the University of West Florida responsible for indoor air quality and hazardous waste. .

EPA – Environmental Protection Agency

Facilities Development and Operations – A title used to summarize the organization responsible for planning, design, construction, operations, maintenance, and the central utility plant production and distribution, business management, and administration.

FDEP – Florida Department of Environmental Protection

F.S. – Florida Statute

L.E.E.D. – U.S. Green Council Leadership in Energy and Environmental Design

NFPA – National Fire Protection Association

NWMA – National Woodwork Manufacturer’s Association

OSHA – Occupational Safety and Health Administration

Owner – University of West Florida

SMACNA – Sheet Metal and Air Conditioning Contractor’s National Association, Inc.

SUS – State University System

University – University of West Florida

University Project Manager – Consultants and Contractors point-of-contact for the University of West Florida within Facility Planning and Construction

HISTORIC TRUST – 501 C-3 Direct Support Organization to the University

GENERAL DESIGN GUIDELINES

University of West Florida's Offices of Facilities Planning and Construction, Facilities and Utilities Operations and Maintenance, and Environmental Health & Safety are responsible for all components of the built environment on the Campus – buildings, open spaces, infrastructure, health and safety. These departments are entrusted with providing the University of West Florida with buildings that incorporate a high degree of:

- 1) Functional Efficiency
- 2) Innovative, but Appropriate Design
- 3) Contextual Harmony with the Site
- 4) Appropriately Selected Materials and Systems
- 5) Health and Safety Characteristics
- 6) Accessibility for the Disabled
- 7) Life Cycle Value
- 8) Sustainability – Refer to FL Statute 255.253; FL Energy Conservation & Sustainable Buildings Act, 2008.

These Standards have been completed to establish general and, in some cases, specific design policies as a guide to University staff and to consulting architects and engineers (A/E) for designing new facilities, as well as the alteration or renovation of existing structures. These Standards supplement the job-specific Facility Program. Should the Facility Program and the Standards conflict, Standards shall supersede.

- A. The Architect/Engineer (A/E) should endeavor to incorporate a design concept that will facilitate possible future changes, expansion, or renovation.
- B. A building's placement and design shall be coordinated with the UWF Campus Master Plan.
- C. Life Cycle Analysis and Energy Modeling for the building is required.
- D. Design elements that should be incorporated into future buildings include:
 1. Recessed or Covered Entries: These elements provide a functional use by controlling heat gain and protection from the elements at the building entrance. Aesthetically, they provide the opportunity for architectural development at the entrance, reduce the building scale at the entrance and give additional visual interest to the building façade.
 2. Masonry Building Materials: Masonry is a low maintenance material that works well in the Florida climate. The nature of the material establishes a feeling of longevity and allows for limitless detailing in the building elevations.
 3. Incorporations of Immediate Site into the Design: The Design of new buildings should integrate significant site features. Existing trees should be maintained, and site grading should be minimized.
 4. Exterior spaces should be integral to the design. The impact adjacent to new buildings should be such that the transitions from exterior circulation paths to interior building spaces are smooth and gradual. The building form and detailing should be designed in conjunction with landscaping and site development.
 5. Screened Mechanical Yards: Mechanical yards and dumpsters should be screened with similar materials and design as the building it serves.
- E. All buildings shall have designated service entrances and their location shall be coordinated with the UWF Master Plan's service access routes.
- F. Adequate time shall be programmed in the design process for complete review of major design projects by the University staff at the Schematics, Design Development and Construction Documents phases (a "stand-up" review meeting shall be scheduled at the end of each review time). Written approval and/or comments of each submittal shall be obtained from the University Project Manager before proceeding with subsequent phases.

In no case shall signed and sealed construction documents be released to prospective contractors before final approval of by the University Project Manager

1. Design Schedule: For detailed requirements at each submittal, consult the State of Florida Department of Management Services Design Professional Fee Guidelines, March, 2015. (Exhibit #1)

Phase of Work Completed	Percentage of Work
a. Conceptual Schematic Design/ Program Confirmation	10%
b. Advanced Schematic Design/Final Programming	25%
c. Design Development	50%
d. 50% Construction Documents	75%
e. 100% Construction Documents	90%
f. Close-out Record Documents	100%

2. The A/E shall submit three (3) sets of documents for each phase of work noted above, (a. through d.). See Standard Operating Procedure (SOP 2.001).
3. The A/E shall allow for a two (2) week minimum review following each submittal of major design projects. A lesser review will be decided on minor addition and renovation projects.
4. At “100% Construction Documents” submittal, the A/E shall submit two (2) “signed and sealed” sets to the State Fire Marshall and three (3) “signed and sealed” sets to the Escambia County Building Inspections Department and one (1) full size set signed and sealed and two (2) half size sets not signed and sealed to UWF Design and Survey Records Office.
5. At “Close-out Record Documents” submittal, the A/E shall update their respective, models or AutoCAD drawing files with contractor recorded changes. Submit (as agreed upon at time of negotiation) full BIM model with all needed objects and reference drawings. Submit one set As-Built hardcopy and electronic AutoCAD files matching hard copy As-Built sheets. Where applicable, close out documents will include:
 - a. O & M Manuals
 - b. Telecom Report
 - c. Test and Balance Report
 - d. Roof System Documents
 - e. Approved mechanical specifications
 - f. Warranties

Upon receipt of complete Close-out Record documents, final payment will be made.

G. CAD Files:

1. All drawings shall be submitted in AutoCAD (Autodesk, Inc. or REVIT as negotiated). DWG format at the current highest release level or level that is 100% compatible to the current highest release level. UWF shall not accept any drawings in the Drawing Exchange Format (DXF). If any drawing translators are used prior to submittal the results of such translations shall be 100% complete. It is the responsibility of the Consultant to crosscheck translated drawings for errors and omissions. Make sure all reference drawings are included or bound.
2. All electronic drawing files shall be submitted CD-R (Record able Compact Disc). No CD-RW's shall be accepted. If a CD-R is to be used, the CD-R shall be written in a single-session (closed) format, using ISO-9660 files system.
3. All submitted electronic media shall be clearly labeled with consultant name, date of submittal, project name, and list of data files. Labels shall be firmly attached to the diskette/CD.

H. Escambia County provides code governance, permitting, and inspections for the University of West Florida. Florida Statutes, Chapter 553.80(6), requires State Universities, Community

Colleges, and school districts to adhere to the requirements of the Florida Building Code, and perform plans review, and inspections by personnel certified under F. S. Chapter 468, Part XII:

- Plans Review of All Required Disciplines
- Permitting of Construction, Renovation and Maintenance activities
- Multiple Inspections of construction
- Issuing of Certificates of Occupancy or Completion by permitting authority

I. Upon completion of Schematic Design Phase, room numbers and door numbers should be coordinated by the University Project Manager. Final numbers shall not appear on subsequent documents without prior approval from the University Project Manager and Space Manager.

J. The UWF Historic Trust, Inc., is an organization comprised of twenty-eight (28) historic buildings located in downtown Pensacola. The Historic Trust is controlled, operated and maintained by the University of West Florida. All work on these structures shall have the approval of the City of Pensacola’s Architectural Review Board (ARB). Questions concerning the procedures of the ARB can be answered by contacting Sherry Morris at (850) 435-1674. All work shall be permitted through the City of Pensacola.

K. Office Space Square Footage Criteria

<u>Title</u>	<u>Square Feet Average</u>	<u>Square Feet Maximum</u>
President	250	350
Vice President	200	250
Dean	200	250
Associate Vice President	175	225
Assistant Dean	175	225
Directors	150	200
Assistant Directors	125	175
Faculty	110	130
Academic Advisors	120	130
Staff	110	130
(Coordinators, Office Managers, Other Administrators)		
Senior Secretarial w/ Files	130	140
Clerk	110	120
Multiple Clerk Office	105 for first person, 50 each additional person	
Reception Area (per number seated)	15 minimum	25
Files	110	130
Storage	125	175
Supplies	100	150
Conference/Training (per occupant)	15	25
Meeting Facilities	10	12
Staff Lounge	10	12
Classrooms:		
- Tablet arm seating per station	20	24
- Seminar seating per station	35	

L. General Classroom Design Criteria:

1. Classroom environments need to be a space that is lecturer flexible and listener (note taker) friendly. This includes the attention to future changes due to curriculum, use of visual displays, orientation of the room given sunlight, and quiet mechanical systems.

- Two lighting zones, one zone for general fluorescent lighting; one zone or incandescent low level lights.

15. Electrical:

- Provide minimum of four, 125v duplex receptacles. One for front wall and one receptacle for all other walls; use will be for media equipment, portable computer on cart, vacuum cleaners, etc.
- Provide empty 3/4-inch conduit between front and rear walls, centered on ceiling for future unknown use with blank face box cover plate.
- Control of instructional equipment to be at front of room.
- Provide electrically operated projection screen in auditorium/theatre rooms of 75 occupancy and greater.
- Provide wall clock visible for instructor and students.
- Provide a floor receptacle near first row of fixed seating at center to accommodate portable projector.
- Provide a ceiling mounted video projector; mount to be:
 - Approximately 15-feet from front, centered screen.
 - Minimum of a 2-inch conduit from projector position to front control panel.
 - 125v duplex receptacle at ceiling mount location

16. Media Design Guidelines and Criteria:

- Sufficient storage and installation of media equipment
- Control of equipment at front and rear of room
- Effective lighting controls and levels (see Lighting, Item 14)
- Effective viewing angles not to exceed a 30-degree angle
- Quality audio listening levels and acoustics
- Provision of standard, high quality, and serviceable models of media equipment. Architectural and Engineering services Owner's Representative to confer with the Information Technology Services.

17. Audio-Visual Equipment: (UPM to plan with IT personnel):

- Provisions for use shall be incorporated into new and remodeled buildings.
- Include flexibility of electrical connections and panels to allow overhead projectors, television monitors, television cameras, and portable cart computer terminals. Note: UPM to check with user to determine if a specialty room is to be wired for students to interconnect their portable laptops at their desk.
- Requirements for equipment selection, conduit sizes, cable trays, amperage, etc., will be developed for projects with assistance from IT personnel.

M. Specific Classroom Needs: In addition to the guidelines for general classrooms the following specific elements need to be incorporated into the design.

1. Auditoriums:

- a. Minimum workspace at front of room should allow 10-feet of distance between the screen surface and overhead projection position. It is preferred to utilize a second corner mounted 84-inch minimum size Screen for overhead projection.
- b. Largest dimensions should be front to rear considering preferred viewing angle for projection. However, a dimension of 80-foot depth and 75-foot width is acceptable if viewing angle does not exceed 30 degrees.
- c. Ceiling height should allow viewing of a vertical 96-inch image without obstruction from all seating positions.
- d. Auditoriums may need to utilize a riser at room front and/or use a sloped floor.
- e. If a rear projection booth for the auditorium is necessary by the user, it should contain:
 - 1) Fixed glass projection window.
 - 2) Controls similar to front of the auditorium.
 - 3) 125v duplex receptacles and data outlets above the counter surface.
 - 4) Two 3/4-inch conduits to front control panel.

- f. Provide a control panel at front side of room with optimum availability for instructors to contain:
 - 1) All lighting, electrical, projection voice/data, and audio control jacks.
 - 2) Lockable storage compartment for video player, PA/sound system, and remote control unit for video player.
 - g. Program and design potential use of the auditorium for remote video conferencing. After review with users, Telecommunications, and that it's use is probable for the space, include:
 - 1) Conduit for remote cameral locations.
 - 2) Extra space for a media wall or switching console projection booth.
 - 3) Interconnectivity (conduit and cable) to the building's fiber optic panel in the utility closet.
 - 4) Two extra 3/4" conduits from front control panel to media wall or projection booth.
2. Classroom (30-50 seat):
 - Minimum workspace at front of room should allow 8-foot distance between the screen surface and overhead projection position. Avoid viewing angles greater than 30 degrees.
 - Therefore, a slightly greater distance should occur front to back and the lesser dimension side to side.
 - Ceiling height should allow viewing of a vertical 70" image without obstruction from seating positions.
 3. Lecture/Presentation (50-120 seat):
 - Storage space of 22-inches by 36-inches for mobile media carts at rear of lecture hall.
 - A 3/4-inch conduit (center of front to center of rear) is required for remote control wiring or future use.
 - A 125v duplex floor receptacle centered approximately 15-feet from room front to portable equipment.
- N. Classroom Technology Requirements: The following are minimum technology standards for all classrooms:
1. Basic Classroom:
 - Lectern with faceplate and wiring for video and data
 - Ceiling mounted projector
 - VCR (VHS)/DVD
 - Two (2) ceiling speakers and amp
 - One (1) screen
 - Close captioning device
 - Cable TV, AC power and telephone jack
 - Dimmable lighting and sound damping panels
 - Ethernet connectivity
 2. Large Classroom (100+ seating):
 - Lectern with faceplate and wiring for video and data
 - Ceiling mounted projector
 - VCR (VHS)/DVD
 - Four (4) to six (6) ceiling speakers and amp
 - One (1) large screen (16-feet +)
 - Close captioning device
 - Cable TV, AC power and telephone jack
 - Dimmable lighting and sound damping panels
 - Digital document camera
 - Ethernet connectivity (consider a wireless access point to provide access for students and the Professor)

3. As pertaining to cabling, the A/E shall specify the latest accepted industry standard; i.e., use CAT-6E in lieu of CAT-5E.
 4. Color-coding for data outlets shall match the following:
 - Data/Nautilus Card = Blue
 - Voice = White
 - Analog/Other = Green
- O. Hurricane Shelter: Until a regional planning council in which a campus is located has sufficient public hurricane evacuation shelter space, any campus building for which a design contract is entered into, subsequent to July 1, 2001, must be constructed in accordance with public shelter standards for use as a public hurricane evacuation shelter. Enhanced hurricane resistance standards include fixed passive protection for window and door applications to provide mitigation protection, security protection with egress, and energy efficiencies that meet standards required in the 140-mile-per-hour wind zone areas. The A/E must also submit proposed facility retrofit projects to the Department of Community Affairs for assessment and inclusion in the annual report prepared in accordance with s. 252.385(3).
- P. In buildings that require vending equipment, a separate room or space must be provided unless directed otherwise. Coordinate all equipment operation and use with the University Nautilus Card System/Access System. Consult Section 16727 (Exhibit No. 12)
- Q. All walls shall be constructed to provide desired sound attenuation and/or fire rated capacity as required by current codes.
- R. Provide acoustical privacy from space-to-space. Sensitive offices or spaces that require complete privacy shall have partitions with sound-attenuation batts that run to the underside of structure above. Sound seals around doors may be required in specific locations.
- S. Custodial Closets: There shall be one custodial closet for each 16,000 gross square feet of building area. Minimum size for custodial closets shall be 40 square feet. Custodial closets shall not share space with: building mechanical, plumbing, and electrical, fire alarm, security, or telecommunications equipment, shall be directly entered from a corridor, and shall not be a passageway to any other room. The design of each custodial closet shall include the following:
 1. A floor mounted service sink with hot and cold water.
 2. Thirty linear feet of 12-inch shelving, wall mounted.
 3. A built-in locker 2-feet – 0-inch by 3-feet – 0-inch by 7-feet – 0-inch with hasp for padlock.
 4. Lighting at 40-foot candles.
 5. Resilient tile floor covering.
 6. An exhaust fan that is interlocked with the air-handling unit serving the area.
(Minimum Exhaust - 200 CFM per area)
 7. Custodial closets must be accessed from the hall and not from a classroom or office.
 8. Adjustable shelves must be provided in each closet.
 9. Door shall open out into hallway.
 10. Walls above floor mounted service sink shall be covered with stainless steel to height of 48" and bottom turned out into sink.
- T. Provide low maintenance and no maintenance materials and equipment both interior and exterior.
- U. Wall construction in high-traffic areas, such as corridors, shall be painted CMU or metal stud/gypsum wallboard assemblies with veneer plaster.
- V. Under no conditions shall the A/E design or specify an EIFS system into any portion of the work.
- W. All tile floors in toilet areas shall slope to floor drains.
- X. The use of skylights is discouraged.

Y. All buildings shall incorporate site furnishings including bicycle racks, trash receptacles and benches meeting university standards.

Z. Non-Programmed Space Requirements:

1. Corridors: Appropriate exiting requirement, drinking fountains, permanent benches, and other public facilities should be included to serve the occupants.
2. Public Toilets: Any pipe space (chase) behind toilets shall be 3-0-feet clear and shall be readily accessible. Include lighting and a separate **120-volt** duplex receptacle in each pipe space. Install hand dryers in washrooms.
3. Maintenance Storage: Provide a storage space of approximately 1/100th the GSF of the building (in a 100,000 GSF building and an area of 1000 GSF should be designed). At minimum, 100 GSF must be included for storage of maintenance items for the building such as extra floor tile, lights, stepladder, etc.
4. Elevators: Size these capable of using an emergency medical gurney. They should be located close to custodial closets for easy access of transporting scrubbers to other floors.
5. Dock/service areas must be appropriate for deliveries considering the building size and equipment.
6. Utility Closets: Locate telecommunications, computing fiber, and branch electrical panel boards in the same utility closet. Provide adequate clearance around equipment.
7. Codes and Legal Compliance: All designs will meet applicable trade and building codes in addition to the Americans with Disabilities Act (ADA), and Life Safety 101.
8. Existing Utilities: No structure will be placed over existing utilities.
9. Mechanical Penthouses: Roof penthouses are discouraged. Mezzanines are acceptable if new replacement units can fit through the access door. Integration of mechanical rooms into the on-grade floor plan is preferred. Placement of appropriate sound attenuation is required.
10. Backflow preventers shall be installed within the building.

AA. Various publications are referenced in other sections of this Standard to establish requirements for the work. These references are identified in each section by document number. The document number used in the citation is the number assigned by the standards producing organization. When preparing a Project Manual, the A/E shall use the most current issue of the publication.

BB. Each public K-20 educational institution that is provided or authorized by the Constitution and laws of Florida shall display daily in each classroom the flag of the United States. The flag must be made in the United States, must be at least 2 feet by 3 feet, and must be properly displayed in accordance with Title 4 U.S.C. A flag must be displayed in each classroom pursuant to this subsection no later than August 1, 2005.

-END OF SECTION-

DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS

All Architects and Engineers selected to provide design services for the University of West Florida will be provided bidding and contract requirements by UWF Procurement and Contracts. These documents are to be completed by the design professional and included in the Project Manual. Specific items, sections, and forms include the following:

- Call for Bids
- Instructions to Bidders
- Proposal Form
- List of Subcontractors and MBE Participation Form
- UWF General Conditions of the Contract for Construction Document as Modified
- Forms of Performance and Payment Bonds
- Form of Owner-Contractor Agreement for Construction
- Forms
- Certificate of Substantial Completion
- Certificates of Contract Completion
- Antitrust Claims Form
- Certificate of Non-Segregated Facilities
- Change Order Form (and Change Order Justification Form)
- Construction Change Directive Form
- Schedule of Values Form
- Payment Requisition Routing Slip
- Certificate of Partial Payment Form
- Project Sign (University of West Florida)
- Special Conditions – In case of conflict, the University expects the most stringent requirement to apply and will be complied with at no additional cost to the owner.
- Supplement to Project Manual

-END OF SECTION-

DIVISION 1 – GENERAL REQUIREMENTS**01010 – Summary of Work**

- A. The A/E shall provide a complete description of all elements of the project, including any related work, and explain the use for which the project is being built, in order that prospective bidders can decide whether or not to bid on the project.
- B. List all Owner-furnished items to be installed by the Contractor, and the work required to install them. Details and installation instructions shall be indicated in the applicable section of the specifications and drawings.
- C. Provide instructions for future work, such as an addition, including structural provisions, utilities, areas of the site to be kept clear, and site preparation, installation of special equipment, or other such task. Indicate provisions for fire safety, circulation, and accessibility. Identify areas of work such as piping, ductwork, and conduit that may be extended in future work without necessitating a system shutdown.
- D. Describe all job conditions that will affect phasing and scheduling of the work. Provide the proper guidance for projects involving remodeling in buildings that are to remain in operation during work. It is the responsibility of the A/E and Contractor to coordinate all required utility shutdowns during construction with the University Project Manager to minimize the impact on operational facilities.

-END OF SECTION-**01015 – Owner-Furnished Threshold Inspector**

- A. For any building classified as a “threshold building,” the A/E shall provide a written threshold plan submitted with the final Contract Documents. University selected independent inspector.

-END OF SECTION-**01026 – Unit Prices**

- A. Unit prices may be used where identifiable materials to be provided are not quantifiable.

-END OF SECTION-**01060 – Regulatory Requirements**

- A. The Design Professional shall follow all requirements specified in the State of Florida Department of Management Services Professional Services Guide. It will be the responsibility of the A/E to ascertain that all new work and renovations concur with current:
 - 1. Florida Building Code.
 - 2. Life Safety Code (NFPA 101, Lastes Ed).
 - 3. National Pollutant Discharge Elimination System (NPDES) relating to storm water.
 - 4. Florida Department of Environmental Protection (FDEP) and the United States Environmental Protection.
 - 5. Requirements of the City of Pensacola Architectural Review Board (ARB) (for WFHPI projects).
 - 6. Fire safety requirements as provided in Section 633, F.S. including required plan review by the State Fire Marshal’s Office.
 - 7. Flood plain management criteria as described in Section 255.25(6) F.S.
 - 8. Facility energy evaluation per the requirements of Section 255.254 F.S.,
 - 9. Applicable codes, regulations, and orders as listed in the “Professional Services Guide” and this document.
 - 10. Northwest Florida Water Management District.
 - 11. Protected or endangered species per FWC.
 - 12. Archaeological survey.

-END OF SECTION-

01100 – Alternates

- A. A limited number of alternates may be used as a means of ensuring base bids within the available construction funds. Only additive alternates shall be used. Proposals shall be clearly defined, listed in priority of need, and clearly reviewed with the University Project Manager.

-END OF SECTION-**01200 – Project Meetings**

- A. The A/E shall record and distribute meeting minutes to each party present and to parties who should have been present.
- B. A “Preconstruction Conference” shall be held to discuss items of significance that could affect progress, including the following:
1. Contractor Safety Program Document (See Exhibit No. 3).
 2. Tentative construction schedule and critical work sequencing.
 3. Designation of responsible personnel.
 4. Procedures for processing field decisions and Change Orders.
 5. Procedures for processing Applications for Payment.
 6. Submittal of Shop Drawings, Product Data, and Samples.
 7. Preparation of record documents.
 8. Use of the premises.
 9. Parking availability.
 10. Office, work, and storage areas.
 11. Equipment deliveries and priorities.
 12. Contractor safety procedures and First aid.
 13. Security.
 14. Housekeeping.
 15. Working hours.
 16. Inspections required by the Escambia County Building Code Official.
 17. Inspections required by the State of Florida Fire Marshal.
- C. Conduct “Construction Progress Meetings” at the project site every two (2) weeks. These meetings shall review the present and future needs of each entity present, including the following:
1. Construction schedules.
 2. Status of submittals.
 3. Deliveries.
 4. Off-site fabrication problems.
 5. Access.
 6. Site utilization.
 7. Temporary facilities and services.
 8. Hours of work.
 9. Hazards and risks.
 10. Housekeeping.
 11. Quality and work standards.
 12. Change orders.
 13. Documentation of information for payment requests.
 14. Meeting format:
 - a. Introductions of new persons attending the meeting.
 - b. Set date of the next pay/progress meeting.
 - c. Review minutes of previous meeting.
 - d. Submittal Schedule:
 - 1) Shop drawing and submittal log (a copy of the project to date log should be attached to the agenda).

- 2) Review of key building component status by contractor (i.e., re-submittals, long lead components and need to expedite, etc.).
 - e. Change Orders, Request for Proposal, and Anticipated Change Orders:
 - 1) Review change order log by number and issue as to what action has taken place by contractor.
 - 2) Review all contract changes. If no changes have occurred, state such.
 - f. Delivery Problems: Report by contractor.
 - g. Project Schedule: Only after items 4, 5, and 6 have been discussed can Item 7 be considered. The schedule needs to be revised per the specification.
 - h. Unresolved Issues:
 - 1) Request for Information by contractors: State each RFI received and the status.
 - 2) Other
 - i. Provide field bulletins written by the on-site observer from Architect/Engineer
 - j. Progress report form each contractor:
 - 1) Past 30-day period progress.
 - 2) Expected next 30-day period progress.
 - k. Contract Status:
 - 1) Contract dollars approved thru this pay request less retainage in row and column format by contractor. Identify Pay Request No., Net Change Orders approved, current contract amount, retainage, current paid amount and any other column you believe necessary.
 - 2) Percentage of contract work completed to date in row and column by contractor.
 - l. Miscellaneous Discussion
 - 1) We expect meetings to have great structure and organization about them.
- D. Conduct “Pre-Installation Conferences” as required throughout this document
1. The following pre-installations shall be scheduled the same day of construction meetings:
 - Concrete formwork, placing, and back shoring
 - Waterproofing
 - Mortar/masonry
 - Flashing
 - Roof
 - Entrance and window installation
 - Sealant
 - Vapor barrier
 - Sprinkler and ductwork
 - Painting
 - Architect or Engineering firm will record and distribute minutes
- E. Training:
- All training for day and night shift personnel shall be coordinated with using agency and A/E. Each session shall be no longer than 3 hours, not more than 6 hours of instruction per day, and maximum of 16 total contact hours/system.
 - Design firm to summarize by division and section numbers with title of the building system on one page within Division 1, general requirements.
 - Training must be scheduled and completed as part of substantial completion.
 - Operating and Maintenance Manuals – Contractor shall provide an electronic and hard copy, English language version of the system operating sequence program prior to energizing system controllers.
 - The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire system. This documentation shall include specific part numbers and software versions

and dates. A complete recommended spare parts inventory list shall be included with the lead time and expected frequency of use of each part clearly identified.

-END OF SECTION-

01300 – Submittals

- A. It is the A/E's responsibility to request and receive approval of a submittal if it is other than specified in these guidelines.
- B. The following submittals shall be forwarded to the University Project Manager (for review) in conjunction with the A/E's approval and prior to the return of the submittals to the Contractor:
 - 1. Brick
 - 2. Roofing System
 - 3. Door Hardware
 - 4. HVAC
 - 5. Plumbing
 - 6. Electrical
 - 7. Communications/Data
 - 8. Access System (Nautilus)
 - 9. Any submittal that requires a color selection.
 - 10. Store fronts and windows
- C. One (1) copy shall be forwarded immediately to the University Project Manager after the approval process by the A/E. The other copy shall be retained by the A/E and shall be delivered to the Owner at completion of the project. The final collection of submittals to the Owner shall be provided in a 3-ring binder with a table of contents and tabbed appropriately.
- D. The A/E shall include the following statement (or approved version) in the Project Manual:
- E. ALL REQUESTS FOR SUBSTITUTIONS OR USE OF "OR EQUAL" PRODUCTS MUST BE SUBMITTED PRIOR TO THE OPENING OF BIDS OR ACHIEVING A GUARANTEED MAXIMUM PRICE, AND APPROVALS SHALL BE GRANTED NO LESS THAN 10 DAYS PRIOR TO THE BID DATE. SUBSTITUTIONS REQUESTED AFTER THAT DATE WILL RECEIVE NO CONSIDERATION.**
- F. The A/E shall provide a Submittal Register as part of the Project Manual and shall distribute copies at the Preconstruction Conference (see Exhibit No. 4 for sample Submittal Register).
- G. Construction Schedule – Computerized Critical Path Method (CPM) unless otherwise noted.

-END OF SECTION-

01500 – Construction Facilities and Temporary Controls

- A. The A/E shall coordinate with the University Project Manager to determine temporary construction facilities such as heating, cooling, and ventilation, water, sanitary, electrical and lighting, fire protection, and barriers and enclosures. **The University Project Manager will decide if the University will require the Contractors to furnish and install meters on all temporary utilities.**
- B. The A/E shall specify that the Contractor be required to provide temporary controls such as drainage, storm water run-off, and noise and dust repression, as required.
- C. The University Project Manager shall direct the A/E as to what degree the Contractor shall provide and/or maintain field offices and sheds, materials and equipment storage, parking and access to the construction area, traffic control and barricades, and the rerouting of University vehicular and pedestrian traffic.
- D. The A/E shall coordinate with the University Project Manager to clearly define the Contractor's staging and storage areas on the Contract Documents.

- E. The contractor shall obtain a permit for his office or field shed and temporary utility connections as required by Escambia County Building Inspections

-END OF SECTION-

01530 – Utility Locations

A. Utility Locates Outside the Building Envelope:

1. Architect/Engineering design firms will provide owner record documents for their use. The owner assumes no responsibility for actual locations of existing utilities. A/E's will show such approximate utility locations on a site plan and other plans as appropriate.
2. Within 48-hour notice, the UWF Plant Operations and Maintenance and University Project manager, in conjunction with local utilities, will assist the contractor with the approximate layout of utility locations. Subsequently, the contractor will be responsible for accurately tracing, identifying and maintaining exact locations throughout construction.
3. Existing Utilities shall be protected by the Contractor. All damages incurred to marked or obvious utilities as a result of the Contractor's operation shall be repaired in accordance with the applicable code, at the Contractor's expense, and to the satisfaction of the Owner. **All damaged utilities being repaired require a permit and inspection from the Escambia County Building Code Inspection Office.** Contractor shall immediately notify Plant Operations and Maintenance Work Control center at 857-6000 in the event of a utility break.
4. Contractor will be responsible to disconnect, remove, cap, continue service, or relocate all facility utilities distribution systems necessary to perform the scope of work within the contract documents. Capping of any utility will be made as close to the main as possible following all applicable code requirements.
5. The contractor will note all such work on as-built construction site drawings.
6. Design consultant shall provide UWF Design and Survey Record Department CADD as-built documents.

B. Utility Locates Inside the Building Envelope:

1. Architect/Engineer design firms will be provided owner record documents for their use. The owner assumes no responsibility for actual locations of existing utilities. A/E will locate utilities on a general plan multiple trades may encounter utilities, or utility plan if only M/E trades will encounter utilities.
2. Contractor will be responsible to locate, disconnect, remove, cap, continue service, or relocate facilities utility distribution systems required to perform the scope of work within the contract documents. Capping of any utility will be made as close to the main as possible following all applicable code requirements.
3. Existing Utilities shall be protected by the Contractor. All damages incurred to marked or obvious utilities as a result of the Contractor's operation shall be repaired in accordance with the applicable code, at the Contractor's expense, and to the satisfaction of the Owner. **All damaged utilities being repaired require a permit and inspection from the Escambia County Building Code Inspection Office.** Contractor shall immediately notify Plant Operations and Maintenance Work Control center at 857-6000 in the event of a utility break.
4. The contractor will note all such work on as-built construction site drawings.
5. The contractor will notify the owner when utilities have been located and the area for demolition or construction has been established. A walk through will be scheduled with the affected department representative to observe and voice concerns.

-END OF SECTION-

01560 – Environmental Protection

- A. All contractors, sub-contractors, and their employees, intending to bid on projects and do work for the University of West Florida, must comply with these procedures as summarized. A complete copy of the procedures may be obtained by contacting one of the Departments listed at the end of this summary. Violations of State and Federal regulations could result in fines or civil and criminal action against the Contractor or the University. The following procedures have been developed to assist the Contractor and the University in meeting requirements of the state and federal regulatory agencies. The numbers in parenthesis appearing at the end of succeeding paragraphs refer to articles contained in the document “Procedures to Identify and Manage Environmental Issues During Demolition, Renovation, and New Construction Projects at the University Of West Florida Exhibit B, Supplemental General Conditions of the Contract for Construction Projects.” See Exhibit 4-5).
- B. During the bidding phase of all demolition and renovation projects, the contractor shall receive a site inspection report from the Office of Environmental Health and Safety (EH&S), or Drawings and / or Specifications from the Architect, Environmental Consult and, or University Project Manager identifying any potential building components of an environmental concern within the scope of the renovation or demolition only. Exhibit 4-5, Section 10.4.1.
- C. Prior to contracting for work, each contractor, subcontractor, and their employees, who use hazardous material and may generate a hazardous waste, must provide evidence of having received RCRA Hazardous Waste Awareness Training, and annual refresher training, as required by Exhibit 4-5, Sections, 40 CFR 265.16, 262.34 and {10.5.3}.
- D. Contractors and subcontractors shall identify all hazardous materials and maintain Material Safety Data Sheets (MSDS) for each product on site as required by the OSHA Hazard Communication Standard. Exhibit 4-5, Sections, {10.4.2 and 10.7.1.3}.
- E. Contractors shall be responsible for estimating the type and quantity of hazardous waste that will be generated by all contractor employees and sub-contractors prior to start of a project. Exhibit 4-5, Section, {10.4.2}.
- F. The Contractor shall be responsible for the proper identification, and management of all hazardous wastes within the scope of a given project. Specifically, contractors must identify a secure waste accumulation area, store waste in appropriate containers, identify the contents of the containers including the words HAZARDOUS WASTE, and inspect the containers on a weekly basis. The inspection must be documented. Exhibit 4-5, Section, {10.1.5.3}.
- G. The Contractor shall turn all properly identified hazardous waste over to the University, Office of Environmental Health and Safety, at the end of the project or other agreed upon time. Any other arrangements shall have prior written approval from the Office of Environmental Health and Safety and the University Project Manager. Exhibit 4-5, Section, {10.1.5.4}.
- H. HAZARDOUS WASTE shall not be removed from the campus by contractors or sub-contractors, unless prior arrangements have been made with the University and the waste is properly manifested and transported by a licensed hazardous waste transporter. Exhibit 4 Section, {10.1.5.5}.
- I. The Office of Environmental Health and Safety will verify the identification of the waste. If the identification is unacceptable, EH&S will not accept the waste and the contractor shall bear the cost of laboratory analysis for adequate identification. Exhibit 4-5, Section, {10.1.5.6}.
- J. All hazardous waste will be shipped off site using the University’s hazardous waste contractor, under a manifest bearing the USEPA ID# of the University of West Florida, and signed by a University EH&S representative, unless prior arrangements have been made and approved in writing by UWF Office of EH&S and the University Project Manager. Exhibit 4 Section, {10.13.5}.

- K. All hazardous waste turned over to the University shall be contained in appropriate, compatible, and closed, containers for the type and volume of waste generated. Containers may include DOT approved 55 or 30 gallon open-head or closed-head drums, 5 gallon pails or cans, etc., or possibly the original container. The contractor shall be responsible for providing the appropriate container for all types of hazardous waste generated. Exhibit 4-5, Section, {10.10.3}.
- L. Paint brushes, rollers rags, sludge, absorbents, etc. used with oil paints or solvents, and that are waste materials shall be placed in 5 gallon sealable buckets, or other appropriate size containers. Exhibit 4-5, Section, {10.1.5.7}.
- M. In no cases shall evaporation be used to dry solvent laden materials destined for disposal. Evaporation of waste solvents is considered illegal disposal of hazardous waste. Exhibit 4-5, Section, {10.15.7}.
- N. All hazardous waste must be stored in a secured, locked, and safe location. Incompatible waste (acids/bases/flammables) must be stored in physically separate location. Hazardous waste storage locations shall be coordinated and approved by EH&S. Exhibit 4-5, Section, {10.6.1}.
- O. All hazardous waste containers must be closed at all times except when adding waste. Exhibit 4-5, Section, {10.1.5.7}.
- P. Fluorescent bulbs and ballasts shall be removed from all lighting fixtures prior to disposal.
1. Fluorescent bulbs shall be placed in appropriate size tube cartons from original cartons or available form bulb recycling facilities. Do not break bulbs. Do not tape bulbs. Broken bulbs must be placed in sealed containers and handled separately. Each box must be labeled in accordance with FAC 62-737 and dated. Exhibit 4-5, Section, {10.12.3}.
 2. Ballasts shall be separated into PCB and non-PCB categories and placed into separate 55-gallon (or appropriate smaller size) open-head steel DOT drum. Each drum must be labeled with appropriate labels: "PCB Ballasts for Recycling" or "Non-PCB Ballasts for Recycling". Exhibit 4-5, Section, {10.12.4}.
- Q. The Contractor shall be charged by the University for all hazardous waste based on the current contract rates with the University's Hazardous Waste Contractor. Exhibit 4 Section, {10.1.5.9}.
- R. Examples of trades that may generate hazardous wastes:
1. Demolition Contractors
 2. Roofing Contractors
 3. Painting Contractors
 4. Carpet/Floor Finish Applications
 5. Specialty Application Contractors
 6. Plumbers
- S. Examples of hazardous waste that may be generated:
1. Florescent and HID Light Tubes
 2. PCB/non-PCB Ballasts
 3. Lead-containing Paint
 4. Mercury containing devices (thermostats & controls)
 5. Mineral Spirits
 6. Toluene
 7. Acetone
 8. Oil based paints and stains
 9. Paint Thinners
 10. Aerosol cans (paints, cleaners, adhesives)
 11. Roof Patch/tar
 12. Carpet glue
 13. PVC Primer and glue

14. Brushes, rollers, and rags used with oil-based paint and solvents
15. Sludge from cleaning oil paints and equipment
16. Waste product from any container labeled flammable or combustible or that contains “petroleum distillates” or chlorinated hydrocarbon compounds.

-END OF SECTION-

01580 – Project Sign

- A. See Exhibit No. 6, for drawings depicting requirements for the project sign for construction.

-END OF SECTION-

01700 – Contract Closeout

- A. The A/E shall review the University’s General Conditions and contract requirements to determine whether or not this subject is adequately covered. Items to be considered shall include, but not necessarily be limited to the following:
 1. Project Record Documents.
 2. “Design” CADD Drawings and Specifications:
 - Before submitting as-built CAD files to the Design and Survey Records Office, all external references (XREF) drawings must be bound and all appropriate script files shall be run so the CAD file shows a true visual representation of its corresponding hard copy. Include all non-standard AutoCAD font files and CAD layer name list and their descriptions. The “purge all” command shall be performed prior to submittal to remove unused elements and reduce drawing size.
 3. As-Built” Drawings and Specifications hard copy and electronic (DWG and PDF) formats.
 4. Minimum of two complete hard copy and electronic Operation and Maintenance Manuals.
 5. Final Inspection/Completion and Final Payment. The Escambia County Building Inspections Department shall approve all final permits.
 6. Project Turnover Procedures.
 7. Warranties, Guarantees, and Bonds.
 8. Certification of Completion or Certification of Occupancy from the Escambia County Building Inspections Department.
 9. Final Project Approval: projects will be finally accepted, regardless of the funding source, after the design firm and the University Project Manager have assured all trades punch list items have been satisfactorily completed. A copy of the official punch list with the lead consultant and University Project Manager’s Representative’s initials with the approval date will be placed in the project file. Final payment will be made after the above has been completed.
 10. Require training on installed equipment, systems etc.
 11. Test and Balance Report.
 12. Roof System Report.

-END OF SECTION-

DIVISION 2 – EXISTING CONDITIONS – STRUCTURE MOVING, DEMOLITION, & SOIL BORING

General Site Work Guidelines

- A. Storm water retention design for each new building or site work project shall be coordinated with the University of West Florida Master plan and with the location of future campus regional ponds.
- B. The A/E shall specify that compaction, pipe leakage, hydrostatic, and other related testing shall be conducted and paid for by the Contractor.
- C. Avoid steps in walks between the street and a building entrance, especially steps midway in the walk. Instead of steps, a ramp may be used, provided that the length of the gradient is short, that the slope is not more than 1:12 ratio and that a handrail is provided alongside the walks if they are sloped more than 1:20 ratio percent. All Florida Accessibility Code for Building Construction requirements must be followed. Exposed aggregate shall not be used for sidewalks except for ADA code requirements.
- D. Utility Shutdown: In order to provide the University community with thorough and timely notification of pending utility outages, the procedures detailed below shall be adhered to for all but emergency situations. Emergency situations are ones in which rapid action is required to shut off a utility service to prevent personnel injury, to ensure public safety, and/or to prevent significant damage to a building or equipment. For other than emergency situations, the University's policy is to make all reasonable efforts to minimize the impact any outage would have on the buildings occupants and operations, while at the same time avoiding project delays. To meet both of these goals, effectively planning and communication are critical.
 1. At least five working days prior to a proposed outage, notification must be made to Project Manager. The written notification must include the following information; the proposed date (s) and time, the location and areas affected, the utility to be shut off, the reason for the outage, a broader range of dates and times within which the outage could be scheduled in the event that the proposed date(s) are not feasible (if broader window is not possible, provide justification), and the name and telephone number of your organization point of contact for scheduling.
 2. The Work Control Center will provide you, you via the Project Manager, with a response to your request no later than two working days prior to the proposed outage date. It is recommended that you not wait to provide the University with notification prior to that five working day limit would facilitate the process.

Subsurface Exploration

- A. The A/E shall furnish a subsurface investigation report as described in the State of Florida Department of Management Services Professional Services Guide. The A/E shall provide plans showing required test boring locations or any other information required for the testing laboratory.
- B. The Owner shall supply the A/E with utility plans showing underground installations and the A/E shall locate borings to avoid these utilities. The A/E shall specify to the Contractor that the Owner shall in no way be held responsible for the accuracy of the information.

Demolition

- A. Structure removal shall be included in the demolition package.
- B. In open areas, foundations of structures shall be removed in its entirety. Where new structures will replace existing structures, indicate extent of foundation removal on the drawings. No existing slabs shall remain under fill for new structures. Hazardous material removal shall be conducted prior to structural removal as required by federal, state and local requirements.
- C. On all projects involving demolition and/or renovation, the A/E shall review with the University Project Manager (for inclusion in the bid documents) the possibility of salvage of materials and equipment, either for use in the remodeling project, or by the Department of Plant Operations and Maintenance. The University Project Manager will notify the A/E of materials and equipment to be removed by the Owner or to be turned over to the Owner by the Contractor. Non-reusable materials, including toxic and/or hazardous waste will be removed from campus by the Contractor. The A/E shall specify in the “Summary or Work” accompanying the Invitation to Bid and in the Contract specifications, that the University reserves the right to remove certain items prior to start of construction, and in defined instances the Contractor shall turn over specified items of salvage to the Owner.
- D. The A/E shall specify that under no circumstances shall demolition materials be buried on-site or on campus property.
- E. All demolitions require permitting through the Escambia County Building Code Inspection Office.

Site Preparation (Tree Protection)

- A. University “Tree Protection Policy”. See Exhibit 8. This document was produced by the University of West Florida and may be used by the A/E as a guideline in the proposed Project Manual.
- B. All excavations require underground utility marking. **IT IS THE LAW OF THE STATE**
The University of West Florida operating procedures can be found at <http://uwf.edu/facservices/facilities/soppdf/fmsop/FM1.015%20Utility%20Locate.pdf>. Design professional have responsibilities to include certain information on drawings regarding underground conditions.

1. On University property you may expect to find the following university:

Utilities:

- Electric lines up to 15,000 volts
- Communication cables
- Fiber optic lines
- Domestic Water lines
- Sanitary sewer lines
- Storm Sewer lines
- Chilled water lines
- Hot water lines
- Propane and Natural gas lines
- Fire Protection services
- Exterior lighting lines, some direct burial
- Also several other utility company lines are on campus

DO'S AND DON'TS

DO'S:

Follow University of West Florida Standard Operating Procedures #FM1.015.
Mark areas to locate with either white paint or white flags.

DON'TS:

DO NOT try to repair or cover up underground utility damage. Call ext. 6000 and if it belongs to a utility other than the University contact them immediately.

-END OF SECTION-

DIVISION 3 – CONCRETE**03300 – Concrete**

- A. The A/E shall specify concrete to have a 28-day compressive strength of 4,000 psi or greater. All work shall be in accordance with ACI 301.
- B. For projects that include masonry bearing walls, the A/E may specify a 2,500-psi mix for wall fill.
- C. Concrete slabs, concrete frames (if building structure is poured concrete) and reinforced masonry walls shall show control and expansion joints on the Drawings. Slabs shall be broken into areas of 400 to 600 s.f. between joints and one direction being no greater than twice the distance in the other.
- D. Slump for concrete shall be specified at 4-inches (plus or minus 1-inch) except for 2,500-psi wall fill or if a super plastisizer is used. The water cement ratio shall be approximately 5 for 3,000 psi concrete with smaller ratios for higher strength concrete or for concrete exposed to salts or other corrosive environments.
- E. Fly ash may be used so long as the amount does not exceed 25% of the cementitious material.
- F. Welding of reinforcement steel shall not be allowed unless approved by the University Project Manager.
- G. The use of a fiber mesh additive may be used in lieu of welded wire fabric when approved by the University Project Manager. Fiber mesh shall not be used where large areas of ceramic or stone floor tile are to be installed.
- H. When major shoring or re-shoring is anticipated, the A/E shall instruct the Contractor to submit for approval a shoring design prepared by a registered engineer specializing in this type of work.
- I. Vapor barrier shall be polyethylene sheeting with a 6-mil minimum thickness.
- J. Where sidewalks are required, they shall be 4,000 psi, a minimum of 6-feet wide, 4-inches thick, with 6x6, W1.4xW1.4 welded wire mesh reinforcement. The edge thickness shall be increased a minimum of 2-inches.

-END OF SECTION-

03520 – Lightweight Concrete Roof Insulation

- A. A lightweight concrete roof insulation system shall reach a minimum compressive strength of 125 pounds per square inch in 28 days and shall meet the following requirements:
 - 1. Foaming Agent: ASTM C 796.
 - 2. Portland Cement: ASTM C 150, Type 1.
 - 3. Insulation Board: ASTM C 578, one pcf density with an average “R” value of 20 when in combination with insulating concrete.

-END OF SECTION-

DIVISION 4 – MASONRY**General Masonry Guidelines**

- A. The A/E shall try to place control joints in masonry walls at roughly 50-feet on center. If the building design exceeds 200-feet in length, the A/E shall design a complete building expansion joint or at least through the walls. Where expansion or control joints are used, continuous bond beam reinforcement shall be stopped and smooth dowels (one end which is greased or wrapped) shall be placed through the joint.
- B. The A/E shall provide a 2-inch minimum air space between veneer brick and cavity insulation. Specify cavity to be unobstructed and free of mortar droppings.
- C. Mock-up panel must be erected adjacent to existing building.
- D. Sealers-All exterior masonry surfaces are to be sealed with SureKlean Weather Seal PD Siloxane. After applications of sealer provision must be made to clean windows.
- E. Lintels-All lintels are to be galvanize.

PREFERRED MANUFACTURERS

- A. Glazed Brick
 - a. Trenwyth Industries, INC.: “Astra-Glaze” glazed masonry units.
 - b. Burns and Russell Co.: “Spectra-Glaze II” pre-glazed masonry units.

-END OF SECTION-**04210 – Brick Masonry**

- A. Specify Type FBS, solid brick, conforming to requirements of ASTM C 216. Solid brick shall be used in lieu of veneer brick where installation of brick would expose cells to view.
- B. The internal and exterior masonry color palate, including accent masonry veneer, will be consistent with this document’s cover letter and as approved by Facilities Development and Operations after considering User input.
- C. Mortar color shall be selected on a project-by-project basis.
- D. A “mock-up” panel with an approximate size of 4-feet by 4-feet will be required for approval prior to the installation of brick veneer. The panel shall also include CMU back-up, thru-wall flashing, insulation, reinforcement and control joints.
- E. Brick Ties: For brick veneer anchoring system to steel stud construction, use 12 gauge triangular wire anchor or 16 gauge corrugated strap anchor. All components shall be hot-dipped galvanized.

-END OF SECTION-**04220 – Concrete Masonry Units**

- A. Hollow and solid CMU shall be Type II lightweight or normal weight, conforming to the requirements of ASTM C 90.
- B. Use of CMU in interior masonry walls and partitions shall be no less than six-inches in nominal thickness.
- C. Coordinate CMU coursing with door heights to eliminate the need for cutting block.
- D. Single-wythe masonry exterior construction will be accepted only when approved by FDO for residential and light commercial type construction

- E. Wall Reinforcement:
 - 1. Single-Wythe Wall Construction: 9-gauge truss-type.
 - 2. Brick Veneer/Masonry Construction: 9-gauge truss-type with an integral composite 3/16-inch wire “hook and eye” (at 16-inches o.c.) for adjustable veneer anchors
- F. Single-Wythe Wall Construction: 9-gauge truss-type.
- G. Brick Veneer/Masonry Construction: 9-gauge truss-type with an integral composite 3/16-inch wire “hook and eye” (at 16-inches o.c.) for adjustable veneer anchors.
- H. The A/E shall specify bituminous damp proofing for all exterior masonry back-up construction.
- I. Provide through-wall flashing of a waterproof, impermeable elastomeric sheeting not less than .030-inch thick.

-END OF SECTION-

04270 – Glass Unit Masonry

- A. All glass unit masonry products and accessories shall be equal to Pittsburgh Corning.
- B. Details and specifications outlining the installation of glass block shall be as per “Pittsburgh Corning Glass Block Products, Design and Specification Guidelines Manual.”

-END OF SECTION-

DIVISION 5 – METALS**General Metal Guidelines**

- A. All steel components exposed to the exterior, shall be hot-dipped galvanized.
- B. Unless directed otherwise, specify all items to be galvanized after fabrications where practical.

-END OF SECTION-**05100 – Structural Steel**

- A. Design all structural steel systems, including layout, materials, installation.
- B. Fabrication, erection, quality control and testing, to be in accordance with the “Manual of Steel Construction – Allowable Stress Design,” latest edition, and pertinent publications of the American Institute of Steel Construction (AISC), American Society for Testing and Materials (ASTM), and American Welding Society (AWS). Structural steel shall be Grade A36 or greater.
- C. If the steel structure design is of a complicated nature, the A/E shall specify that the fabricator shall be an AISC certified plant with a Category I or II rating. Steel connections shall be specified to designed and sealed by the fabricator’s engineer if the structure is very complicated and not specifically detailed on the Drawings.
- D. Specify that all welders, welding operators and tackers shall be qualified by AWS.

-END OF SECTION-**05200 – Metal Joists**

- A. The A/E shall state uplift requirements on the Drawings and shall refer to the Steel Joist Institute for bridging requirements.
- B. If joists are to be left exposed, painting shall be specified in the painting section of the Specifications.

-END OF SECTION-**05300 – Metal Decks**

- A. The A/E shall indicate profile, depth, gauge and structural properties of metal decks and whether the deck is to be painted or galvanized.
- B. If acoustical decks are to be used and the larger flat portion of the deck is placed on the bottom, the A/E shall specify an appropriate structural material to be placed on top of the deck to bridge the distance between the small upturned ribs.

-END OF SECTION-**05400 – Cold-Formed Metal Framing**

- A. Provide manufacture’s standard C-shaped steel studs with lipped flanges, a G90 galvanized coating designation, and with a Grade A, 33,000-psi minimum yield strength.
- B. Approved Manufacturers
 1. Alabama Metal Industries Corp.
 2. Dale/Incor Industries of Florida
 3. Unimast, Inc.

-END OF SECTION-

05500 – Metal Fabrications

- A. The A/E shall specify and design items that do not form a part of the structural steel framework, such as lintels, angles, and miscellaneous mountings and frames.

-END OF SECTION-

05720– Aluminum Handrails

- A. Design aluminum handrails 1 1/2 diameter x 1/8" aluminum tubing with a 3/4" sq bar bracket 6063-T5; caprail & bottom rail use 2" ϕ x .125" 6063-T: 2" x 2" x 1/4 post 6061-T6; 3/4" x 1/8 sq. 6063-T5 aluminum pickets to reject 4" sphere; 3 1/2" ϕ core drill holes 4" embedment minimal w/FX-935FL grout, FC=12000 PSI.
- B. Design Loads
1. Top Rail:
 - a. Concentrated load of 200 pounds applied at any point and in any direction.
 - b. Uniform load of 50 pounds per linear foot applied horizontally and concurrently with uniform load of 100 pounds per linear foot applied vertically downward.
 - c. Concentrated load need not be assumed to act concurrently with uniform loads.
 2. Intermediate/Bottom Rails:
 - a. Concentrated load of 200 pounds applied at any point and in any direction.
 - b. Uniform load of 50 pounds per linear foot applied in any direction.
 - c. Concentrated and uniform loads need not be assumed to act concurrently.
- C. Interior: Handrails to be stainless, aluminum, or galvanized.
- D. Exterior: Railing to be stainless steel, aluminum or galvanized.
- E. Thermal Movement: Provide handrails and guard railings that allow for thermal movement resulting from the maximum change (range) in ambient and surface temperature. This will preventing, buckling, opening of joints, overstressing of the components, failure of connections and other detrimental effects.

-END OF SECTION-

DIVISION 6 – WOODS, PLASTICS, COMPOSITES**06100 – Rough Carpentry**

- A. All pressure-treated wood items shall be in accordance with pertinent publications of the American Wood Preservers' Association (AWPA).
- B. The A/E shall specify that the following items be pressure-treated:
 - 1. Wood plates, furring and sleepers that are less than 24-inches from the ground.
 - 2. Any wood item that is set into or in contact with concrete or masonry.
 - 3. Wood nailers, edge strips, crickets, curbs and cants for roof decks.
- C. The A/E shall detail or note wood blocking in walls and ceilings at locations for the installation and attachment of finish materials, fixtures, and equipment.

-END OF SECTION-**06200 – Finish Carpentry**

- A. All wood finish and trim items shall meet the standards of the Architectural Woodwork Institute (AWI) and the National Wood Window and Door Association (NWWDA).

-END OF SECTION-**06400 – Architectural Woodwork**

- A. All cabinets, countertops and custom casework shall meet the standards of the Architectural Woodwork Institute (AWI), Builders' Hardware Association, Inc. (BHMA), Hardwood Plywood Manufacturers' Association (HPMA), and the U.S. Department of Commerce Product Standards (PS).
- B. Specify that all cabinets shall be fabricated to "Custom" grade standards of AWI. Exception: All door and drawer fronts utilizing natural/stain finish wood veneer shall be fabricated to "Premium" grade standards of AWI.
- C. All cabinet "boxes" shall be constructed with melamine panels except for "boxes" that contain sinks, lavatories, or other items that may cause damp, humid, or wet conditions. These wet-location "boxes" shall be constructed of exterior grade veneer plywood with plastic laminate finish.
- D. Countertops shall be constructed using only veneer plywood. It is preferred that all countertops are designed with a hardwood, PVC, or post-formed edge.
- E. Minimum hardware standards:
 - 1. Hinges: Concealed, heavy-duty, wide opening angle hinge, adjustable.
 - 2. Door and Drawer Pulls: At the Architects' discretion.
 - 3. Drawer Slides: Standard extension, 100-pound, commercial load capacity, side-mount with ball bearing rollers.
 - 4. Grommets: Provide recessed grommets with caps, properly sized, for wiring access slots in countertops.
- F. See Exhibit No.15, for design drawings depicting the University's standard lectern for classroom application.

-END OF SECTION-

DIVISION 7 – THERMAL AND MOISTURE PROTECTION**General Thermal and Moisture Protection Guidelines**

- A. All roof and roof accessory installations shall meet wind load the greater requirements as defined by:
 - 1. Florida Building Code, current addition, and ASCE-7.
 - 2. ANSI/SPRI – Wind Design Standard for Edge Systems (ES198).
- B. Roofs shall have a slope of not less than 1/4-inch per horizontal foot. The slope of the roof can be obtained either through the structural design or tapered insulation. The design and workmanship of the finished roof shall be such that no water shall pond on the roof surface more than 24 hours.
- C. An interior means of gaining access to low slope roofs shall be provided with locking capability.
- D. No interior building roof drains shall be allowed.
- E. Emergency overflow scuppers should be constructed not more than one-inch above the roof surface in compliance with building codes. Calculations will be provided for the sizing of all roof drains and scuppers.
- F. On all built-up or membrane roofs, roof walkways shall be provided from roof access point(s) to and around all roof installed mechanical or electrical equipment. Verify walkway locations with the University Project Manager.
- G. Unless otherwise approved by the University, the A/E shall specify a minimum of three manufacturers of roofing systems and shall obtain notarized letters from each factory technical representative that the type of roofing system specified will perform as specified in this locality and that all materials delivered to the job site and installed by the Contractor complies with the specifications.

Minimum warranty shall be 20 years unlimited with no dollar limit unless otherwise approved by the University. Warranties from roofing manufacturers shall include all labor and materials. In the event of roofing material failure, the roofing manufacturer shall warrant all costs of roofing repairs, including labor. Warranty shall be in effect for as long as the material warranty is in effect. The Manufacturer of the roof system will provide a final inspection and written certification of acceptance of the installation and verifying warrant ability of same.
- H. Parapet walls and caps (or coping) shall have through wall counterflashing. If limestone or cast stone is used, they shall have a lead “T” shaped cap embedded in caulking between each piece of stone cap. Mortar shall not serve this purpose. Pre-cast concrete caps shall not be used.
- I. The A/E shall perform core drills on all existing roofs (membrane roofs) prior to any re-roofing project. Metal deck and insulation conditions should be ascertained. The UWF thermal image photograph as well as visual observation of roof conditions will be used to determine the location of roof cuts.
- J. The A/E shall provide a water tight repair to all areas of core drills or sample cuts.
- K. A pre-construction conference shall be held two weeks prior to starting roof systems work.
- L. Emulsion waterproofing for open cavity masonry walls. University Approved Products: a. HLM 5000 by Sonneborn & b. Henry (See Terri 4 spec).
- M. All thermal & moisture protection shall follow recommendations of ASHRAE for the region.
- N. The A/E shall have all roof drains camera scoped, and provide the University Project Manager a copy of the recoding at completion of project. Reroof projects drains shall be camera scoped before work starts and again at completion.

DO'S AND DON'TS**DON'TS:**

DO NOT use vinyl siding on any portion of the work.

DO NOT specify an Exterior Insulated Finish System (EIFS) into any portion of the work.

-END OF SECTION-

07100 – Dampproofing and Waterproofing

- A. Waterproof all sub surface areas with monolithic membrane.
- B. Approval manufactures:
 1. American Hydrotech Monolithic Membrane 6125
 2. Product shall be applied per the manufactures specification and instructions.

-END OF SECTION-

07212 – Mineral Fiber Blanket Insulation

- A. The A/E shall specify membrane-faced glass fiber batts that comply with ASTM C 553, Type I, or ASTM C 665, Type II, Category 1. These batts shall be used where the thermal envelope vapor barrier is the outside face of the insulation.
- B. The A/E shall specify membrane-faced glass fiber batts that comply with ASTM C 665, Type II, Category 2. These batts shall be used where the vapor barrier is not integral with the insulation.
- C. The A/E shall specify membrane-faced glass fiber batts that comply with ASTM C 665, Type III, Category 2. These batts shall be used where a reflective facing is required and the vapor barrier is not integral with the insulation.

-END OF SECTION-

07214 – Board and Block Insulation

- A. Provide polyisocyanurate rigid foam insulation board that complies with ASTM C 1289, Type I and/or Type II.
- B. Insulation board shall be 1-inch minimum thickness with a compressive strength of 20 psi.
- C. Approved Manufacturers:
 1. Apache Products Company
 2. Celotex Corporation
 3. Dow Chemical Company

Note: When insulation is used in lightweight concrete system, polystyrene insulation or other insulation as approved by the lightweight manufacturer will be acceptable.

-END OF SECTION-

07220 – Roof Insulation

- A. Provide polyisocyanurate rigid foam insulation board for flat or tapered insulation systems. Insulation board shall comply with ASTM C 1289, Class 1, Type II. R-values shall be by LTTR (Long Term Thermal Resistance).
- B. Specify the insulation board to be 1 1/2-inch minimum thickness with a compressive strength of 20 psi.
- C. All insulation systems shall have FM Standard 4450/4470 approval.
- D. The A/E will verify compatibility of insulation with substrate and roofing system selection.

Note: When insulation is used in lightweight concrete system, polystyrene insulation or other insulation as approved by the lightweight manufacturer will be acceptable.

-END OF SECTION-

07310 – Fiberglass Shingles

- A. Provide high wind and impact resistant fiberglass asphalt shingles complying with ASTM D 3018, Type I, ASTM D 3161, Type I, and ASTM D 3462. The shingle shall have a minimum 25-year limited warranty, UL Class “A” fire rating and a UL 997 Wind Test label. Provide with 5-inch exposure.
- B. The A/E shall specify an “Ice and Water Shield” type product with an adhesive back for underlayment.
- C. Hand nailing is preferred method.
- D. Specify Manufacturer provide written notice that the shingles as shipped show correct nailing placement. Specify Contractor Installer provide written notice that the shingles as shipped show correct nailing placement
- E. Approved Manufacturers:
 - 1. Certain-teed Corporation
 - 2. GAF Materials Corporation
 - 3. Owens Corning

-END OF SECTION-

07412 – Standing Seam Metal Roofing

- A. The A/E shall specify an architectural standing seam metal roofing system that has been tested in accordance with ASTM E 331. Typically roof slope at 3 in 12 or greater should be used. A 20-year water tightness warranty should be provided by the manufacturer.
- B. Roofing material shall be a pre-finished minimum 24-gauge steel sheet, meeting ASTM A 653 and/or ASTM A 792. The exposed finish shall be a high performance organic finish – fluoro-polymer finish such as Kynar 500. Manufacturer’s standard prime coat finish for the bottom side is acceptable. A **minimum 20-year warranty on the finish** to be provided by the manufacturer. Color shall be approved by the University Project Manager and Associate Vice President prior to their selection and use.
- C. All fasteners shall be concealed.
- D. All roof curbs will be fully welded with integral cants and painted to match the roof.
- E. All other roof penetrations shall be detailed to avoid cutting of any standing seams.
- F. Flashings, closures, wall panels, gutters and related accessories shall be of the same material and finish as the roofing panels.
- G. The A/E shall specify an “Ice and Water Shield” type product with an adhesive back for underlayment. This material should also act as a slip sheet; if not provide separate slip sheet.
- H. Do not allow double pin roof edge systems. Preference is to fasten (fixed end) roof at the peak and allow edge expansion.
- I. Seam should be mechanically crimped and include sealant factory applied sealant in the joint prior to crimping.
- J. Wind speed warranties should be included for minimum 140 MPH winds or current code.
- K. Approved Manufacturers:
 - 1. Berridge Manufacturing Company
 - 2. MBCI, Metal Roof and Wall Systems
 - 3. McElroy Metal, Inc.
 - 4. Architectural Metal Systems

-END OF SECTION-

07540 – Thermoplastic Membrane Roofing

- A. Limit specifying only those membranes that have a minimum 15-year proven track record in the local of the installation. The Manufacturer must provide evidence of existing functional roofs at least 15 years old in a similar hot humid coastal environment of a composition substantially the same as the product currently offered.
- B. As thermoplastic membranes are heavily dependent on specific chemical formulation and manufacturing processes and as such careful and thorough consideration should be given of proposed substitutions.
- C. PVC membrane roofing shall conform to ASTM D 4434, Type II, Grade 1, for fully adhered applications and ASTM D 4434, Type III, for mechanically fastened applications. The preferred system is a fully adhered system with supplemental mechanical fastening.
 - 1. Approved Manufacturers:
 - a. Sarnafil, Inc. (fully adhered)
 - b. Fibertite Roofing Sys. (fully adhered)
- D. Evaloy membranes are relatively specialized formulations that maintain flexibility by avoiding migrating plasticizers. The A/E should carefully review performance history of Evaloys as several manufacturers are just introducing new products to the market. The preferred system is a fully adhered system with supplemental mechanical fastening.
 - 1. Approved Manufacturers:
 - a. Fiber-tite (by Seaman)
 - 2. As manufactured, the membrane shall conform to the following physical properties:
 - a. Color to be standard white
 - b. 45 –mil minimum thickness
 - c. Fiberglass reinforced membrane
- E. All membrane-laminated, galvanized or stainless steel metal flashings, flashing accessories, fasteners, and adhesives shall be produced or approved by the membrane manufacturer.
- F. Wind speed warranties: The basic wind speed warranty shall be for 140 MPH, or current code.

-END OF SECTION-**07550 – Modified Bituminous Membrane Roofing**

- A. Provide a 3-ply built up roof with SBS cap sheet with the following attributes.
 - 1. Application method shall be hot asphalt, torch applied or cold adhesive.
 - 2. Bitumen: Comply with ASTM D 312, Type III.
 - 3. Modified SEBS Bitumen: Comply with ASTM D 6152.
 - 4. Base Sheet: Comply with ASTM D 4601, Type II, with no perforations.
 - 5. Roofing Felts: Comply with ASTM D 2178, Type VI, premium grade fiberglass reinforced roofing felt.
 - 6. Mineral surfaced SBS Modified Bitumen Membrane Cap Sheet: Comply with ASTM D 6162, Type II, Grade G, 150-mil minimum thickness.
 - 7. Manufacturer's products shall be labeled with ASTM designation, Flash Point and EVT (equiviscous temperature).
 - 8. Solar Reflectance Index: 90 or greater.
- B. Metal for edging, counterflashing, copings, patch pans, and other related items, shall be .040-inch pre-finished aluminum as a minimum.
- C. Vented base sheet is acceptable where applicable.
- D. Modified Bituminous membrane roofing systems shall comply with ANSI "Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems".

- E. Approved Manufacturers:
1. Garland Company
 2. Surprema
 3. Firestone Building Products Company
 4. Siplast Roofing Products

DO'S AND DON'TS

DON'TS – DO NOT allow torch down applications on wood decks.

-END OF SECTION-

07660 – Sheet Metal Flashing

- A. Roof flashing systems shall comply with ANSI/SPRI ES1-98 “Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems”.
- B. Reference to SMACA details should be made only after careful consideration to the appropriateness of the reference. In general, do not assume SMACA details will result in an acceptable detail.
- C. Galvanized and “paint-grip” type flashings shall not be utilized.

-END OF SECTION-

07920 – Sealants and Caulking

- A. Products shall be equal to “Sonolac,” as manufactured by Sonneborn Building Products.
- B. Exterior Sealant: Specify a one-component urethane sealant conforming to ASTM C 920, Type S, Grade NS, Class 25, use NT, M and A. Products shall be equal to “NP1,” as manufactured by Sonneborn Building Products.
- C. Silicone Sealant: Specify a one-component silicone sealant conforming to Type II, Class A, Type Non-sag Class A, Type S, Grade NS, Class 25.
- D. Fire Caulking: The A/E shall utilize 3M’s “Applications and Specifiers Guide for Through-Penetration Protection Systems” manual as a reference for the design and application of fire stopping products and systems. All fire stopping shall comply with the requirements of the Fire Resistance Directory, Volume II published by the Underwriters Laboratory, Inc., and comply with NFPA 101 and the Florida Building Code (current editions).
- E. Approved manufacturers:
 1. Sonneborn Building Products
 2. Dow Chemical
 3. GE Sealants & Adhesives

-END OF SECTION-

DIVISION 8 – OPENINGS - DOORS AND WINDOWS**General Door and Window Guidelines**

- A. Steel studs shall be nested at door jambs and head to accommodate weight of door and shock caused by closing the door. Finished wall shall extend a minimum of 1-1/2-inches into the wrap-around frame throat opening.
- B. At least one (1) main entry door shall be handicap-accessible from adjacent sidewalks, and shall display the proper handicap signage. All other entry doors shall have proper signage to direct wheelchair handicapped persons, according to University signage standards, Division 10. The accessible door shall have automatic door opening devices as provided and installed by the Contractor.
- C. All corridor doors, closet doors, and all doors required to be fire-rated shall meet requirements of NFPA 80 and 101, and shall be able to use standard locksets.
- D. All egress doors shall have vision panels conforming to the requirements of NFPA 80 and FBC compliant.
- E. All classroom and office doors shall have vision panels set in steel framing or stops complying with NFPA 80.
- F. It is desirable that all exterior entrance doors be recessed or covered. For a minimum of 24” so not to have leverage to bend hinge and/or hinge mount.
- G. Manufacturer’s Guarantee:
 - 1. All components of each door system shall be protected against failure and/or performance deficiencies by a product manufacturer’s installation and materials warranty. Said warranties shall be specific to each system required and shall be non-prorated warranties which guarantee against material and labor defects for a minimum period of five (5) years.
 - 2. Interior solid core wood doors shall have lifetime guarantee, and shall include removal, finishing, and hanging of doors at no cost to the University.
 - 3. Power operators, controls, electrical circuitry provided by the power door operator equipment supplier shall be guaranteed against defects in material and workmanship at no cost to the University for a period of five (5) years from the date of installation.
 - 4. Hardware including: closers, hinges, locksets, hold-opens, etc. required for the proper installation of all interior and exterior doors shall be provided with a manufacturer’s minimum five (5) year guarantee against defects in labor and materials.
 - 5. Windows shall provide warranties guaranteeing material and workmanship for ten (10) years and against failure of hermetic seal in insulated glazing for ten (10) years.
- H. The A/E shall provide a power source at locations where power-assisted door openers are required.
- I. ANSI A250.8-Recommended Specifications-Standard Steel Doors and Frames of Steel Door Institutes.
 - 1. SDI-105 Recommended Erection Instruction for Steel Frames.
 - 2. Underwriter’s Laboratories, Inc. (UL) and Factory Mutual (FM), as applicable to fire rated hollow metal doors.
 - 3. NFPA No. 80-Fire Doors and Windows
 - 4. ASTM A653-Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron alloy coated (Galvanized) by the Hot-Dip Process, General Requirements.
 - 5. ASTM A569-Steel, Carbon, Hot-Rolled Sheet and Strip, Commercial quality.
 - 6. ASTM A591-Steel Sheet, Cold-Rolled, Electrolytic Zinc-Coated.
 - 7. ASTM A366-Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

- J. Shop Drawings and Product Data in accordance with Section 01300.
1. Indicate general construction, configurations, jointing methods, reinforcements, anchorage methods, hardware locations and locations of cutouts for glass and louvers
- K. Deliver hollow metal work crate to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory finished doors.
1. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided finished items are equal in all respect to new work and acceptable to architects; otherwise, remove and replace damaged items as directed.
 2. Store doors and frames at building site under cover. Place units on wood sills at least 4” high, or otherwise store on floors in manner that will prevent rust damage. Avoid use of non-vented plastic or canvas shelters, which could create humidity chambers. If cardboard wrapper on door becomes wet, remove cardboard immediately. Provide ¼” spaces between stacked doors to promote air circulation.

PREFERRED MANUFACTURERS

Panic Hardware-

Sargent Manufacturing Company
 Corbin Russwin
 Kawneer

Handicap Operators-

Dorma Door Controls (2.7.F.7)

Locksets-

Best Access System (2.7.F.7) **Residence Halls only.**
 Corbin-Russwin

Cylinders-

Best Access System **Residence Halls only.**
 Corbin-Russwin

Hollow Metal-

Phillip Manufacturing Company
 Steelcraft Corporation
 Ceco Corporation
 Pioneer Industries
 Curries Co.

Plastic Laminate Doors-
 Special-lite

Hinges

Hager Hinge Company

-END OF SECTION-

08110 – Steel Doors and Frames

- A. All single steel doors shall be 3-feet 0-inches by 7-feet 0-inches by 1 3/4-inches, 18 gauge galvanized steel, minimum.
- B. All double steel doors shall be 6-feet 0-inches by 7-feet 0-inches by 1-3/4-inches, 18 gauge galvanized steel, minimum and shall be provided with removable center mullion.
- C. All exterior and interior metal frames shall be one piece-welded frames. For renovation projects, knock-down frames for interior only application may be used when approved by the University Project Manager.
- D. All steel frames shall be 14-gauge galvanized steel. All frames in masonry walls shall have a 4-inch head, a minimum of three (3) anchors at each jamb, and shall be grouted solid at head and jambs. Where two (2) doors swing from the same mullion, the frame shall be 12 gauge and reinforced.

- E. All components of steel doors and frames shall be specified to be shop-primed (all surfaces).
- F. Materials: Commercial quality, level, cold-rolled steel conforming to ASTM-A-366 and free of scale, pitting or other surface defects. Face sheets not less than 18 gauge. Face sheets for exterior doors shall have a zinc coating of not less than 0.20 ounces per square foot and not less than 14 gauge.
1. All doors shall be custom made, of the types and sizes shown, and shall be fully welded seamless construction with not visible seams or joints on their faces or vertical edges. Minimum door thickness shall be 1-3/4 inch. Minimum door size shall be 3'0" X 7".
 2. All doors shall be rigid and neat in appearance, free from warpage or buckle. Corner bends shall be true and straight, and of minimum radius for the gauge of metal used.
 3. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them available and provide a smooth flush surface.
 4. Top and bottom edges of all doors shall be closed with a continuous recessed steel channel not less than 18 gauge, extending the full width of the door and spot-welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and, where required for attachment of weather-stripping, a flush closure also at their bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.
 5. Edge profiles shall be provided on both vertical edges of doors as follows:
 - a. Single-Acting Swing Doors: Beveled 1/8 inch in 2 inches.
 - b. Double-Acting Swing Doors: Rounded on 2-1/8 inch radius.
 6. All hardware furnished by the hardware contractor for single-acting doors shall be designed for beveled edges as specified.
 7. Hardware Reinforcements:
 - a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only, in accord with approved hardware schedule and templates provided by the hardware contractor. Where surface-mounted hardware is to be applied, door shall have reinforcing plates only; all drilling and tapping will be performed under Section 06100.
 - b. Minimum gauges for hardware reinforcing plates shall be as follows:
 - 1) Hinge and Pivot Reinforcements: 7 gauge.
 - 2) Reinforcements for Lock face, Panic devices, Flush bolts Concealed Holders, Concealed or Surface-Mounted Closers: 12 gauge
 8. Glass Moldings and Stop:
 - a. Where specified or scheduled, doors shall be provided with hollow metal moldings to secure glazing provided under Section 08800 in accordance with glass openings sizes shown.
 - b. Fixed moldings shall be securely welded to the door on the security side.
 - c. Loose stops shall be not less than 20 gauge steel, with Mitered corner joints, secured to the framed opening by cadmium or zinc-coated counter sunk screws. Snap-on attachments not permitted.
 9. Louvers shall be minimum 18 gauge, inverted "V," of welded blade type of construction providing the free air area indicated.
 10. Labeled Doors: see Article titled "Labeled Doors and Frames."
- G. Materials: Hollow Metal Frames
1. Frames for exterior openings shall be made of commercial grade cold rolled steel conforming to ASTM-A-366, not less than 14 gauge, and shall have a zinc coating of not less than 0.10 ounces per square foot.
 2. Frames for interior openings shall be either commercial grade cold-rolled steel conforming to ASTM-A-366 or commercial grade hot-rolled and pickled steel conforming to ASTM-A-569. Frame metal thickness shall be not less than 16 gauge.
 3. Mortar Guard Boxes: Minimum 22 gauge welded in place.

4. All frames shall be custom made welded units with integral trim, of the sizes and shapes shown on approval Shop Drawings. Knocked-down frames will not be accepted.
 5. All finished work shall be rigid, neat in appearance, square, true and free of defects, warp or buckle. Molded members shall be clean cut, straight and of uniform profile throughout their lengths.
 6. Jambs, Head, and Trims profile and backbends shall be as shown.
 7. Corner joints shall have all contact edges closed tight, with trim faces mitered and continuously welded, and stop mitered. The use of gussets will not be permitted.
 8. Minimum depth of stops shall be 5/8 inch.
 9. When shipping limitations so dictate, frames for large openings shall be fabricated in sections designed for splicing in field.
 10. Frames for multiple or special openings shall have mullions and/or rail members which are closed tubular shapes having no visible seams or joints. All joints between faces of abutting members shall be securely welded and finished smooth. Reinforce head sections where mullions occur.
- H. Hardware Reinforcements: Frames shall be mortised, reinforced, drilled and tapped at the factory for fully template mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware contractor. When surface-mounted hardware is to be applied, frames shall have reinforcing plates only; all drilling and tapping will be performed under Section 06100.
1. Minimum thickness of hardware reinforcing plates shall be as follows:
 - a. Hinge and Pivot Reinforcements: 7 gauge, 1-1/4 inch x 10 inch minimum size.
 - b. Strike Reinforcements: 12 gauge.
 - c. Flush Bolt Reinforcements: 12 gauge.
 - d. Closer Reinforcements: 12 gauge.
 - e. Reinforcements for: Surface-mounted hardware-12 gauge; hold-open arms-12 gauge; surface panic devices-12 gauge.
- I. Floor Anchor: Floor anchors shall be securely welded inside each jamb with two holes provided at each jamb for floor anchorage.
1. Where so scheduled or specified, adjustable floor anchors, providing not less than 2 inch height adjustment, shall be provided.
 2. Minimum thickness of floor anchors shall be 14 gauge.
- J. Jamb Anchors: Frames for installation in masonry walls shall be provided with adjustable jamb anchors for the T-strap type. Anchors shall be not less than 16 gauge steel. The number or anchors provided on each jamb shall be as follows.
1. Frames Up to 7 Feet 6 Inch Height: 3 anchors.
 2. Frames 7 Feet 6 Inches to 8 Feet Height: 4 anchors.
 3. Frames over 8 feet Height: 1 anchor for each 2 Feet, or fractions thereof, in height.
- K. Frames for installation in stud partitions shall be provided with steel anchors of suitable design to allow passage of grout, not less than 18 gauge thickness, securely welded inside each jamb as follows:
1. Frames Up to 7 Feet 6 Inch Height: 4 anchors.
 2. Frames 7 Feet 6 Inch to 8 Feet Height: 5 anchors.
 3. Frames over 8 Feet Height: 5 anchors plus 1 additional.
 4. Frames over 5 feet wide shall be provided with anchors in the head of the frame (similar to jamb anchors) located approximately 8 inches from each jamb and 24 inches maximum spacing between.
 5. Where frames occur in concrete walls, or in new openings cut into existing masonry walls, provide pipe spacers, 3/8 inch steel bars, and No. 1 gauge plates attached to inside jamb frame 2 feet o.c., to receive expansion bolts; minimum of 4 bolts per 7 foot high jamb. Fasteners for such anchors shall be provided under Section 06100.

- L. Frames for installation in masonry wall opening more than 4 feet in width shall have an angle of channel stiffener factory welded into the head. Such stiffeners shall be used as lintels or load-bearing members.
- M. Dust cover boxes (or mortar guards) of not thinner than 26 gauge steel shall be provided at all hardware mortises on frames to be set in masonry or plaster partitions.
- N. All frames shall be provided with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.
- O. Loose glazing stops will be of cold-rolled steel, not less than 20 gauge thickness, butted at the corner joints and secured to the frame with countersunk, flat head cadmium or zinc-plated screws.
- P. Labeled Frames: See “Labeled Doors and Frames” Section 8600.

PREFERRED MANUFACTURERS:

Ceco Door Products
 Republic Builders Products
 Steelcraft Manufacturing Co., Ingersoll-Rand Company

-END OF SECTION-

08120 – Aluminum Storefront Doors and Frames

- A. All aluminum entrance doors shall be full-glazed with medium or wide stile and rails with 1/4” tempered glazing. Frames with sidelites and transoms shall be double-glazed.
- B. Extrusions shall comply with ASTM B 221M, Alloy 6063-T5 or T6. Fasteners shall be hard aluminum or stainless steel. New construction shall be medium-bronze anodized and renovation projects shall match existing doors and frames unless otherwise directed by the University Project Manager.
- C. Doors to receive surface applied hardware shall be reinforced as required.
- D. Metal glazing beads, vinyl inserts, and glazing gaskets shall be provided for securing glass. Glass stops shall be tamperproof on exterior side.
- E. Weather-stripping shall be continuous thermoplastic elastomer bulb and fin type and shall be provided on head, jamb, and sill of exterior door frames.
- F. Storefront doors to accept Corbin-Russwin 1/C cylinder (refer to section 08700 Finish Hardware).
- G. Storefront doors that require panic device (refer to section 08700 Finish Hardware, Panic Devices).
- H. On locations with multiple doors per entrance only one requires cylinder access.
- I. Storefront doors that require card reader access refer to (08700 Finish Hardware, Hardware requirements for card reader access).
- J. Approved Manufacturers:
 1. AMARLITE Architectural Products, Aluminum and Glass Co., Inc.
 2. Kawneer Company, Inc.
 3. Vistawall Architectural Products

-END OF SECTION-

08210 – Wood Doors

- A. All single wood doors shall be 3- feet 0-inches by 7-feet 0-inches by 1 3/4-inches solid core, 5-ply construction. Veneer faces shall be Premium Grade plain-sliced birch (for natural finish) and/or Custom Grade hardwood veneer (for paint finish), or of wood species as directed by the University Project Manager. Doors shall comply with the standards of the National Woodwork Manufacturers' Association (NWMA) and the Architectural Woodwork Institute (AWI).
- B. Approved Manufacturers:
1. Algoma Hardwoods, Inc.
 2. Georgia-Pacific Corporation
 3. Weyerhaeuser Door Division

-END OF SECTION-**08213 – Plastic Faced Wood Doors**

- A. Plastic laminate facing for wood doors shall conform to NEMA LD-3. Adhesives for interior and exterior shall conform to ANSI/NWMA-I.S.1.

-END OF SECTION-**08500 – Aluminum Windows**

- A. Exterior windows shall be fabricated from aluminum extrusions, thermally-broken, double-glazed insulated, with an outer shield of solar glass. Operable windows shall be provided with positive locking devices.
- B. Provide windows with minimum rating of HC-60 and/or as required to meet local and state building codes and applicable wind loads.
- C. Windows shall be furnished with a Kynar 500 coating complying with AAMA 2605 or anodic coating (anodized) complying with AA 45.
- D. Approved Manufacturers:
1. Graham Architectural Products Corporation
 2. Traco/Three Rivers Aluminum Company
 3. Wausau Metals Corporation

-END OF SECTION-**08700 – Finish Hardware**

- University shall review and approve each item prior to specifying.
- Samples shall be furnished upon request.
- Necessary templates and schedules shall be submitted as soon as possible to hollow metal and wood door fabricators in accordance with their fabrication schedule.
- Manufacture's written installation and adjustment instructions shall be followed.
- Experienced personnel shall perform installation of hardware.
- Hardware shall be permanently installed after finishing operations are complete and dry.
- Hardware shall be properly adjusted and left in operating condition at the time of final completion.
- Coordinate with electrical specification for any special alarms and/ or releases.
- All locks must accept Corbin/Russwin 6 pin I/C cylinder cores coordinate with university locksmith.
- All doors (with exception to storefront / exit devices) shall be Russwin MORTISE locksets. (In order to minimize the required amount of parts on hand to perform repairs/ maintenance); ML 2010 passage for non locking requirements, ML2030 for privacy or bathroom, ML2057 for storeroom or secure areas where door should lock each time upon closing, ML 2051 for offices, class rooms lock function will be determined by room

usage (general.lab) and approved by University's Locksmith. All locksets shall be provided with curved lip strike option (SA-114). With 630 finish, LWA or LWM trim.

- Require UL listed hardware for doors that are to receive UL labels.
- Organize hardware schedule by building.
- Example of lockset order ML2051-LWM-630-CL6xSA114xBR.STK.

Cipher Lock Requirements:

- Access Control: Alarm Lock DL3500 series contact UWF locksmith for other functions.
- Cylinder: 8027 (Corbin Russwin direct ship to UWF and must obtain authorization letter from Mr. Walker, Locksmith)
- Push Plate: 30S-4 x 16 US28
- Edge Filler: CV86 x USP
- Cylinder Tailpiece: #404079 (Kaba Ilco)

Partition Door Hardware Requirements

1. Corbin-Russwin CL 3851-NZD-626-CL6 x SF118
Grade 2 Tubular Entry Lever set
2-3/8" B.S. x Full Lip Strike with IC prep
2. Corbin-Russwin 8027-(keyway)-626 x CKC2
Pyramid Permanent Core with 2 Cut Keys
x Visual & Concealed Key Control

The campus locksmith will need to provide letter of authorization to hardware provider for Pyramid Cylinder to be ordered.

Hardware requirements for card reader access (Nautilus Card):

- Von Duprin 5100 series electric strike.
- Power transfer hinge: Von Duprin EPT2.
- Mortise lockset to be: Russwin ML20905 with manufacture's required power supply.
- Exit / Panic Device to be: Russwin option M94/SEC with manufacture's required power supply.
- Von Duprin option EI with manufacture's required power supply.

Screws and Fasteners:

- Manufacturer's standard fasteners with Phillip heads.
- Do not use self-tapping, self-drilling, or sheet metal screws.
- Nuts and bolts on fire rated doors and on other products in accordance with manufacturer's recommendations.

Hinges:

- ANSI A156.1, full mortise door hinges.
- For interior doors with closers 1-3/4" thick, 24" to 36" wide – hinges shall be 4-1/2" high, heavy weight 134, template, 5 knuckle 2 ball bearing hinges.
- For fire rated doors 1-3/4" thick, 24" to 36" wide – hinges shall be 4-1/2" high, heavy weight .134, template, 5 knuckle 2 ball bearing hinges.
- For exterior doors 1-3/4" thick, 24" to 36" wide- hinges shall be 4-1/2" high, heavyweight. .180, template, 5 knuckle 4 ball bearing hinges.
- Hinge width shall be 4-1/2".
- For exterior doors, provide non-removable pin hinges.
- Hinge base metal for all exterior doors shall be non-ferrous metal.
- Hinge base metal for all other doors may be ferrous metal.
- Exterior – ANSI A 5111 x NRP. 4-1/2" high thru 42" width, 5" for doors over 42".

Quantity:

- 2 hinges up to 60" in door height. One additional hinge for every 30" of door height.
- 4-1/2" Height up to 3'6" door.
- 5" height over 3'6" door.
- Hinge width as required to clear trim.

Types:

- Exterior – ANSI A5111
- Interior doors with closers – ANSI A8112
- Interior doors without closers – ANSI A8113
- Interior doors at public restroom, Assembly, Food service, Cross-corridor etc. ANSI A8111.
- Exterior doors and interior reverse bevel doors with locking to have non-removable pins or safety stud.

Closers:

- ANSI A156.4, Mount closers on inside of rooms and on inside of exterior doors.
- Acceptable Products:
 - a. LCN - 4041 reg. Arm (for interior); 4041- PA (P.A. 180); 4041- cush (P.A. 90 dead); 4041-h-cush P.A. (open 90 dead stop.)
 - b. Norton - 7500BF; 7500 P.A.-BF; 7500 CLP-BF; 7500 CLP- T- BF.
 - c. Ryobi - D-4550 / D4551 series std. Arm, std. hold-open Arm, or optional heavy-duty Arms for high traffic door applications.

Panic Devices:[Interior]

- Corbin – Russwin Panic rim ED 5200xL755; Fire rim ED5200AxL755; Panic Mortise ED5600 Lx L7m55; Fire mortise ED 5600ALx L7m55.
- VonDuprin - Panic Rim 99l x 992l; Fire Rim 99l - f x 992L; Panic Mortise 9975L x 992L - M; Fire Mortise 9975-L-Fx992LM.
- Precision - Panic Rim1108x39LC; Fire Rim FL–1108x39lc; Panic Mortise 1308x39LC; Fire Mortise FL–1308x39LC.

[Exterior]

- Corbin - Russwin ED5200xT1357-m52
- VonDuprin CD99NL
- Precision 1103CDx 17
- Aluminum storefront doors shall have Kawneer Paneline CR90

Mullion:

- VonDuprin; KR4954, Mullion Fire KR9954.
- Precision; KR822, Mullion Fire KRFL822

Access Device

- Automatic Door Operator: Operator shall conform to the requirements of A156.19
- Mode of operation to be low energy as defined by A156.19
- Respond to push plates, radio control (390MHZ only) or Magic Touch.
- Immediate reverse-on-obstruction during opening capability.
- Open, open check and closing speed adjustment.
- Adjustable time delays.
- Shall provide positive control of door though entire swing; shall permit use of butt-hung, center pivot, offset pivot doors.
- Approved Manufactures
- Door Motion Technologies
- Dorma swing door operator
- Others to be approved by UWF Locksmith

-END OF SECTION-

08800 – Glazing

- A. The types of glass and location shall be indicated on the drawings or in the specifications as follows:
1. The A/E shall specify obscure glass in toilet and bathroom windows.
 2. Tempered Glass: Glass for exterior aluminum doors shall be ¼-inch thick, minimum, tempered safety glass.
 3. Insulating Glass: Glass for exterior windows shall be ¾-inch – minimum clear (non-reflective) “Low-E” type with interior air space filled with inert low heat transfer gas and 1-inch minimum for aluminum storefront.
 4. Color and Coatings: All glass shall be clear unless approved otherwise by the University Project Manager.
 5. Mirror glass – Type I transparent flat, Class 1-Clear, 1/4-inch minimum thickness conforming to ASTM C 1036.

-END OF SECTION-

DIVISION 9 – FINISHES**General Material and Finish Guidelines**

- A. All materials specified shall be assessed for long range, life-cycle cost analysis.
- B. The A/E shall coordinate all color and material selections with the University Project Manager.
- C. The A/E shall investigate the use of hard tile, entrance barrier matting, or other durable floor finish at all entrances into new and renovated facilities.
- D. The A/E shall provide schedules and samples for all interiors and exterior finishes, and shall be presented in the form of a non-returnable “color board”. In the case of special concrete or stucco finishes, a sample at least 12-inches square shall be submitted.
- E. The A/E shall utilize the USG “The Gypsum Construction Handbook,” Centennial Edition, as a guide for all drywall, veneer plaster and conventional lath and plaster applications.
- F. The A/E shall indicate solid wood blocking at locations in walls requiring the attachment of finish materials.
- G. All ancillary equipment such as, but not limited to, handrails, bookshelves, door bumpers, etc. shall be anchored to solid backing when attached to walls.
- H. All gypsum board will be a minimum of 5/8” thickness. Thickness and fire rating must adhere to applicable codes.
- I. In drywall construction all outside corners in hallways, classrooms, laboratories, and bathrooms to have exterior corner guards made of plastic as approved by UD, minimum width is 2”.
- J. In masonry construction, outside corners in high traffic areas to have corner guards made of plastic as approved by UWF. Stainless steel corner guards may be used with approval by UWF Project Manager.
- K. Unless factory finish is specified herein, finish painting of doors and frames will be performed in the field under the provisions of Section 09900, PAINTING. There are to be no hi-lights.
- L. After installation, touch-up scratched, rusted or damaged surfaces. Use type of primer recommended for galvanized surfaces or identical to that used for shop coat.
 - 1. Clean doors and frames and protect from damage until completion of project.
 - 2. Damaged work will be rejected and shall be replaced.

DO’S AND DON’TS**DO’S:**

DO provide the University Project Manager one box of replacement tiles for their use.

DON’TS:

DO NOT use customized ceiling tiles or grids.

-END OF SECTION-

09200 – Lath and Plaster

- A. Plaster shall be a three-coat gypsum plaster application, with a minimum finished thickness of 7/8-inch. All surfaces shall be smooth trowel finish unless otherwise specified. The A/E shall indicate ample control joints, particularly in overhangs.
- B. The A/E shall specify zinc alloy for all lathing accessories wherever highest corrosion resistance is required. Otherwise accessories shall be specified as galvanized steel.

-END OF SECTION-

09210 – Thin-Coat Veneer Plaster

- A. The A/E shall specify a one-coat veneer plaster system to be applied over 5/8-inch gypsum board base. Thickness of veneer shall be a minimum of 1/16-inch to a maximum of 3/32-inch.

-END OF SECTION-

09250 – Gypsum Wallboard

- A. Minimum thickness for all gypsum wallboard applications shall be 5/8-inch.
- B. As per “The Gypsum Construction Handbook,” the following finishing levels shall be used for establishing the University’s standard of acceptance for gypsum wallboard finishes:
1. Level 1: For use in areas above ceilings, in attics, in concealed applications, and in areas not normally open to public view.
 2. Level 2: For use where gypsum wallboard is used as a substrate for tile.
 3. Level 3: For use where gypsum wallboard will receive heavy texture finishes.
 4. Level 4: For use where gypsum wallboard will receive painted finishes.
- C. Where a gypsum wallboard/metal stud partition abuts a masonry wall, hold off gypsum wallboard finish 1/2-inch from face of masonry. Provide a pressure-treated reveal where partition abuts on exterior wall.
- D. Gypsum wallboard as an exterior sheathing board will not be allowed.
- E. Provide moisture resistant gypsum board ceilings in all interior wet locations, including toilet areas.
- Approved manufacturers:
1. Georgia-Pacific Corporation
 2. National Gypsum Co., Gold Bond Building Products
 3. United States Gypsum Co., USG Corp.

-END OF SECTION-

09310 – Ceramic Tile

- A. The A/E shall utilize the current edition of “The Handbook for Ceramic Tile Installation”, as published by the Tile Council of America for selecting installation methods, design details, and specification wording. The handbook shall be listed in the specifications as a reference guide.
- B. Ceramic tile is desirable for floors and walls and/or wainscots in toilets as well as in some laboratories and utility rooms, and shall be specified wherever appropriate. Toilet floors shall have dark sealed grout.
- C. Wainscots shall be 6-foot high minimum. The A/E shall coordinate wainscot height with toilet partition mounting brackets and other accessories.
- D. Size, Type and Placement of Tile:
1. Floors: 1 x 1 or 2 x 2 unglazed ceramic mosaic.
 2. Walls: 2 x 2 and 4-1/4 x 4-1/4 glazed ceramic.
 3. Other sizes and types as approved by the University Project Manager.
- E. Use commercial grade.
- F. Use in toilet rooms and kitchens.
- G. If quarry tile is used in entrance ways choose smooth cut with appropriate slip Resistance. (Wire cut is difficult to maintain).
- H. All bathroom thresholds shall be marble.
- I. Thin set is strongly discouraged and must be approved by UWF.

- J. Residence halls showers and bathroom walls: American Olean, matte, 4-1/4" X 4-1/4" Designer Whiter or approved equal.
- K. Gang Showers: Floors American Olean, 2"X2", unglazed porcelain ceramic mosaics with granite pattern, such as A21 driftwood or approved equal. Single Shower: 36: square (min) terrazzo base.

PREFERRED MANUFACTURERS

American Olean
 Daltile Corporation
 Florida Tile Industries, Inc.

-END OF SECTION-

09510 – Suspended Acoustical Ceilings

- A. The A/E shall specify standard patterns of ceiling tile, unless otherwise requested by the University Project Manager. Maximum tile size shall be 24-inches by 24-inches, square lay-in, 15/16-inch grid face, equal to "Fine Fissured" Series with HumiGuard Plus as manufactured by Armstrong World Industries. A reveal/tegular edge and 9/16-inch grid face may be used when approved by the University Project Manager.
- B. The A/E shall specify that all acoustical ceiling materials shall meet the NFPA 101 flame-spread rating requirements, and the Florida Building Code for interior finish according to occupancy classification.
- C. The A/E shall specify acoustical ceiling tile by Noise Reduction Coefficient (NRC) as well as by tile thickness. Panel thickness shall be 5/8-inch minimum.
- D. The A/E shall not specify acoustical ceiling tile for dormitories.
- E. Whenever exposed grid ceiling systems are specified, the A/E shall provide reflected ceiling plan(s). The A/E shall specify construction tolerances regarding plumbness, dimensions and locations, especially where exposed masonry and concrete are used.
- F. Provide ceiling support hangers at all four corners of lay-in light fixtures.
- G. Stainless steel hanger wires and fasteners shall be specified for ceiling/soffit suspension systems in locations subject to moisture penetration of condensation. All framing members and components shall be hot-dipped galvanized steel. Cut ends shall be cold galvanized treated.
- H. Color of tile and grid shall be white unless directed otherwise by the University Project Manager.
- I. Use either a 2"X2" or 2"X4" system tee bar system. Center grid in all spaces. Center penetration in tiles.
- J. Kitchen and Serving areas must meet all Public Health Regulations.

PREFERRED MANUFACTURERS

Armstrong World Industries Chicago Metallic Corporation USG Interiors, Inc., USG Corp. Dry areas: Armstrong #1728. Do not use custom design. Wet areas: Ceiling grid system shall be Armstrong "Prelude Plus" or equal. Ceiling tile shall be Armstrong travertine Ceramguard.

DO'S AND DON'TS

DON'TS

- DO NOT use splined system.
- DO NOT support equipment from the ceiling grid or ceiling tiles.
- DO NOT use base ceramic in high traffic areas, unless otherwise approved.
- DO NOT use white or light colored grout on ceramic tile floors.

-END OF SECTION-

- Roppe Rubber Base – 139, “Deep Navy”
3. Scheme ‘C’: Lee’s Faculty Remix – 565, “Regenerated Indigo”
Roppe Rubber Base – 139, “Deep Navy”
 4. Scheme ‘D’: Lee’s Faculty Remix – 665, “Refreshed Green”
Roppe Rubber Base – 169, “Hunter Green”
 5. Scheme ‘E’: ” Interface Entrophy – “Chance”, 14648
Roppe Rubber Base – P169, “Hunter Green,” 138, “Burgandy” or
139, “Deep Navy”
- C. The following carpet and base types are a part of the “**Executive Level Standard Interior\Finishes**” to be used for executive offices, conference rooms, or other specialty areas:
1. Scheme ‘A’: Lee’s DESIGNSCENE II- GT 105 – 218 – “Foundation
 2. Scheme ‘B’: Lee’s PHOTOFINISH II – 935 – “Free Pass”
 3. Scheme ‘C’: Interface “S201” – 9798 - Sage
 4. Scheme ‘D’: Interface “Duo” – 103872 - Stone
- All Roppe Rubber Base standard color choices listed above can be paired with these carpet selections or use: Roppe Rubber Base - P123, “Charcoal”.
- D. The A/E shall specify a transition carpet where appropriate.
- E. The A/E shall specify that replacement carpet, remnants and usable scrap and overage in carpeting shall be packaged in appropriate wrapping, labeled and left on premises at job site for the Owner.
- F. The A/E shall specify a reducer strip equal to Mercer Imperial Reducer complying with ANSI requirements for wheelchair traffic.

-END OF SECTION-

- A. **09900– Painting**The University shall provide the A/E with information regarding the quality of paint required. This information shall include acceptable vendor products as well as paint specifications for specific paint types and their application, and may be included in the Project Manual. Paints with the highest proportion of titanium dioxide shall be used for dirt shedding properties.
- B. The following paint colors are part of the “Standard Interior Finishes” to be used for campus renovations. All paints can be mixed and matched with the carpet/base schemes. The following colors are from ICI Dulux Paints for reference only.
1. #A0071, “Wedding White”
 2. #A1773, “Unicorn White”
 3. #A0161, Shaded Ice”
 4. #1899, “Oriental Ivory”
 5. #A1431, “Quiet Blue”
 6. #A0716, Egg Nog”
- C. Painting/Coating Schedule:
1. Exterior Metal Surfaces: Provide one (1) coat of primer and two (2) coats of semi-gloss enamel.
 2. Interior Metal Surfaces: Provide one (1) coat of primer and two (2) coats of eggshell or semi-gloss paint.
 3. Building System Surfaces (including mechanical, electrical, fire extinguishing sprinkler systems, exposed piping and miscellaneous metal items): Provide one (1) coat of primer and two (2) coats of semi-gloss paint.
 4. Existing Concrete:

- a. Provide primer as recommended by paint manufacturer and two (2) coats of flat or semi-gloss pant; or,
 - b. Provide primer as recommended by the paint manufacturer and two (2) coats of elastomeric coating (with sand texture).
5. Exterior Concrete Masonry:
- a. Provide one (1) coat of block filler/primer and two (2) coats of flat or semi-gloss pant; or,
 - b. Provide primer as recommended by the paint manufacturer and two (2) coats of elastomeric coating (with sand texture).
6. Exterior Stucco and Plaster:
- a. Provide one (1) coat primer and two (2) coats of flat or semi-gloss pant; or,
 - b. Provide primer as recommended by the paint manufacturer and two (2) coats of elastomeric coating (with sand texture).
7. Interior Concrete: Provide one (1) coat primer and two (2) coats of flat, eggshell, or semi-gloss paint.
8. Interior Concrete Masonry: Provide one (1) coat block filler, one (1) coat primer, and two (2) coats of eggshell or semi-gloss paint.
9. Interior Gypsum Wallboard: Provide one (1) coat of primer and two (2) coats of flat, eggshell, or semi-gloss paint.
10. Exterior Painted Wood: Provide one (1) coat primer and two (2) coats of semi-gloss paint.
11. Interior Painted Wood: Provide one (1) coat primer and two (2) coats of eggshell or semigloss paint.
12. Interior Plywood Cabinets, Natural Finish: Provide one (1) coat sealer and three (3) coats of satin finish coating
13. Wood Doors, Natural Finish: Provide one (1) coat primer, one (1) sealer, and sand with 220 grit, and two (2) coats of a satin finish coating
- D. The A/E shall specify clear silicone waterproofing, or an approved alternative, containing a minimum of 3%-5% silicone resin solids in a hydrocarbon solvent conforming to formulation and performance standard of Federal Specifications SS-W-OO11O (GSA) for all exterior brick and stone. The product container label shall certify that it meets the above requirements. A 3% silicone shall be specified as a minimum. For Limestone, a minimum of 5% silicone shall be specified. The following products are approved by the University:
1. Florida Laboratories Chemclear 30.
 2. Sonneborn-Hydrocide S-X.
- E. Where paint is specified for use on interior masonry or concrete surfaces, no silicone waterproofing shall be specified.
- F. Use water based products for health and environmental reasons.

PREFERRED MANUFACTURERS

ICI Dulux
Porter – Premium Hi-Hide
Benjamin Moore

DO'S AND DON'TS

DO'S:

- DO follow manufacturer's guidelines for painting in cold/inclement weather.
- DO use University standard colors in public areas.
- DO apply primer to all surfaces before finish coating.

Interior:

1. Walls and Ceilings (drywall and block)
Primer-First Coat Primer

- Finish- Latex - eggshell
- Latex -satin
- New block-use block filler
- 2. Trim
 - Primer-Alkyd enamel underbody
 - Finish- Satin Impervo (alkyd)-satin
 - Latex - satin

Exterior:

- 1. Wood
 - Primer-Latex Exterior-Primer
 - Finish – As specified
- 2. Metal
 - Primer-Latex exterior primer
 - Finish- As specified
- 3. Concrete/block
 - Primer-Latex exterior primer
 - Finish-
 - New block-use block filler

Piping:

Paint Specifications:
Enamel

Piping Paint Colors:

Chilled Water Return	Light Green
Condensor Water Supply	Blue
Condensor Water Return	Light Blue
Domestic Water Lines	Dark Green
Oil Lines	Grey
Gas Lines	Yellow
Fire Protection Piping	Bright Red
Chemical Treatment Lines	Orange
Roof Drain Lines	Black
Heating Hot Water Lines	DO NOT paint

* Additional information on this subject may be acquired from the following resource: ASME/ANSI A13.1-96 “Scheme for Pipe Identification”.

Flooring:

Polyamide Epoxy Gloss coating with Gloss Catalyst Grit additive shall be: M67 Anti-Slip aggregate at manufacturers recommended rate.

DON'TS:

DO NOT thin or reduce egg-shell finishes for ease of application. Apply by rolling or with appropriate spray nozzles.
DO NOT water down paint

-END OF SECTION-

DIVISION 10 – SPECIALTIES**General Specialties Guidelines**

- A. The A/E shall indicate solid wood blocking at locations in walls requiring the installation and attachment of equipment, fixtures and for other miscellaneous items as needed.
- B. Shelving in offices: identify (3)-6-0 shelves on universal brackets on the wall opposite of the desk, telephone, and computer data table.
- C. General Office trash receptacles are to be **Rubbermaid Model 2956** for general trash and are to be **SPAR model 29666** for paper re-cycling. Provide one each for each desk.
- D. Public area trash cans are to be Westlund Freeman Crown Series (<http://www.imd2001.com/crowne.htm>).

-END OF SECTION-**10100 – Tackboards and Markerboards**

Approved Manufacturers:

- American Chalkboard Company
- Claridge Products and Equipment, Inc.
- Nelson Adams/GSI

-END OF SECTION-**10150 – Toilet Compartments**

- A. Toilet partitions shall be 1-inch solid plastic. Where appropriate other types will be considered by the University. Partitions shall be floor-mounted and overhead-braced. Ceiling mounted partitions shall not be used unless approved by the University. Full-length attachment brackets shall be used where partition panels abut walls. If urinal screens are utilized, provide floor-supported panels and/or partial panels with full-length attachment brackets at walls.
- B. Handicapped toilet compartments shall comply with all requirements of ANSI A117.1, Florida Accessibility, and ADA requirements.
- C. Each toilet stall door shall be equipped with rubber-tipped coat hook.
- D. Approved Manufacturers:
 - 1. Ampco Products, Inc.
 - 2. Santana Plastic Products
 - 3. Capitol Partitions, Inc.

-END OF SECTION-**10200 – Louvers and Vents**

- A. All wall louvers shall be extruded aluminum, stormproof, and include bird and insect screens. All louver perimeters shall be sealed to provide full perimeter integrity. Provide with prefinished Kynar 500 coating.
- B. Acceptable Manufacturers:
 - 1. Reliable Products
 - 2. Ruskin Manufacturing
 - 3. Aiolite Company

-END OF SECTION-**10260 – Wall and Corner Guards**

- A. High impact vinyl or stainless steel wall and corner guards may be used with the approval of the University. Guards shall be 3/16-inch or heavier gauge PVC with integral color.

-END OF SECTION-

10420 – Letters and Plaques

- A. The Owner requires a bronze building dedication plaque on new construction and major renovations as stated in the Special Conditions. The University Project Manager shall provide the A/E with specific requirements. See: Exhibit 9.
- B. Letters and numbers used for exterior building identification shall be cast aluminum.
- C. All donor plaques shall be 4 inch by 6 inch brass with black engraved lettering in Three Line Roman (Times Romans) font. Lettering shall include the donor's name, title of room and the year of donation. See: Exhibit 8A. Donor plaques shall be mounted 2 inches above the room identification sign.

-END OF SECTION-

10440 – Signs

- A. Room Identification Signage: Drawings and Specification for room identification signage should reflect the 6 inch by 6 inch design layout as shown in Exhibit No. 8B. This signage has removal laminate to allow replacement of occupant information. The signage will include the room number in raised graphics to include Braille lettering and the University of West Florida logo. Signage for exterior rooms shall be weatherproof. **Color will be a medium gray.**
- B. Signage should be purchased for the following:
 - 1. Rooms
 - 2. Stairs
 - 3. Restrooms
 - 4. Handicap Restrooms
 - 5. Directories, if applicable, approved by the University Space Manager
- C. Signage schedule shall be confirmed by the University Space Manager and the University Project Manager and will be used for the assignment and locations of room signage.
- D. Signage mounting height to be 60-inches above finish floor to the centerline of the sign or to current ADA specifications. Mount on wall adjacent to the latch side of the door. At double doors, mount on wall on left hand side of doorframe if a possible and logical position. Attach to walls using # 8x1 ½" screws W/nylon anchors.
- E. Building Directories: required for all new construction and major renovations. Building directories are required on each floor of multi-level buildings. See: Exhibit No 9C. Location of directories shall be determined at final approval of design development. Attach to walls using # 8x1 ½" screws W/nylon anchors.

-END OF SECTION-

10522 –Fire Extinguishers, Cabinets and Accessories

- A. All fire extinguishers shall be provided in accordance with NFPA 10, and location reviewed with the Director of Environmental Health and Safety and the University Project Manager.
- B. All corridors and mechanical spaces shall be provided with 10# ABC extinguishers.
- C. All computer areas and laboratories shall be provided with 10# extinguishers of the type approved by the State Fire Marshall and applicable Codes and Regulations.
- D. All extinguisher cabinets shall be painted steel, flanged, full recessed, and lockable, with full flat glass in door.
- E. Approved Manufacturers:
 - 1. JL Industries, Inc.
 - 2. Larsen's Manufacturing Company
 - 3. Potter-Roemer, Smith Industries, Inc.

-END OF SECTION-

10800 – Toilet and Bath Accessories

- A. The A/E shall verify with the University Project Manager as to which toilet accessories are required to be lockable on a Department of Building and Grounds standard key.
- B. Accessories:
1. Sanitary Napkin Receptacle: HOSPECO-HS-6140W OR Equal surface mounted. Provide at each water closet in Women's toilet room.
 2. Mirror: Stainless steel framed without shelf, Bobrick Series B-290 (or American Series 500) minimum 16"x24". Mirror for handicapped usage shall have the bottom mounted at 40" above the floor or shall be a fixed tilt unit, Bobrick B-293 (or American #573). Provide above each lavatory.
 3. Soap Dispenser: Betco Clario Foaming Soap Dispenser #91821. Furnished by UWF Department of Buildings and Grounds and installed by Contractor. Provide at each lavatory.
 4. **Unisex/Single Stall Restrooms:** Toilet Tissue Dispenser: Kimberly Clark Model # KC 09602- Product use: KC-Coreless Toilet Tissue Model # 07006. Furnished by UWF Department of Buildings and Grounds and installed by Contractor.
 5. **Multi-Stall Restrooms:** Toilet Tissue Dispenser: Bay West Dispenser, Model # BW-80300. Product use: Opticore Toilet Tissue Model # 61990. Furnished by UWF Department of Buildings and Grounds and installed by Contractor.
 6. **Owners Approval required:** Paper Towel Dispenser/Waste Receptacle: Surface Mount, American Specialties, ASI 0469-9. Recessed unit will be similar to American Standard ASI 0469-9. Paper Towel Dispenser only unit will be Kimberly-Clark # 09116. All to accept Scott SCOTTFOLD hand towels.
 7. **Multi-user Restrooms:** Paper Towel Dispenser: Bay West Dispenser Model # BW-86800. Product use: BW-Opticore Toilet Tissue Model #31400. Furnished by UWF Department of Buildings and Grounds and installed by Contractor.
 8. Grab Bars: 1 1/2 diameter, stainless steel length as required by Code.
 9. Baby Changing Stations: One per bathroom.
- C. General Office trash receptacles are to be Rubbermaid Model 2956 for general trash and are to be Rubbermaid 7 gal. # 2956-06BLUE/2956673 for paper recycling. Provide 1 each for each desk.
- D. Public area trash cans are to be Westlund Freeman Crowne Series (<http://www.imd2001.com/crowne.htm>). Open top with Satin Aluminum finish. Size to fit specific need.

-END OF SECTION-

DIVISION 11 – EQUIPMENT

General Equipment Guidelines

- A. The A/E shall coordinate all equipment selections with the University Project Manager and User.
- B. Selection of standard items (in lieu of special items), such as theater, audio-visual, parking, loading dock, food service, athletic, and laboratory equipment, is encouraged to help reduce costs and maintenance/replacement problems.

-END OF SECTION-

DIVISION 12 – FURNISHINGS**General Furnishing Guidelines**

- A. The A/E shall coordinate all furnishing selections with the University Project Manager, Procurement and Contracts, and User.
- B. Products such as pre-manufactured casework, furniture, and auditorium seating, shall be specified by the A/E in coordination with Procurement and Contracts, to establish an acceptable level of quality and aesthetic value, which shall include finish appearance, joinery, method of fabrication, and operational/functional characteristics.
- C. All perimeter classrooms with window openings are to be furnished with audiovisual blind systems that exclude light and or room darkening roller shades.

-END OF SECTION-

12510 – Horizontal Louver Blinds

- A. The A/E shall specify 1-inch mini aluminum blinds with the following attributes:
 - 1. Slats: Aluminum alloy 6011, 1-inch by .008-inch thick before painting.
 - 2. Provide one-piece, .024-inch thick steel handrail with end caps.
 - 3. Furnish with tilt wand and lift cords.
- B. Approved Manufacturers:
 - 1. Hunter Douglas, Inc.
 - 2. Levelor Contract, Inc.
 - 3. Springs Window Fashion Division, Inc.

-END OF SECTION-

DIVISION 13 – SPECIAL CONSTRUCTION

General Special Construction Guidelines

- A. This division takes into account items such as pre-engineered metal buildings, swimming pools, and solar energy systems. The University Project Manager will assist and advise the A/E when any item covered under this division is to be utilized.

-END OF SECTION-

DIVISION 14 – CONVEYING EQUIPMENT**14200 – Elevators**

- A. Elevators shall be handicapped barrier free in accordance with design standards of the National Elevator Industry, Inc., ANSI A-1 17.1, and ADA standards. A covered certificate holder is to be included.
- B. Cab interiors, doors and frames shall be stainless steel. Formica or other plastic laminate will be considered for cab interiors on a limited budget.
- C. All elevator floors shall be carpet or tile ceramic.
- D. All elevator equipment shall be specified to include solid-state power control (non-proprietary) systems.
- E. The A/E shall include in the project specifications the requirement that for each elevator, the elevator contractor shall install a complete drawing of the control schematics in the machine room of the elevators. Such schematics shall be framed with a glass cover. Also, the contractor shall provide the University Project Manager with two complete sets of schematics, current version of Auto Cadd, and a reproducible copy (4 mil mylar) of the original control schematics showing all interconnections and a point-to-point wiring list for each elevator.
- F. All elevator firemen's recall service shall have a common key type (GAL 1617) and an installed fireman's key box. This key box shall have a manufacturer's key with a means of locking to secure a key either upon use by first responders or to facilitate monthly testing.
- G. All elevator fireman's recall service including the operational service shall have proper signage and/or placards to indicate the type of service.
- H. Elevator rooms or equipment must have fire protection and/or detection, and a representative from the Office of Environmental Health and Safety Fire Systems Section must be advised prior to inspection and acceptance.
- I. A hydraulic elevator can only be used when total travel is less than fifty (50) feet.
- J. Each elevator shall have an emergency telephone and an alarm.
- K. A home-run conduit shall be provided from the elevator phone to the telephone equipment room.
- L. Elevator machinery rooms shall be no larger than necessary to house and repair the machinery.
- M. Elevator motors shall be high efficiency power factor corrected to 95 percent.
- N. Grating shall be provided in shafts to permit safe lubrication of sheaves and equipment.
- O. Elevator systems test and balance will be provided by the University through the design professional as an additional service. The specifications will state that the contractor will participate in the testing, make any changes necessary and pay for any re-testing that may be required to make the systems meet specifications.
- P. All elevators, handicap lifts, dumb waiters shall meet all NFPA, ASME codes and ADA standards.
- Q. All elevators and similar equipment shall be accepted by the University only after it is approved by the University recognized inspection agency.
- R. Elevator contractor shall be responsible to insure that the pits, hoist ways, hatches, door rails, landing sills, and elevator machine rooms are clean before inspection.

- S. In all elevator sumps, install a submersible sump pump at each location in the event of flooding.
- T. All piston type lifts shall be landed and repacked before turnover and equipped with scavenger oil systems.
- U. All passenger elevators shall have 2 speed doors with GAL operators.
- V. Before acceptance elevator contractor shall provide 2 each keys for doors, fireman's service, control cabinets and maintenance by pass.
- W. Elevator ADA telephones shall be manufactured by Vandal Proff products, Model VPP-T1240 and be mounted in a flush manner. No substitute or equivalent shall be accepted.
- X. Elevators and similar equipment shall be provided with not less 1 year of full service contract provided to the University Plant Operations and Maintenance organization.
- Y. Elevator car light shall have a dedicated circuit served by a fused disconnect switch.

PREFERRED MANUFACTURERS

Otis Elevator Company
Bagby Elevator

DO'S AND DON'TS**DO'S:**

Light in elevator machine rooms shall be on emergency power and protected by a safety shield

DON'TS:

DO NOT install any propriety process control systems.

-END OF SECTION-

MECHANICAL GUIDELINES**General Mechanical Guidelines**

- A. Utility work and connections to University utility meters must be properly planned to prevent disruption of classes and/or research efforts. All utility work shall be coordinated with the UWF Utility Services through the University Project Manager.
- B. It shall be the responsibility of the A/E to investigate and determine the actual location of all underground utilities or obstructions at the building site before beginning design work. This information is to be shown in the drawing package (See Division 1, Section 01530). Coordinate with the Supervisor of Facilities Maintenance within the Department of Plant Operations and Maintenance, through the University Project Manager.
- C. The construction contract specifications shall provide for the orientation and training of University Plant Operations and Maintenance personnel on all installed equipment and systems, day and night shifts.
- D. ASHRAE Standard 62-1989 or the most recent revision shall be the design guideline for outside air quantities (typically 20 cfm per person for offices; 15 cfm per person in housing units and other occupancies) shall be specified.
- E. Accurate means for measuring and controlling outside air quantities into VAV air handling units shall be provided.
- F. The campus heating hot water (HHW) and chilled water (CHW) distribution system shall be utilized for comfort heating, cooling and dehumidification whenever possible.
- G. The mechanical system shall be designed to provide not less than 60-65% ASHRAE Standard 52-76 Dust Spot filtration in all major air-handling units with 40% (2") pre-filters.
- H. The application of fan coil units is discouraged unless exception is approved by the University Project Manager. When used units must have a full sized sealed secondary drain pan and secondary drain.
- I. Factory-fabricated pre-insulated heating hot/chilled water piping for underground use shall be the basis of design. Thermacore or approved equal.
- J. All utilities shall be metered for each building, including electricity, drinking water (DW), natural gas (NG), irrigation water (IW), chilled water BTU metering and heating hot water BTU metering. Utility metering shall be interfaced to the **Siemens Building Automation System (BAS)** and coordinated with the University Project Manager both during design and with the Contractor prior to construction.

The Utility Usage Screens shall be indicated with the following headings and units:

Year	Month	CHW Million Btu's	CHW Ton-hrs	HHW Million Btu's	DW 1,000 Gals	IW 1,000 Gals	NG 1,000 CF	
Year	Month	On Peak Time of Day	Off Peak Time of Day	Total kWh	On Peak kWh	Off Peak kWh	On Peak kW	Off Peak kW

- K. Heat, air conditioning, humidity control and any other environmental factors shall be the responsibility of the contractor throughout the construction period.
- L. Exhaust fans shall be direct drive if possible.
- M. When balancing dampers, isolation valves or other devices requiring service are provided above an inaccessible ceiling board, plaster, concrete, etc., access doors shall be supplied and shall be indicated on the mechanical plans and the reflected ceiling plans. Access doors shall be 16"x16" minimum when physical access to equipment above the inaccessible space is required. Access door size must be large enough to remove or replace equipment located above inaccessible ceiling spaces.

N. USGBC - LEED REQUIREMENTS (meet and not exceed a “silver” certification rating.

-END OF SECTION-

DIVISION 21 – MECHANICAL – FIRE SUPPRESSION

Fire Protection

- A. The use of fire suppression systems shall be governed by the requirements of individual projects. Where systems are required they shall be designed in accordance with the applicable NFPA standards. (No design required if not required by NFPA.)
- B. Fire protection that is cost-effective, yet provides a maximum degree of protection consistent with the type and degree of fire exposure, shall neither be diminished in an effort to reduce project costs nor shall it be set aside for security or other considerations.
- C. Halon should not be considered at any time for fire suppression.
- D. Automatic fire suppression systems and other fire protection systems shall be designed so that their proper operation does not depend upon a high degree of sophisticated maintenance.
- E. Sprinkler systems will be performance specified by the designer in compliance with NFPA 13 and the appropriate design manuals using the more stringent of the two in case of discrepancy. Preliminary hydraulic calculations shall be provided to insure that system demand does not exceed available supply. Plans developed shall indicate water densities, hazards, area of operation, water flow test data, and any other data necessary for the contractor to design the system. The contractor will use the plans and specifications as a guide for subsequent preparation of detailed drawings that will be coordinated with requirements and options of the work of other trades required for construction of the facility. A note to this effect shall be placed on the plan. Riser locations shall also be shown on the plans. All fire systems shall have at a minimum a double check back flow preventer.
- F. Designers shall check each system and its equipment to assure ready accessibility and operability of all maintenance points, gages, valves, controls, and signals. Devices whose operations are critical during emergency conditions shall be prominently located and singularly identified. All system drains and inspectors test ports shall be run to the outside of building.
- G. All fire sprinkler heads in rooms not hallways, shall be located no closer than 3ft from any wall except where required for windows, fire doors, fire curtains and special applications.

In a room that is too small to mount the sprinkler head 3 ft from the walls the head shall be mounted as close to the center of the room as possible, if provisions do not allow for centering in the room than mount centered just inside the room at the end of the room where the door is located.

-END OF SECTION-

DIVISION 22 – MECHANICAL – PLUMBING

- A. Standard or “packaged” equipment shall be used to the greatest extent possible to simplify specifying, purchasing, installation and maintenance of equipment.
- B. Piping System: Piping materials and sizes shall comply with the recommendations in the National Standard Plumbing Code. Flow velocities in water pipe shall not exceed 10-feet per second. All piping shall be sloped to permit complete drainage and must be properly supported with allowances for expansion and contraction. Expansion loops or expansion joints and anchor points shall be shown on plumbing drawings. Piping subject to freezing shall be suitably protected. Water supply piping shall not be buried under concrete floors except in special instances where other methods of installation are impractical or economically unfeasible.
- C. Wall Hydrants and Lawn Faucets: The maximum spacing between wall hydrants or between lawn faucets around the perimeter of a building is 200-feet. Add 5 gpm for each hydrant or faucet to building load for sizing water main.
- D. Floor Drains: Floor sinks shall be provided and installed to finish floor grade in all boiler and equipment rooms and floor drains shall be provided adjacent to each emergency eye wash/deluge shower assemblies.
- E. Grease interceptors shall be installed outside of buildings.
- F. Backflow Prevention: The water distribution system shall be protected against the flow of water or other liquids into the distributing pipes from any source or sources other than their intend flow. Refer to the National Standard Plumbing Code for requirements on all systems. All backflow preventers shall be reduced pressure principle type. In order to prevent further problems of non-accessible backflow preventers, all newly installed backflow preventers shall be installed no more than 5’ above floor (max. height). On fire systems there shall be adequate space available around backflow preventers to be accessible by floor crane for maintenance purposes. Any contractors needing to use water shall install at minimum a double check valve assembly, backflow preventer at the point of connection to water system. All potable water backflow preventers shall have insulated fiberglass enclosures. **NO EXCEPTIONS. Backflow preventers shall be installed within the building.**
 - 1. Specify that backflow preventers and double check valves will be tested and certified by the installing contractor prior to substantial completion.
- G. Verify adequacy of end-line device pressure with all backflow devices installed.
- H. New building construction shall include installing a line sized flush valve on the dead end of the potable water supply piping to the building. Multiple story buildings shall have a flush valve for each floor that is piped to the outside ground level.
- I. Each building shall have a “Full Port Ball Valve” for the purpose of building isolation.
- J. Domestic Hot Water: In the design of any buildings in which there are installed water closets and showers, the A/E shall exercise the necessary precautions to prevent personnel from being scalded while taking showers due to simultaneous operation of water closets equipped with flush valves.
- K. Domestic Hot Water Temperature: Domestic hot water supply maximum temperatures at the point of use will be as follows for the indicated facilities or areas unless higher temperatures are required for sanitizing or special processes.
- L. In all restrooms without showers or tubs, the actual measured temperature of hot water delivered to the user shall not exceed 100 degree F.
- M. In all facilities with showers or tubs, the actual measured temperature of hot water delivered to the user shall not exceed 110 F.

- N. A water blending system using a 3-way mixing valve as indicated in ASHRAE Systems Handbook may be used where equipment room space is limited and/or the water heater is designated to supply hot water at temperatures greater than required.
- O. Compressed Air: Unless requirements are stated in specific instructions, compressed air system and compressor sizes will be determined by the A/E from analysis of equipment layout and/or coordination with using agency requirements.
- P. LP Gas shall not be used as fuel.
- Q. Gas Distribution and Gas Fittings: The exterior gas distribution system specification will extend from point of connection with existing main to a point 5-feet from the building. The interior gas system shall begin with the connection at the 5-foot mark and covers all interior gas piping.
- R. Fixture Selection: All specifications and references to outfit numbers and figure numbers shall be as defined in Federal Specification WW-P-541D. Unless they are an integral part of the fixture, toilet accessories such as prefabricated shower stalls, towel bars, mirrors, etc., shall be included in other specifications.
- S. Specify metering for each system including gas, water and irrigation. Irrigation shall have a separate meter. The metering will integrate with the Siemens Building Automation System.
- T. No water pipes in exterior walls.
- U. Provide floor drains with trap primers in toilet rooms.
- V. Low consumption fixtures required.

PREFERRED MANUFACTURERS

Fixture

- American Standard
- Zurn
- Delta
- Kohler

Faucets

- Delta
- Speakman
- Zurn
- American Standard
- Kohler
- T&S

Shower Valves

- Speakman
- Kohler
- American Standard
- Bradley
- Delta

Shower Bases

- 36" square Terrazzo Bases

Flush Valves

- Sloan-Royal
- Zurn

DO'S AND DON'TS

DO'S:

- DO use low consumption fixtures required. Flush motors are required.
- DO use non-white porcelain sinks.

DO turn over hose-bib and silcox keys over to Facility Maintenance

DON'TS

- DO NOT use fiberglass fixtures.
- DO NOT use stainless steel sinks.
- DO NOT use tank toilets.

-END OF SECTION-

Domestic Water System

- A. Provide a separate shut-off valve outside each building for domestic water service and fire protection service.
- B. Type “1” copper for domestic water lines.
- C. Provide valve at each branch water line.
- D. Resilient Wedge Valves to be used on piping 2” and above.
- E. All meters should measure in gallons.
- F. All water piping with the potential to contaminate domestic water system must have backflow preventers. All new buildings shall have backflow prevention on potable, fire protection and irrigation systems and shall be located within the building.
- G. One exterior hose bib on side of each building.

PREFERRED MANUFACTURERS

Valves

Ball Valves (use up to 4”)

Apollo

Watts

Nibco

Gate Valves (use 4 1/2 ‘ and up)

Stockham

Nibco

Check Valves

Stockham

Nibco

Watts

Thermometers and Gauges-

Ashcroft

Marsh

Circulating Pumps-

Bell and Gossett

Armstrong

Pressure Regulating Valves, Backflow Prevents, and Relief Valves

Watt Company

Febco

Wilkins

Zurn

Conbraco

Tempering or Thermostatic Mixing valves

Lawler

ITT

Leonard

Solenoid Valves

ASCO only

Food Service Faucet and Spray Valves

T & S Brass

Safety Shower and Eyewashes
 Speakman Company only

Water Coolers
 Halsey Taylor
 Oasis

Laboratory Faucets
 Delta
 T & S Brass
 Chicago Faucets

Instantaneous or Semi-Instantaneous Hot Water Heater
 Patterson-Kelly
 Aerco

DO'S AND DON'TS

DO'S:

DON'TS:

- DO NOT use butterfly valves in Plumbing.
- DO NOT place water lines in the outside walls.
- DO NOT specify Leslie Constantemp instantaneous "Domestic hot water heaters.
- DO NOT use galvanized piping.

-END OF SECTION-

Distribution Piping

A. Piping General Requirements:

1. Outside Piping: (Hot/chilled water) Specify factory fabricated pre-insulated piping with integral outer jacket. Thermacore or approved equal.
2. Water Velocities: Pipe sizes 2-inch and smaller: Velocities shall be not less than 2 fps and not more than 4 fps except that the minimum pipe size in any case shall be 3/4-inch. Pipe sizes larger than 2-inch: Velocities shall be not less than 2 fps and not more than 8 fps.
3. Frictions Rates: In general, design for friction rates between 1-foot to 4-feet head loss per 100-feet of piping, while maintaining the velocity limits described above. Note that in the smaller pipe sizes, the maximum velocity limitation of 4 fps permits the use of friction loss rates higher than 4-feet per 100-feet.
4. Thermal Expansion: Expansion shall be accounted for in straight runs of piping. All lines above ambient temperature must be considered, and calculation for lines above 160 F must be included in the design analysis. Allowable stress ranges are given in ANSI B31.1.

B. Interior Piping:

1. System Layout. Interior piping shall be self-balancing, to the greatest extent possible, by using reverse return systems. Reverse return systems shall be looped to minimize the amount of pipe required.
2. Chilled and hot water piping in equipment spaces and in all exposed locations shall be covered with a heavy gage corrugated aluminum jacket, sized for field painting.
3. Balancing: Specify flow stations for building, long branch lines and at each device where flow must be measured to balance and adjust the system. Design and detail recommended straight runs of equivalent pipe diameters to assure accuracy of flow station. Do not use the flow station (circuit setter) as a means of isolation on the return side of the system. Always specify a dedicated isolation valve downstream of the flow station.

C. Exterior Piping:

Chilled and Hot Water Distribution Systems: The contract drawings shall show the general arrangement of piping, sizes, grades, thrust blocks, and other details. Analyses shall be made to determine the most economical thickness of insulation for the supply and return

lines. The systems will generally be composed of factory fabricated pre-insulated conduit sections. Submit calculations and diagram describing spacing and size of expansion loops and anchoring methodology prior to the construction document phase.

- D. Welding Standards for Conditioned Water Piping
1. All pipes shall be beveled to 37 degrees.
 2. All pipe shall have 1/16-inch to 1/8-inch lands.
 3. All pipe shall be fit, tacked and inspected by the owner's designated representative, prior to weld out
 4. The owner's designated representative shall clearly mark the pipe inspected by and ready for weld out with a stencil, unique to the institution and inspector.
 5. All pipe shall have a root, two filler passes and a cap weld.
 6. The welder shall clearly identify each weld with an individual stencil mark unique for each certified welder employed by the contractor.

-END OF SECTION-

Chiller & Cooling Tower Equipment

- A. Use standard valve for cooling tower make up controlled by Stainless Steel Float Valve
- B. Counter flow cooling tower are acceptable.

PREFERRED MANUFACTURERS

Chiller equipment Trane, Carrier, York
Cooling towers Marley, BAC, Evapco

DO'S AND DON'TS

DO'S:

- Low ambient temperature condenser will be supplied with head pressure sensing controls. No dampers will uncontrolled fans.
- Mount condensers on the roof when possible, if at ground level they must be screened in and on a concrete slab.
- A cooling tower to have "Y" strainers and centrifugal separators.
- Cooling tower fans shall be shaft driven.
- Use refrigeration alarms-do not use oxygen level meter.

DON'TS:

- DO NOT plan on electric or magnetic water treatment

-END OF SECTION-

Chilled Water Lines

- A. Steel chill water piping is scheduled 40, black pipe with welded joints.
- B. Valves ¼" through 2" are to be quarter turn ball valves 150# stainless, threaded.
- C. Valves 3" through 4" are to be quarter turn ball valves 150# stainless, flanged.
- D. Valves above 4" are cast iron gate valves flanged 125# rising stem.
- E. Butterfly valves are lug type high performance with gear operators (with stainless steel parts).
- F. Pipe fittings are 150# black malleable or welded.
- G. Weld flanges are steel raised face.
- H. Use grade 5 chrome plated hex bolts and grade 5 extra heavy chrome plated.
- I. Underground chilled water lines add trace wire to none-metallic piping.

PREFERRED MANUFACTURERS

Thermacor pipe
Gasket-Garlock gylon, Fawn #3200 1/16"

Gate Valves-Stockham. Nibco, Watts
Ball Valves-Jamesbury, Apollo, Watts
Butterfly Valves-(high performance lug type only)-Jamesbury, Dezurik, Watts
Circulating Pumps-Bell and Gosset
Chilled water pumps- Allis Chalmers, Peerless, Bell and Gosset
Condenser Pumps- Allis Chalmers, Peerless, Bell and Gosset
Manhole rings and covers-Neenah Foundry
Refrigeration alarms-MSA, Foxborough
Lift check valve-Powell
Bolts-Lake Erie Only

DO'S AND DON'TS

DO'S:

Thermacore pipe installation will be approved when a Thermacore pipe inspector submits a written verification that all test have been completed and approved by Thermacore pipe.

Overlay piping will be overlaid with marking tape (Bradly Identoline or equal).

Use "Y" type strainers.

All pumps cooled by chilled water will be provided with a separator and mechanical seals.

All pumps shall have vibration isolation.

DON'TS:

DO NOT use basket strainers.

-END OF SECTION-

DIVISION 23 - MECHANICAL – HVAC**Mechanical**

- A. The A/E shall coordinate space requirements, foundation supports, duct pipe routing, electrical service, etc., for heating, ventilation and air conditioning (HVAC) items with architectural, structural, and electrical design elements. Sufficient detail should be given to eliminate conflicts of the various trades and proper maintenance/service access above ceilings and adjacent equipment. Coordinate exterior HVAC distribution systems with design elements handling other exterior utility designs and site work. Provide de-confliction coordination drawings.
- B. Standard or packaged equipment shall be used to the greatest extent possible to simplify specifying, purchasing, installation, and maintenance of equipment.
- C. A computerized systems simulation energy and life cycle costs analysis will be required for each facility unless specific exception is granted.
- D. Provide preliminary computerized load calculations for block load and individual space load with programming data and other assumptions and submit prior to construction document phase of design. Submit final calculations at the 100% construction document phase. Calculations should indicate design peak outside air peak dry bulb temperature and peak wet bulb temperature.
- E. The existing Central Utility Plant (CUP) chilled and heating hot water distribution system shall be utilized as the primary cooling and heating source for all new buildings, all additions to existing buildings, and all existing buildings with increased HVAC requirements unless Approved by the University Associate Vice President.
- F. In the design of building HVAC systems, variable air volume (VAV) air handling unit systems are generally preferred. VAV Single zone air handling units with individual zone reheat may be considered if the space may be better served by these systems. It is preferable to address cooling, dehumidification and heating of required outside ventilation air by dedicated outdoor air system separately from building latent and sensible loads.
- G. Noise Control: All noise control design work shall be in accordance with ASHRAE Standards or specific requirements that are determined during the programming phase of design.
- H. Fire Protection: The current requirements of NFPA 90A and 90B will be incorporated in all heating and air conditioning systems designs. Corridors shall not be used as supply, return or exhaust air plenums.
- I. Filtration: For standard HVAC applications, filtration shall be provided as follows:
 - 1. "MERV 11
 - 2. Maximum filter face velocity shall be 350 FPM. Only standard filters sized of 24" x 24" and 24" x 12" will be allowed.
 - 3. Mount filters in low leakage factory fabricated galvanized steel housing with hinged access doors each side. Housings shall be all double wall-insulated construction. Housings shall be Farr 3P Glide/Pack or engineer approved equal
 - 4. Specify analog differential pressure (dp) pressure gauge with digital read out and integrate with Building Automation System (BAS).
 - 5. Filter application may vary depending on building use, i.e. Labs, etc.
 - 6. When HVAC design requires air flow measurement station to monitor outside air ventilation quantities, incorporate separate and additional Merv 11 filtration of outside air prior to passing through the outside air flow station.
- J. Buildings shall be maintained at a positive pressure with respect to atmosphere at all times. An air balance diagram and supporting calculations shall be provided with each design submittal.

- K. Provide means of active control of outside air ventilation shall be specified serving either air handlers or directly to the space. Exhaust systems shall be interlocked with the associated air-handling units to run only when the air-handling unit is running
- L. Equipment Rooms: All equipment rooms shall be air conditioned.
- M. Hazardous Areas: The exhaust system discharge point shall be such that the vapors cannot enter other areas through open windows or the fresh air system. The capacity of the exhaust system shall be sufficient to prevent flammable or toxic vapors from escaping into surrounding hazardous areas. Direct recirculation shall not be permitted. Mechanical ventilation and exhaust systems for flammable and toxic gases shall follow the codes of practice of the National Fire Protection Association, Industrial Ventilation, and the ASHRAE guide and data books.
- N. Special Buildings: Ventilation requirements for special buildings will be evaluated, and recommendations and calculations will be submitted for approval to University Project Manager prior to commencement of design.
- O. Humid Area Considerations: The following criteria shall be applied to all projects:
 - 1. The use of fan coil units is prohibited unless exception is approved by the University Project Manager.
 - 2. Selection of equipment shall be based in part on an analysis of part load operating hours for extended periods at low load conditions and design peak outside air dew point temperatures.
 - 3. Dedicated outdoor air units should be selected to maintain a 48 °F dew point temperature of treated conditioned air to the space served
- P. Mechanical equipment (sized from three manufacturers), piping, and accessories in equipment rooms will be drawn to scale in both plan and elevations. Adequate space will be provided for maintenance, operation, and replacement of equipment, piping, and accessories. Catwalks, ladders, platforms, access panels and doors required for operation and maintenance of equipment, valves, and accessories will also be indicated and detailed on the drawings.
- Q. The design engineer is responsible for analyzing the requirements for chilled and heating hot water piping to service the HVAC needs of the project and evaluate the impact to the distribution system and Central Utility Plant (CUP). Sizing of heating hot water and chilled water lines to buildings should be evaluated to minimize the use of booster pumps. Notify the University Project Manager in writing if existing capacity is not adequate to serve proposed project in the Design Development Phase
- R. For remote buildings in which chilled and heating hot water service from the CUP is not practical, life cycle analysis and specific project requirements shall evaluate alternate cooling and heating systems.
- S. VAV Air Handling Units shall be specified with a variable speed drive unless exception is approved by the University Project Manager.
 - 1. VAV boxes when used, generally should be close off type with hot water reheat coil unless specific requirements require a series or parallel fan powered box. Generally specify heat or reheat for all boxes unless VAV box is for cooling mode only to address internal process or heat load.
 - 2. Carefully evaluate heat fan cubic feet per minute (CFM) and volume control for fan powered VAV boxes.
 - 3. When fan powered boxes are required specify 1" Merv 11 filtration
 - 4. Galvanized drip pans shall be provided under all VAV boxes and associated valves and connections to mitigate incidental condensation drips that can occur during times of elevated internal building dew-point conditions. Install a minimum of 4" below VAV unit.
- T. Central station type air handling units are generally limited to 60,000 CFM or less and should be specified with 2" insulation, double wall construction, stainless steel drain pan, intermediate drain pans, stainless steel coil support structure, internal vibration isolation, full

sized access doors on both sides of each compartment, primary and secondary filters and 5/8" coil tube diameter. Water coils:

1. Water-cooling coils shall be certified in accordance with ARI STD 410. Limit design air face velocities on chilled water cooling coils to 350-450 fpm.
2. Provide 36" clearance minimum of all sides of unit.
3. Provide coil pull clearance and indicate with shaded area on documents.
4. Specify 6" pad and secondary drain pan and drain under unit.
5. Generally do not specify suspended units from the structure or above other equipment unless approved by the University Project Manager.
6. Generally mechanical rooms will not be used as a return plenum. In return plenum designs specify return duct out of the mechanical room unless approved by the University Project Manager.
7. Specify convenience 20 amp GFIC outlets in mechanical rooms. (Electrical documents)
8. Specify one potable water hose bib with vacuum breaker for each mechanical room.

-END OF SECTION-

Split Systems - All split systems must have a SEER rating of 16 or above.

- A. Any split system that uses auxiliary or existing heating, must be controlled by a single low voltage thermostat.
- B. Condensing unit must be interlocked with corresponding air handling unit.
- C. All split systems must have a crank case heater.
- D. Any split system must have a proper sized DX coil. Chilled water coils are not acceptable.
- E. Generally specify dx split system unit with low ambient controls.

DO'S AND DON'TS

DO'S:

- All refrigeration line must be silver brazed. (No soft solder.) Heat pumps use low side lines for high pressure when reversed.
- All refrigeration lines must be properly sized, mounted, secured, with hangers, etc.
- Replacement compressors must be replaced with the same type, semi-hermetic for semi-hermetic, hermetic for hermetic, etc.
- All ductwork must be externally insulated and sized according to the room sizes and heat and cooling loads.
- All new split systems must have a separate sheet for each unit listing all name plate data, including manufacturer, model number, serial number, refrigerant type, refrigerant charge, filter size and quantity, voltage, amps, belt size, etc., for air handler, condensing unit, and compressors.
- Any air handler system with a D/X coil and hot water coil must be properly protected from coil freeze up.

DON'TS:

DO NOT use split systems where chilled water is available from the Central Plant.

-END OF SECTION-

HVAC Design Requirements

- A. Design system to maintain (+/-) 72 deg F inside space condition in both summer and winter cycles. Equipment should be designed for an outside ambient temperature to meet the following conditions:
- B. Outside Air Design Criteria
Winter 20 °F dry bulb
Summer 96 °F dry bulb and 82 °F wet bulb
- C. All coils must have adequate clearance for removal and service. All multi-pass coils vents and drains should be installed for easy access for service.
- D. Chilled Water and Heating Hot Water Selection Criteria.
 - 1. Chilled Water Coils
Entering Chilled Water Temperature: 45°F
Leaving Chilled Water Temperature: 60°F
 - 2. Heating Hot Water Coils
Entering Heating Hot Water Temperature: 180°F
Leaving Heating Hot Water Temperature: 150°F
- E. All motors shall be premium efficiency
- F. All pumps must have vibration eliminators
- G. All completed jobs must include as-built mechanical prints and as-built ATC prints along with the sequence of operation. Air balance and water balance reports must also be included before job is turned over to University.
- H. Butterfly valves (High performance only) for dual temperature change/over valves or chilled water mains. Other applications standard butterfly valves acceptable
- I. One thermostat controlling multiple rooms or areas should be kept to a minimum. (I LEED)
- J. For equipment using adjustable frequency drives, refer to VFD/Motor.
- K. All mechanical rooms on the ground floor to be flood proof.
- L. Air Elimination Devices – Individual air vents installed on boilers, tanks, and terminal units. Spirotop air release valves as manufactured by Spirotherm. Chilled water and heating hot water systems, main air separators-Spirovent Dirt Model.

PREFERRED MANUFACTURERS**High Performance Butterfly Valves**

James bury 815L-11-2236MT

Dezurik BHP

Standard Butterfly Valves

Nibco

Milwaukee

Dezurik

Gate Valves

Nibco

Milwaukee

Watts

Stockham

Ball Valves

Milwaukee

Apollo

Jamesbury
Watts

Base Mounted In-Line Pumps

B-G
Peerless
TACO

Motor Starting Equipment-Relays (Refer to Section II.2 for Motor Control Center)

Square D
Westinghouse
Furnas

DO'S AND DON'TS

DO'S:

- K-Type Copper should be used in all HVAC applications.
- All moving equipment must be supplied with Manufactures Operating & Maintenance Manual. Each manual should have the name-plate Model and Serial number of equipment, plus equipment designations, i.e. P-3, AH-4, on top of page.
- Use ball valves for all valves less than 3 inches to insure positive shutoff.
- All pumps must be supplied with date information, including pumps curves and impeller size.
- All pumps must have pressure gages, mounted in the suction and discharge sides of the pumps with ½" thread-o-lets, that alone with pump curves and impeller size, GPM readings can be calculated.
- Separate filter list should be supplied listing size, quantity, and type of filter for each unit.

DON'TS:

DO NOT use electric heat trace as primary freeze protection means.

DO NOT use di-electric unions for dissimilar metal transitions. This does not alleviate contractor of responsibility for providing proper transition fitting for dissimilar metals. Recommend use of waterway nipples for Victaulic Corporations.

DO NOT sue Vortex damper.

-END OF SECTION-

Insulation

- A. Elastomeric insulation required on all piping subject to sweating (chilled water, refrigerant, a/c condensate, roof drains).

System	Avg. Temp	Insulation Type	Pipe Size	Insulation Thickness
Steam Piping	Above 212	Fiberglass	Up to 2" Pipe	2"
			2"-4" Pipe	2"
			5"-6" Pipe	2"
			8" & Up Pipe	2"

System	Avg. Temp	Insulation Type	Pipe Size	Insulation Thickness
Steam Condensate	200-230	Fiberglass	Up to 2" Pipe	1.5"
			2"-4" Pipe	1.5"
			5"-6" Pipe	1.5"
			8" & Up Pipe	1.5"

System	Avg. Temp	Insulation Type	Pipe Size	Insulation Thickness
Heating Hot Water	95-180	Fiberglass	Up to 2" Pipe	1.0"
			2"-4" Pipe	1.5"
			5"-6" Pipe	1.5"
			8" & Up Pipe	1.5"

System	Avg. Temp	Insulation Type	Pipe Size	Insulation Thickness
Chilled Water (Inside Building)	94-64	Foamglass/ Elastomeric	Up to 2" Pipe	1.5"
			2"-4" Pipe	1.5"
			5"-6" Pipe	1.5"
			8" & Up Pipe	1.5"

System	Avg. Temp	Insulaton Type	Pipe Size	Insulation Thickness
Chilled Water (Underground)	41-64	Pre-Insulated Steel, polyurethane foam, w/ HDPE Jacket	Up to 2" Pipe	1.86"
			2"-4" Pipe	1.56"
			5"-6" Pipe	1.56"
			8" & Up Pipe	1.56"
Refrigerant Piping	30-100	Elastomer FinishWhite, Vapor Seal	.5"	
Condensate Drains	60	Elastomer FinishWhite, Vapor Seal	.5"	.5"
Domestic Cold, Hot and Recirc	40-140	Fiberglass	1"	1"

- B. General design at standard is Owens-Corning ASJ fiberglass pipe insulations and Armstrong AP Armaflex elastomeric insulation

PREFERRED MANUFACTURERS

Owens-Corning
Armstrong
Manville
Certain-Teed

DO'S AND DON'TS

DO'S:

All parts of the chilled water system must be insulated with a continuous vapor barrier to prevent condensations. Use oversized hangers with load bearing inserts or calcium silicate on 12 in long hanger shields, insulate entire assembly and provide a vapor barrier.

-END OF SECTON-

Variable Air Volume Systems

- A. VAV boxes generally shall be close off type with hot water reheat coil unless specific requirements require a fan powered series or parallel type box.
1. Specify 24" clearance on all sides of VAV box.
 2. Specify no other components below bottom of box.
 3. Specify 24" maximum above ceiling to VAV unit.
 4. Carefully evaluate heat fan cfm and volume control for VAV boxes.
 5. When fan powered boxes are used, specify 1" filter for VAV box
 6. Specify access doors to access all internal components
 7. Specify 24" minimum straight run of duct on primary side of VAV box equal to primary inlet opening size and configuration of VAV box.

8. Specify low leakage boxes with 1 ½” insulation with foil faced vapor barrier on air side.
 9. Design and specify sealed galvanized drip pans to be installed beneath VAV boxes and reheat piping connections to VAV box to capture incidental condensation that may occur during times of elevated dewpoint in the building.
- B. Specify supply diffusers that are suitable for varying flow rates without dumping at flow.
 - C. Use light troffers for return air into ceiling return plenums. Do not use light troffers for supply air diffusers.
 - D. Generally control of air handling unit fan speed in response to changes in system static requirements shall use a variable frequency drive (VFD) unless approved by the University Project Manager. Siemens or approved equal.
 1. The design engineer shall provide criteria for maximum allowable noise levels generated by VFDs in the specifications. Specify premium efficiency motors.
 2. All VFDs shall be required to have a true electrical bypass with magnetic motor starter and motor starting circuit housed in a separate cabinet from the VFD. The electrical bypass feature shall allow service of all components in the VFD cabinet with no power or control voltage present.
 - E. Provisions shall be made in the design of variable volume air handling systems to maintain the outside air rate constant regardless of fluctuations in the supply air flow rate.
 - F. Output waveform of VFD (Variable Frequency Drive, Adjustable Frequency Drive, electronic Adjustable/Variable Speed Drive) is to be Pulse Width Modulated (PWM).
 - G. The VFD shall be located as close as possible to the motor in order to minimize the cable lead length.
 - H. Consider using a motor/drive combination manufactured by the same manufacturer for small motors (less than 5 hp). Ensure compatibility between motor and drive
 - I. Documentation of verification ensures compatibility between motor and drive shall be approved by the Engineer.
 - J. The harmonic distortion produced by the VFD shall not exceed the limits as specified in IEEE-519.
 - K. Do not use power factor correction or surge suppression methods on the load side of the drive connected to a motor.
 - L. Specify bypass capability.

APPROVED MANUFACTURER OF DRIVES

Siemens
ABB
Yaskawa

-END OF SECTION-

Fan Coil Unit Based System

- A. Use 4 pipe systems in new construction.

PREFERRED MANUFACTURERS

Trane
York
Carrier

DO'S AND DON'TS

DO'S:

All Coils on HVAC equipment should have ball valves (4” or less) on both supply and return for positive shut-off.

All hot/chill water supply and return risers should have shut-off valves to isolate each floor level.

DON'TS:

DO NOT use as a method of introducing outside air.

-END OF SECTION-

Air Handler Based System

- A. Air handler based systems are strongly preferred for all new construction.
- B. A separate filter list should be provided showing quantity, description and size of all filters required.

PREFERRED MANUFACTURERS

Air Handlers

Trane

Carrier

York

Governair

Air Enterprise

Temptrol

Fans generally shall be plug type or fan wall configuration.

Specify full sized stainless steel drain pans for coil and fan sections.

Specify stainless steel coil support structure and frame.

Specify double wall construction with minimum 2" spray iso-foam insulation.

Specify access plenum sections for both sides of coil for inspection and cleaning of coils.

Generally specify access doors on both sides of units to access fan, coils and filters.

Generally specify UV lighting on leaving side of cooling coil with light switch on exterior of unit.

Generally specify general purpose interior service lighting with exterior light switch for fan, motor and filter sections.

Specify internal fan vibration isolation.

Generally specify unit base rails.

Generally specify Ventlok 699 access ports or equal to be factory installed for all unit panels that require field testing of static pressure or temperature of AHU components.

(Typically fan section, before and after coil sections, before and after filter sections.)

On design documents floor plan or enlarged plan, show outline of coil pull space on drawings.

Generally design should provide 36" clear space on all other sides of unit from walls or other equipment in mechanical room.

Fan motors shall be premium efficiency. When possible fan design should utilize direct drive motors.

Specify low leakage air handlers with thermal break construction to minimize external condensation.

Generally condition the mechanical room when feasible.

Generally condition the electrical room when feasible.

Generally design mechanical rooms as separate rooms from electrical rooms.

DO'S AND DON'TS

DO'S:

All closed loop heating/cooling systems must have adequate air bleeding capabilities.

All vents should be self-venting and handle system pressure.

All duct work for air handler system must have external insulation.

- All coils on HVAC equipment should have ball valves (3" or less) on both supply and return for positive shut-off.
- All hot/chilled water supply and return risers should have shut-off valves to isolate each floor. Vent stations must be provided at highest point, and at each floor level.
- When connecting into existing handler's for renovation spaces, rebalancing of complete unit must be provided.
- Any freeze-stat used on an air handler system must be a manual reset type. Automatic resets are not acceptable.
- Use 1-1/2" rigid duct board insulation on exterior of heat duct.
- Use 2" rigid duct board insulation on exterior of cooling duct and vapor seal.
- Use 1-1/2" fiberglass for round duct insulations.
- For all exterior ductwork insulate with 1" Armaflex and 3 coats of finish and seal any porous cut ends with adhesive before applying finish.

DON'TS:

- DO NOT use self stick pins use only spot-welded or apply with adhesive.
- DO NOT use flexible duct work except for VAV box and then use minimal lengths.
- DO NOT use fiberboard duct work.
- DO NOT use internal fiberglass insulation inside of duct work, air handlers, or any other place in the air stream.
- DO NOT use electric preheat.
- DO NOT use conduloc ductwork.

-END OF SECTION-**Ductwork**

- A. Ductwork shall be designed in accordance with applicable SMACNA and ASHRAE recommendations. Specify the appropriate pressure class, duct sealing and cfm leakage tests per SMACNA.
- B. Generally specify supply round or oval ductwork on main trunk lines unless space constraints require rectangular ductwork. Ductwork is to be externally insulated unless design requirements call for double wall duct with integral insulation.
- C. Fiberglass ductwork will not be allowed for HVAC ductwork in any location or application.
- D. Rectangular duct elbows generally shall be double radius with inside radius equal to 1.5 times the height of duct in the plane of the elbow. When space constraints require the use of square elbows, specify single thickness turning vanes. For round and oval duct generally specify continuous seam or 5 segment gore type elbow with minimum inside radius of 1.5 times the height of the duct in the plane of the elbow.
- E. Flexible round ductwork shall be factory prefabricated with 2" insulation and internal vapor barrier. Maximum length of any flexible duct run out shall be 6'. Specify adequate saddle type hanger supports.
- F. Return air ductwork generally shall be galvanized steel rectangular and externally insulated with 2" thick 1-1/2" pound density FRK type vapor barrier jacket unless acoustical evaluation dictates internal insulation.
- G. Outside air ductwork shall be galvanized steel rectangular or round duct with 2-inch thick 1-1/2 pound density fiberglass external duct wrap insulation with FRK type vapor barrier jacket.
- H. Exhaust air ductwork (normal building exhaust) shall be galvanized steel rectangular or round duct.
- I. Exhaust air ductwork for explosive, corrosive, chemical, or other special applications shall be as required for code compliance, proper operation and longevity.

- J. Manual volume dampers shall be provided for all air supply, return and exhaust distribution devices (diffusers and registers) and shall be provided in the branch duct takeoff to the individual air distribution device. Manual volume dampers shall not be installed in the air distribution devices. In addition, manual volume dampers shall be installed in main branch ducts serving multiple air distribution devices to facilitate zone air balancing. Locate volume dampers above lay-in type ceilings, or provide large access panels in hard ceilings. Access panels shall be sized with locations shown on both architectural and mechanical drawings.
- K. Installation of access panels shall be by the Contractor. All manual volume dampers shall have locking quadrants. Rectangular manual volume dampers shall be opposed blade type.

-END OF SECTION-

DIVISION 25 – INTEGRATED AUTOMATION – BLDG. AUTOMATION SYSTEM**Controls and Instrumentation**

- A. Controls: A complete sequence of operation shall be included on the drawings along with a schematic control diagram and description of components for each typical system. This information shall not be repeated in the specifications. The sequence of operation, schematic control diagrams, and description of components shall cover each item of controlled equipment and shall detail each electrical starting circuit and each interlock including fire alarm interlocks and exhaust fan interlocks. The diagrams shall clearly differentiate between items to be provided and installed by the controls contractor.
- B. HVAC controls shall be Siemens to match campus system. Controls shall be able to communicate on the campus internet with central reporting to Building 40. The following are minimum requirements that shall be incorporated into the control design.
1. Building entrance chilled/ heating hot water flow and btu metering.
 2. Building entrance chilled/ heating hot water temperature and pressure drop and control valve position.
 3. Remote start/stop/status and schedule for all equipment.
 4. Chilled/ heating hot water entering/leaving temperatures for each coil.
 5. Chilled/hot water valve position.
 6. AHU duct static pressure.
 7. Variable Frequency Drive (VFD) speed, kW, volts and amperes.
 8. AHU Filter Pressure Drop (ΔP) (Analog air filter dp with digital readout).
 9. Ebtron Gold air velocity sensor for outside air duct volume measurement.
 10. VAV supply air temperature.
 11. VAV damper position.
 12. VAV cfm and setpoint.
 13. VAV heating valve position and heating fan status.
 14. Room temperature and setpoint.
 15. Color graphics indicating schematics of systems with real time data.
 16. Multi-zoned – supply air temp, sensors on each zone.
 17. Space rh sensor.
 18. Space CO2 sensor.
 19. Exhaust fan proof (Air flow switch and or ct).
 20. Omicon 10 BTUH flow meter and match water temperature sensors.
- C. Coil leaving air temperature sensors shall be averaging type. One linear foot of averaging temperature sensor shall be provided for each square feet of coil area.
- D. Chilled water and heating hot water control valves shall be selected for a minimum pressure drop of five (5) pounds per square inch (PSI).

-END OF SECTION-**ATC-EMS**

- A. All new building or significant renovations except residence halls will have DDC ATC systems.
- B. In DDC systems use all electric operators.
- C. All electronic ATC valves must have manual override capabilities.
- D. The project is responsible to connect main building EMS panel to the University fiber optic network, which is located in the building communication room. Actual final connection is done by using university personnel but the project is responsible for providing all wiring and modems in place to prepare for this connection.

PREFERRED MANUFACTURERS

A.T.C electronic Venders
Siemens
Thermometer and Gauges:
Ashcroft
March-Tuerice
Wilka Instrument Company

DO'S AND DON'TS

DO'S:

All DDC systems must be connected to central energy management system using the university Ethernet network system.
Include complete computer graphics.

DON'TS:

DO NOT use any other ATC manufacturer except Siemens except what is specified.

-END OF SECTION-

DIVISION 26 – ELECTRICAL

General Electrical Guidelines – Electrical Systems (0-600 Volts)

- A. All conductors, bus bars and the like shall be of copper. Conductors 600 volts and below shall have THHN/THWN insulation or insulation type as required by application.
- B. All electrical panel boards, switchboards, and other electrical equipment shall have easy access, and shall comply with the working clearance requirements of the current addition of the NEC. All panel boards shall have exterior identification. All circuit breakers shall be numbered and identified on the directory as to type device and area serviced. The directory shall be covered by plastic. Circuit breaker panel boards for 480/277 volt and 120/208 volt systems shall be lockable, specification grade with 100% size neutral buses. The panel boards shall have bolt-on branch circuit breakers, a ground bar, and an isolated ground bar. The circuit positions designated as spaces shall have all necessary mounting and connecting hardware to accommodate future circuit breaker installation. All panels shall have hinged swing open covers. All enclosures shall be selected based on industry best practice for intended environment.
- C. A separate watt-hour meter with a 15-minute demand register shall be provided for each building. All metering applications shall be integrated in the **Siemens Building Automation System** and coordinated through the University Project Manager after consultation with the Central Utility Plant Unit Supervisor.
- D. The connected electrical load in any building shall be corrected to 95 percent power factor or above, using automatically controlled capacitors (PCB free), where required.
- E. Provide an automatic starting diesel fueled generator, with base mounted fuel tank, to serve the building emergency panel board(s) in the event of power failure, through automatic transfer switch(s). The generator shall have an elapsed time meter and an automatic “exerciser” in the control system. The generator shall have a battery charger and a jacket water heater supplied from an emergency panel board. In addition, the generator’s electrical capacity shall be sufficient to operate at least one elevator, building emergency lighting, all building data gathering panels used for HVAC control, building management systems and sump pumps. Provide protective bollards and raised access platform as required by UWF Maintenance Department. Coordinate with UWF Project Manager.
- F. From the campus underground communications duct and manhole system, provide conduits into the buildings for telephone, instructional television, fire alarm, and HVAC control and monitoring. See Telephone/Data System Guidelines Section.
- G. Provide reduced voltage starters, or variable frequency drives, for all motors that are 15 horsepower and larger. All variable speed drives shall be connected to the Siemens energy management system. Contact the Utility Department for specific details as to the requirements.
- H. High efficiency, high power factor motors shall be used in all cases where available for a particular application.
- I. Vending areas shall be supplied with electrical outlets at 4’-0” intervals along walls against which vending machines will be located.
- J. Hallway areas shall be supplied with electrical outlets a minimum of every 50 feet to accommodate building maintenance equipment.
- K. Outside utility outlets are required around building exterior to support outside maintenance efforts. Spacing should be 100 feet between outlets, maximum. All devices shall have gasketed, weather proof, cast aluminum covers.
- L. Building electrical systems shall be 277/480 volt, three phase, four wire, with 120/208 volt, three phase, four wire service for convenience outlets. Service entrance shall be installed in

galvanized rigid steel conduit with two bitumastic coats applied. Dry type transformer(s) shall be used to provide 120/208 volt, three phase, four wire service for convenience outlets. All mains and feeders shall be protected by circuit breakers rated for the calculated available bolted fault short circuit current. All data and calculations used in sizing electrical equipment shall be provided to the University Project Manager.

- M. Switches and controls for lights, heat, ventilation, windows, draperies, all other essential use controls, and fire alarm boxes shall be located as specified in the latest ANSI standard for the handicapped.
- N. Convenience electrical outlets shall be specification grade 20 amp, 125 volt, NEMA 5-20 R, Grounding Type, back and side wired, nylon receptacles, and provided as specified in the NEC. They shall be mounted with their centerline 18" AFF unless otherwise noted. All special application outlets shall be specification grade. Configuration, voltage, and current rating to match application
- O. Convenience electrical outlets/USB charger, Hubbell USB20C2W or approved equal shall be used in approved application.
- P. Convenience outlet plates and switch plates shall be #302 stainless steel.
- Q. Where floor service, electrical, telephone or similar outlets are used, they shall be of a flush mounted type with flush carpet plates.
- R. Where concentrations of computer and/or other non-linear electrical loads are heavy, consideration shall be given to use of k-rated transformers or methods of minimizing induced harmonics.
- S. Both the 277/480 volt and 120/208 volt electrical mains shall have surge protection provided by a surge protector having at least a 50 nanosecond response time, a 2250 joule energy absorbing capability, and clamping voltages, at 100A, of 660V and 310V respectively. AC power line protectors, Models 2021-120/208V AC and 2023-277/480V AC as manufactured by MCG Electronics Incorporated, 160 Brook Avenue, Deer Park, New York, 11729, meet these specifications.
- T. Direct burial electrical wiring for exterior lighting, and the like, shall not be used. All exterior wiring shall be in a minimum 1 1/4" conduit. PVC conduits shall be permitted for exterior lighting purposes.
- U. All conduits used to connect secondary electrical service to outbuildings and/or building sections shall be galvanized rigid steel with two bitumastic coats (no plastic) and shall be bonded to the building entrance ground system.
- V. All large spaces wired for TV cable shall have conduit and outlet at the "front" of the space. Verify locations with the University Project Manager.
- W. All empty conduits shall contain a polyolefin pull line-JET LINE #232 or approved equal.
- X. Oil-type transformers (PCB free) pad mounted outside is preferred. But, where dry-type are used, they shall be kept indoors and away from mechanical rooms, steam pipes, hot water pipes, and the like. All transformers, switches, and other electrical equipment are to be PCB free and labeled as such.
- Y. Interior conduit shall be EMT unless otherwise required by the application. Fittings for EMT shall be steel compression type. Die cast metal fittings are not allowed.
- Z. All conduits installed below grade shall be schedule 40 PVC or galvanized rigid steel. When using PVC employ galvanized rigid steel conduit for turn-ups through slab. Install separate grounding conductor per NEC where PVC conduit is used. Where galvanized rigid steel conduit is used below grade or in slab two coats of bitumastic coating shall be field applied prior to installation.

AA. Electrical power and its accessibility required during construction shall be paid for by the Contractor. If electrical power is available and adjacent to the project site the Contractor shall install a temporary power pole with service entrance, meter and grounding in accordance with local codes, to receive power supplied by the University. It will be the responsibility of the Contractor to provide code compliant connection to temporary power as directed by the University. The University will bill the Contractor monthly for energy used. Where feasible, the University will treat other utilities in a similar fashion.

BB. Electrical equipment rooms:

1. Electrical equipment rooms shall be dedicated to this use and shall not house mechanical equipment, telecommunications equipment, or equipment for any other building system.
2. Electrical equipment rooms shall be sized to maintain the minimum clearances to electrical equipment required by the National Electric Code. There shall be room/space to allow for emergency power inputs and switchgear.
3. Ductwork, piping, or any other equipment foreign to the electrical installation shall not be permitted in and shall not be permitted to enter or pass through electrical equipment spaces.
4. Finished ceilings installed below conduit and pull boxes in electrical equipment rooms are prohibited. All conduit and pull boxes in equipment rooms shall be fully exposed to view and accessible from within the room.
5. All electrical equipment rooms shall be equipped with single or double 3-foot and 0-inches by 7-foot and 0-inches metal doors as required allowing easy access and replacement of all housed equipment. Doors shall open to the exterior or to a main corridor on the interior.
6. Floor mounted transformers and switchgear shall be installed on six-inch thick concrete housekeeping pads. All exterior concrete transformer pads shall be installed with an open slot for future conduits.

CC. All switchgear equipment, panels, circuits, (including devices), and meters shall be labeled.

DD. All main secondary switchgear shall be supplied from the switchgear manufacturer with instrument class CTs installed and wired to a CT shorting block.

EE. Specify University standard “Master Padlock keyed the same (lock #2246)” on all panel doors.

FF. All circuits will have dedicated neutral.

APPROVED MANUFACTURERS

Secondary service gear, panel boards, switchboards, load centers, (Bolt-in Only)
 Square D
 Cutler Hammer
 Siemens

DO'S AND DON'TS

DO'S:

DO design devices around Hubbell specifications
 DO us only 20 amp spec grade devices

DON'TS

DO NOT specify or approve any devices not listed.

-END OF SECTION-

General Electrical Guidelines – Electrical Systems (600-15,000 Volts)

- A. The inside dimensions of communications manhole walls shall be 8'-0" X 8'-0" square. Precast manholes are recommended. Use only round manhole access lids.
- B. Manhole duct entrances shall be indented at least 4" and shall be provided with carbon bell ends. This will also apply when galvanized steel conduit is indicated.
- C. A 4/0 AWG copper ring bus ground shall be provided 18" above the floor, around the perimeter of the manhole. The ground bus shall be connected by an exothermic weld to a 5/8" coupled sectioned, copper-clad steel, ground rod driven to a depth required to obtain a maximum of 10 Ohm ground resistance. In addition, all manhole ground rings shall be connected by a 4/0 AWG copper conductor and approved exothermic welding.
- D. The minimum clearance from the centerline of the lowest duct entrance to the floor of the manhole shall be 2'-0".

Underground duct lines shall consist of polyvinyl chloride (PVC) encased burial (EB) ducts with spacers in 3,000 psi concrete envelope, with reinforcing steel when duct line is in street. The duct line shall be a minimum of 36" deep from finished grade to top of concrete.

- E. Cable racks used for electrical circuits shall be heavy duty galvanized.
- F. Hooks used for communication circuits shall be 12" lengths or approved.
- G. Rack backs in communications manholes shall extend from ceiling down 4'-0".
- H. All manhole hardware shall be new and compatible in each manhole.
- I. Provide hardware type equal to existing, or replace with new hardware plus new quantities as scheduled.
- J. Each manhole shall contain pulling irons located in the walls not less than 6" above or below and opposite the conduits entering the manhole. Irons shall be fabricated from bent steel bars and shall be hot-dip zinc-coated after fabrication.
- K. All manhole hardware shall be bonded to the ground bus with an exothermic connection.
- L. Medium voltage electrical manholes:
 1. Minimum size is 8'x8'
 2. Bottom of manhole to rest on 12" rock bedding.
 3. Specify with 4-5" bell end openings and 2-4" bell end openings for each side of manhole.
 4. Specify round traffic rated manhole lid.
 5. Specify with 12" diameter sump pit in corner of manhole
 6. Specify 2-2" sleeves on side of manhole with sump pit located above ductbank stubouts approximately 12" below top of manhole wall for solar pump system.
 7. Specify 12v sump pump, float switch, battery rack, 12V marine battery, solar panel, charger controller, solar panel pole and frame, conductors and pvc discharge drain with splash drop. See Exhibit 10-1 (**Electrical Manhole Detail**)
- M. Each new or renovated facility shall receive electrical service via the campus 12,470 volt distribution system as follows:
 1. Extend two 15kv nominally rated circuits from closest applicable system manhole or switch location to load interruption, pad mounted isolation switch-gear unless specifically directed otherwise by the owner. All 15 kv cable shall be 4/0 copper XLP. Coordinate @UWF Utility Department.
 2. Building service transformer shall be pad mounted oil type and shall include main feeder switches located in a separate compartment of the transformer weatherproof housing. Transformer shall be 12,470/480 volt, Delta/Wye con-figuration
 3. Install "SCADA" system compatible with system currently in use and as directed by the University, Plant Operations and Maintenance Department

4. Install fault indicators on medium voltage distribution system per current university practice. Coordinate with UWF Utilities Department.
5. Medium voltage ductbank.
 - a) Source feeder conduit ductbank shall be 5"conduit.
 - b) Provide three spares in addition to conduit run with conductors.
 - c) Ductbank to be concrete encased. As a general rule the top of ductbank shall be greater than minimum 36" deep unless otherwise approved by UWF.
 - d) **See Exhibit 10-2 (Electrical Ductbank Detail)**
6. Padmount Medium voltage switches:
 - a) Specify cooper VFI oil filled switches with stainless steel cabinet and related hardware.
 - b) Specify 2 sources and 2 taps with buss tie connection unless otherwise determined in programming and design.
 - c) Specify 24" deep blackout rough-in opening window as measured from top of slab to provide space for conductor alignment from conduit to elbow connection to minimize stress on cable.
7. Padmount Medium voltage transformers: 12470 to 480V or 208/120 volt>
 - a) Specify oil filled transformer with stainless steel cabinet and related hardware. Oil shall be biodegradable, nontoxic, Cooper Systems Envirotemp FR3 or equivalent.
 - b) Transformer to have integral disconnect switch on low voltage side.
 - c) Provide metering at transformer

N. Cable Spec.

Voltage Rating:	15kv
Cable Size/Material:	Minimum 4/0 AWG, 7strand copper
Drain/Shield:	Copper wire shield
Insulation:	Cross-link polyethylene; 175 mil thickness;133% Insulation level, ground maybe bare
Type:	Use 15 KV Okinite Cable
Temperature Rating:	Minimum 90 degree C
Industry Spec:	ICEA-566-524 and AEIC CS 5

Note: A #2 stranded copper THHWN conductor shall be installed in each service conduit, terminated at each end of the run, and terminated to the system grounding points.

O. All underground installations shall meet the following minimum requirements:

Raceway:	4" Schedule 40 PVC
Encasement:	6" of minimum 3,000 PSI concrete
Marking (encasement) red dye at surface not less that 2: in concrete pour	
Exposed locations:	4" rigid steel conduit. DO NO USE IMC. Paint red in all interior exposed locations.

- P. All transformers vaults, switchgear rooms and elevator equipment rooms shall be provided with emergency lighting originating with building emergency lighting system.
- Q. All Distribution transformers to be liquid filled. Oil shall be biodegradable, nontoxic, Cooper Systems Envirotemp FR3 or equivalent.
- R. All pad amount transformers shall be loop feed with internal lightning arrestors and provided with 5 point hex head closure bolts on primary and secondary compartment doors.
- S. All outdoor switchgear installations shall have internally powered strip heaters.
- T. All medium voltage switchgear shall be supplied from the switchgear manufacturer with instrument class current transformers (CTs) installed and wired to a CT shorting block. All medium voltage switchgear shall be supplied from the switchgear manufacturer with instrument class PTs installed.

U. Include lightning arrestors in all service transformers.

PREFERRED MANUFACTURERS

Switch Gear Oil filled only, no SF6 gas

Square D

ABB

S&C

Cooper

Transformers

Square D

ABB

Cooper

Terminations, splices, load break ells etc.

Ray Chem

Elastimold

RTE

3M

DO'S AND DON'TS

DO'S:

Do design around Square D specifications.

Do provide emergency lighting in all vaults and switchgear rooms.

Do provide switching capabilities at the university/service utility demarcation point.

(The utility company switch and or pole top disconnects do not satisfy this requirement).

DON'TS:

DO NOT specify or approve any switchgear not listed herein.

DO NOT specify any outside dry type transformer.

DO NOT use manholes as splice points.

DO NOT install uncontrolled service laterals.

DO NOT use IMC in exposed location underground.

DO NOT install surface mount conduit/wire mold

-END OF SECTION-

General Electrical Guidelines – Devices

A. All devices shall be 20-Amp spec-grade devices.

B. All receptacles shall use the following standard color code:

Emergency Red

Isolated Grounds Orange

Surge Protection Blue

Note: In areas where aesthetics are important (such as offices, meeting rooms, etc.,) solid ivory colored, receptacles shall be used.

PREFERRED MANUFACTURERS

Devices:

Hubbell

Leviton

P&S

Bryant

DO'S AND DON'TS

DO'S:

DO design devices around Hubbell specifications

DO use only 20 amp spec grade devices

DON'TS:

DO NOT specify or approve any devices not listed.

DO NOT use wire mold type.

-END OF SECTION-**Lighting**

- A. The consultant shall investigate fluorescent vs Light Emitting Diode (LED) lighting alternatives for each project. Lighting alternatives utilizing LED products shall be developed by the consultant and recommendations made to the University Project Manager for approval. The following general guidelines are to be use:
1. Four to one manual light level control is required for each space. Use 3 lamp fixtures and switching to allow 1, 2, or 3 bulbs to be on. (Use a 2 bulb and a 1 bulb ballast). Light levels shall have 4 to 1.
 2. Fluorescent or LED lighting shall be used in classrooms, hallways, laboratories, restrooms, etc.
 3. Use metal halide or LED in indoor sports areas.
 4. Install Passive Dual Technology motion detectors, utilizing Microphonics and PIR, to turn off and on lights in classrooms, restrooms, and conference rooms with manual override.
 5. Where LED sources are used they shall be of the same color temperature as the fluorescent lamp standards.
- B. Exterior Lighting:
1. Preferred fixture shall be LED, Lithonia CSX 2 LED 330B700/40K SR3 or approved equal. HPS fixture shall be EMCO ECOLUME-ECA 181 QV volts-BRP series or approved equal. LED fixtures shall be evaluated for all applications and used unless it is not feasible to do so. .
 2. Poles shall be square tapered aluminum. The shaft shall be extruded from all new 6063 alloy aluminum tubing and heat-treated to produce a T6 temper. The shaft shall be inserted into the anchor based casting. The anchor base casting and shaft shall be joined by a continuous circumferential weld at the outside top and inside bottom of the anchor base. The anchor bolt and nut recesses in the anchor base casting shall be flush, covered by four tamper resistant aluminum nut cover discs. Finish shall match fixture finish. Wall thickness for 12 ft and 20 ft poles shall be .188 inches, for 30 ft poles wall thickness shall be .250-inches. Anchor bolts shall be fabricated from structural quality, hot rolled carbon steel bar, having minimum yield strength of 50,000 PSI. Galvanized 3/4-inch diameter "J" bolts 24 inches long, must be used.
 3. Pole and Foundation design shall be based upon wind loads in accordance with most recent Florida Building Code of 140 mph wind velocity as per ANSI A58.1. Calculation shall be provided by a Florida Registered Professional Structural Engineer.
 4. All grounding shall be per NEC, and NFPA 78.
- C. Switches and controls for lights and mechanical room lights shall be controlled by a watt saver light dimming control switch. Programmable to operate lights within a 3 to 12 hour range. All other essential using controls shall be located at 48-inches to center above finished floor or as specified in the latest ANSI standard for the handicapped at time of the design.
- D. Exterior walkway and security lighting shall be controlled by a photoelectric switch. Light standards shall be protected by an LS type Delta lightning arrestor. Provide continuous around connection between each light standard and the electrical service point utilizing a bare #6 copper wire and industry approved connectors. All walkway/street light wiring shall be 480 volts, 3 phase with 3 #6 w/ #8 ground THHN or THWN installed in Schedule 40 PVC 1 ¼" conduit.
- E. Electrical systems for buildings shall be 277/480 volt, 3 phase, 4 wire, y system, with a 120/208v, 3 phase, 4 wire sub-feeder. Convenience outlets and other 120v loads shall be served via 277/480/120/208 3 phase dry type transform. Neutrals shall be sized the same as phase conductors per NEC without exception. All mains and feeders shall be protected by circuit breakers rated for the maximum bolted fault short circuit current that may be

encountered. Short circuit current data and calculations for the building shall be provided by the engineer of record to the Director of Facilities Planning, Maintenance and Construction. Contractor shall connect building steel, rebar, piping, and made grounds as required by the NEC.

- F. Both the 277/480V and 120/208V electrical mains shall have surge protection provided by solid state protectors. Minimum protection shall conform to Section I-R of these standards.
- G. All electrical wiring shall be copper.
- H. All electrical panels shall meet access and minimum clearance requirements of latest edition of NEC. All panels shall have bolt-on breakers. All disconnect switches shall be heavy duty (600 volt), matched to anticipated environments. Disconnect switches shall be externally labeled with both name and number of equipment served. External labels shall be engraved phenolic tags (white letters red background) with letters not less than 1-inch high. All equipment shall be labeled as designated in contract documents. Within breaker panels, each breaker shall be identified as to circuit and service on a typed, plastic covered index.
- I. No light fixtures shall be used which require special procedures or equipment to relamp or service. No lights are to be installed within or on buildings that require scaffolding for relamping. Fixtures on stairways shall be above landings not above steps.
- J. Incandescent light fixtures shall not be used.
- K. Emergency lighting shall be provided at all exits and in all stairways, hallways, mechanical rooms, elevators, and the like according to the NFPA. Emergency lighting shall be LED type powered from the building emergency generator system where available.
- L. A plastic buried cable warning tape shall be installed 12-inches above all underground with battery and electric cable. All connections shall be made above ground level, no underground splicing will be allowed.
- M. No lights are to be installed within or on buildings that require scaffolding for relamping.
- N. When search lighting is required in an interior classroom, a bypass will be provided to permit darkening of the room when visual aids are being used.
- O. Exterior walkway and security lighting shall be provided and controlled by a photo-electric switch connected in series with switch over-ride
- P. In the interests of energy conservation, lighting levels, in general, can be less than standard levels. However, where close work is performed, better lighting will be required. Lamps and ballasts shall be energy efficient type. Recommended lighting levels are as follows:
 1. Auditorium – 10-20 foot-candles
 2. Chalkboard / Markerboard – 50-100 foot-candles
 3. Classroom (Regular) – 30-75 foot-candles
 4. Conference Room – 20-50 foot-candles
 5. Dining Area – 5-10 foot-candles
 6. Drafting Room – 50-100 foot-candles
 7. Elevator – 10-20 foot-candles
 8. Exhibition Hall – 10-20 foot-candles
 9. Exhibit – 20-50 foot-candles
 10. Food Preparation – 50-100 foot-candles
 11. Gymnasium – 30-50 foot-candles
 12. Hallway – 10-20 foot-candles
 13. Laboratory – 50-100 foot-candles
 14. Lecture Room – 20-50 foot-candles
 15. Library Card File – 50-100 foot-candles
 16. Library Stacks – 20-50 foot-candles
 17. Locker Room – 10-20 foot-candles
 18. Lounge/Lobby – 10-20 foot-candles

19. Office (Regular) – 20-50 foot-candles
 20. Patient Room – 20-50 foot-candles
 21. Reading Room – 20-50 foot-candles
 22. Shop Area – 50-100 foot-candles
 23. Stairway – 10-20 foot-candles
 24. Storage Area – 10-20 foot-candles
 25. Toilet – 10-20 foot-candles
 26. Washroom – 10-20 foot-candles
 27. Outdoor Security/Parking Lot – (2 ft) candles minimum
- Q. Exit lights shall be of the Light Emitting Diode (LED) type with brushed aluminum stencil face.
1. Exit lights shall be Lithonia LED or Emergi-Lite LED.
 2. Residences Hall Exit Lights shall be Lithonia
 - Model #
 - AC only (Single Faced) LES1R 120/277
 - AC only (Double Faced) LES 2R 120/277
 - Self-Powered (Singed Faced) LES 1R 120/277 EL N SD
- R. The use of track lighting is strongly discouraged.
1. Dimmers for general use (classrooms, seminars, rooms, etc.) to be fluorescent on LED.
 2. Incandescent lighting shall only be used in dimming systems where approved and in special artifact and art illumination.
- S. Provide multiple zones of lighting in the classrooms. At a minimum, marker board light and any ceiling light that could contribute incident lights on the projection screen should be separated from the lights in the remainder of the room. During slide/video presentation, should be flexible to turn off these lights completely.
- T. Provide a dimming system that has ability to control made by the same manufacturer.
- U. Fluorescent Dimming Ballasts
1. Single, two-lamp or three-lamp fluorescent ballast shall be used in any one luminary. Luminaries shall be tandem wired as necessary to utilize multi-lamp socket and shall not exceed 7 feet for T-8 lamps and 3 feet for T-5 lamps.
 2. Ballast shall have a Class “A” sound rating or better.
 3. Input current third harmonic content shall not exceed 10%.
 4. Ballasts shall have an average lamp current crest factor of 1.6 or less.
 5. Ballasts shall meet minimum efficiency standards of Public Law No. 100-357, National Appliance Energy Conservation Amendment of 1988, and meet requirements of FCC regulations Part 18, governing Electromagnetic and radio Frequency interface, and ANSI standards C82.11 and C642, 41.
 6. Ballasts shall have a frequency of 20 KHz or greater and shall operate without visible flicker.
 7. Maximum ballast case operating temperature 65 degree C.
 8. Ballasts shall maintain constant light output over operating ranges of 90 volts to 145 volts (120 volt ballasts) and 200 volts to 320 volts (277 ballasts), 50/60 Hz.
 9. Ballasts shall dim continuously between 100% and 10% light output. Ballasts shall maintain full filament heat throughout the dimming range.
 10. Ballasts dimming circuitry shall be UL Class 2 and fully isolated from ballast input power. Ballasts shall require no intermediate trimming controls between ballast and controlling device. Ballasts wiring shall have a maximum 500 micro ampere current for control purpose between 10 volts and 0 volts.
 11. Approved Manufacturer and Model No. “Lutron ECO-10” or Advance Mark X.
- V. Compact Fluorescent Dimming Ballasts:
1. All ballasts shall be UL limited Class “P”, high power factor 90% or above.
 2. Single or two lamp fluorescent dimming ballasts shall be used in any one luminary.

3. Ballast shall have a Class “A” sound rating or better.
4. Input current third harmonic content shall not exceed 20%.
5. Ballast shall have an average lamp current crest factor below 1.6.
6. Ballast shall meet minimum efficiency standards of Public Law No. 100-357, National Appliance Energy Conservation Amendment of 1988, and meet requirements of FCC regulations Part 18, governing Electromagnetic and radio Frequency interface, and ANSI standards C82.II and C642.41
7. Ballast shall have a frequency of 20 KHz or greater and shall operate without visible flicker.
8. Ballasts shall dim continuously, without flicker, between 100% and 5% light output. Ballasts shall maintain filament heat throughout the dimming range.
9. Ballast shall be capable of striking lamps at any light level without first flashing to full light.
10. Ballasts dimming circuitry shall be UL Class 2 and fully isolated from ballast input power. Ballasts shall require no intermediate trimming controls between ballast and controlling device. Ballasts wiring shall source a maximum 500 micro ampere current for control purpose between 10 volts and 0 volts.
11. Approved manufacture and model: Lutron “Hi-Lume”.

PREFERRED MANUFACTURERS

Dorm Exit Lights- Lithonia
 Exit Lights- Lithonia
 Fixtures- Lithonia, Duray
 Dimmers-Lutron, LC & D
 Dimmers Controls- Synergy, Litetronics, LC & D
 Motion Detectors- Sensor Switch
 Bulbs & Tubes (fluorescent, high pressure sodium, metal halide) – Phillips

-END OF SECTION-

Motor Control – Section 16 & 20

- A. Provide phase-loss protection.
- B. All motor greater than 20 horsepower should have power factor correction with a targeted result of 94-97%.
- C. For motors associated with variable frequency drives (VFDs), refer to section 15170 (2.3.J.1).

PREFERRED MANUFACTURERS

Motor Control Centers, Cross Line Starter, etc.
 Medium Voltage
 GE
 Westinghouse
 Low Voltage
 Furnas
 Square D
 Allen Bradley
 Motor Controls & Related Equipment
 Furnas
 Allen Bradley
 Square D Company
 VFD
 Siemens

DO'S AND DON'TS

DO'S:

Do Design around Furnas specifications

Do provide phase-loss protection on all 3 phase starters

DON'TS:

DO NOT Specify or approve any motor control equipment not listed.

-END OF SECTION-

General Electrical Guidelines – Exterior Lighting

- A. **SITE LIGHTING:** All site (Security) Lighting shall use HPS light source or LED source with five tap fused ballast and vandal resistant hardware. Decorative building wash lighting shall be metal halide, or LED. LED lighting shall be the specified source unless approved in writing by the UWF Project Manager.
- B. University proprietary fixtures shall be installed in sleeved receivers per University shop drawing attached.
- C. **UNDERGROUND WIRING:** All wiring for Campus lighting, etc. shall be installed in PVC Schedule 40 Conduit not smaller than 1 1/4" minimum dept 24". Conduits installed under driveways, parking lots and other traffic areas shall be in schedule 40 PVC with minimum burial dept of 36". No direct burial cable installations are permitted. Provide tape 5" below grade to mark conduit.
- D. **GROUND ACCESSIBLE EXTERIOR LIGHTING:** Shall be completely vandal-proof in construction.
1. There shall be no in-ground, subterranean, or recessed in wall or step lighting installed.
Bollard type lights are not to be used.
- Site Lighting: Fixture Manufacturers:
Hubbell

Note: Hubbell RCS Series, shoebox with special transformer base. 150 w High Pressure Sodium and 20' for sidewalks with round pole. 250 w High Pressure Sodium and 25' for small parking lots with round pole. Hubbell will provide a lighting layout by calling (540) 382-6111. A representative can quote unit. www.hubbell-ltq.com. Color: Brown Anodized.

Kennel
Sylvania

DO'S AND DON'TS

DO'S:

- DO Design around Hubbell specifications.
DO Use vandal resistant hardware at less than 10' above finished grade.

DON'TS:

- DO NOT Use any source other than high-pressure sodium. Exception: metal halide may be used in building-wash applications only.
DO NOT Leave existing lighting circuits inoperable for any overnight period.

University of West Florida Lamp Standards: Existing Facilities

General Notes:

1. Unless otherwise notes, all lamp designations are Phillips lamps. Additional lamp manufacturers are: Osram-Sylvania and GE.
2. All fluorescent lamps shall have a color temperature of 3500K.

FLUORESCENT LAMPS					
	Recommended Replacement Lamp	Description	Pin	Existing Lamps	Pin
1	PL-L40W/35RS	2", 40W BIAxIAL	30043-4	PL-L40W/35RS PL-L40W.41RS	30043-4 30044-2
2	FC8T9CW	40W T9 8 1/4" O.D. CIRCLE	20601-1	FC8T9CW	20601-1
3	FC16T9/CW	40 W T9 16" O.D. CIRCLE	36451-3	SAME	
4	PL-S 7W/35	7 W TWIN 2-PIN	32780-9	PL-S 74/27	24256-8
5	PL-S9W/35	9 W TWIN TUBE 2-PIN	32786-6	PL-S9W/35 PL-S94/50	32786-6 33385-6
6	PL-S 13W/35	13 W TWIN 2-PIN	26214-7	PL-S13W/27	34258-4
7	PL-C 13 W/35/USA	13 W QUAD 2-PIN	34005-9	PL-C13W/27/USA	24546-4
8	PL-C 18W/35	26 W QUAD 2-PIN	34008-3	PL-C18W/41 PL-C18W/27 PL-C184/35	34011-7 33944-0 34008-3
9	PL-C26W35	26 W QUAD 2-PIN	34009-1	PL-CL26W/27 PL-C26/35	34953-0 24009-1
10	PL-C 26W/35/4P	26 W QUAD 4-PIN	34028-1	SAME	
11	F282D/835/4P	28W, 2D 4-PIN	22180 (GE)	F2B2D/B35/4P	22180 (GE)
12	SLS20	20W SELF-BALLASTED SCREW-IN-BASE	22008-7	SLS 15 SLS 20 SLS 25	22003-8 22008-7 22009-5

University of West Florida Lamp Standard: New Construction & Renovation

FLUORESCENT LAMPS			
	Recommended Replacement Lamp Description	Description	Pin
1	50PAR20/HAL/NFL	50W PAR 20 NARROW FLOOD	22911-2

INCANDESCENT LAMPS					
	Recommended Replacement Lamp	Description	Pin	Existing Lamps	Pin
1	50PAR20/HAL/NFL	50 W PAR 20 NARROW FLOOD 130 V	22921-2	50R20-130 50PAR20/HAL/NFL	22082-2 22911-2
2	25Q/CL-130V	250 W	22886-6	250Q/CL-130V	22886-6
3	40BA9C/F/4M	40 W FROSTED, BENT TIP CANDELABRA	31094-6	60B13/4M 40BA91/2/4M 40BA9C/4M 40F15/4M 15F10/C/M* 40BA9C/F/4M	31107-6 31098-7 31093-8 31122-5 31126-6 31094-6
4	40B13/4M	40 W BLUNT TIP CANDLE, CLEAR, MED BASE	31105-0	40B13/4M	31105-0
5	45PAR38/H/SP	45 W PAR 38 FLOOD	22946-8	45PAR38/H/SP	22946-8

General Notes: Incandescent Lamps

1. Incandescent lamps to be used only for special University approved applications such as art work and display lighting.
2. All incandescent lamps shall be 130 volts.

3. Unless otherwise noted, all lamp designations are for Philips lamps-additional approved manufacturers are Osram, Sylvania and G.E.

FLUORESCENT LAMPS			
	Recommended Replacement Lamp Description	Description	Pin
1	F17T8/TL735*	2' LINEAR T8	32297-4
2	F25T8/TL 735*	3' LINEAR T8	32298-2
3	F32T8/TL735	4' LINEAR T8	27249-2
4	PL-L140W/35/RS	2' BIAxIAL	30043-4
5	FB32T8/T1735/6	2' U-BEND, 6" LEG	34077-8
6	PL-S 13W35	13 W TWIN TUBE, 2 PIN	26214-7
7	PL-C18W/35/4P	18 W QUAD TUBE, 2 PIN	24004-4
8	PL-C 26/W/35/4P	26 W QUAD TUBE, 4 PIN	34028-1
9	PL-T 26/35/4P	26 W TRIPLE TUBE, 4 PIN	34742-7
10	PL-T 32/35/4P	32 W TRIPLE TUBE, 4 PIN	34744-3
11	PL-T 42/35/4P	42 W TRIPLE TUBE, 4 PIN	22126-7

*2' AND 3' T8 lamps to be used for special applications only.

General Notes: Fluorescent Lamps

1. Unless otherwise noted, all lamp designations are for Phillip lamps-additional lamp manufacturers are: Osram, Sylvania, and GE.
2. All fluorescent lamps shall have a color temperature of 3500 K.
3. T5 linear fluorescent lamps to be used only in University approved applications.
4. All fluorescent lamps shall be operated on electronic ballasts.

-END OF SECTION-

Special Systems

- A. **Blue Light Emergency System:** The A/E shall coordinate the location and purchase of the exterior 'Blue Light' emergency system with the University Project Manager. The University has established a standard system utilizing a solar powered structure that reports to Campus Security using a 900 MHz radio system.
- B. **Lighting Protection System:** Lightning protection shall be provided for all buildings. Each building electrical main shall be provided with a qualified ground rod(s). Ground rods shall be driven with a power driver as required. Additional rods shall be added if required to achieve a 10.0 ohm reading or less using the "three-point test method" (150-foot depth required maximum). Multiple rods may be necessary to obtain 10.0 ohm. In addition, all ground rods shall be connected by approved exothermic welding process. Each rod shall be tested in the presence of owner's representative. A written record of the test results shall be prepared and signed by the contractor's and owner's representatives and submitted to the architect and the University. Manhole band cable size shall be matched for tie-in to existing system.
- C. **LIGHTING TIMING DEVICES:** All devices should have eight (8) hour carry-over capabilities.
- D. **SYSTEM FURNITURE:** When power panels are specified, coordinate and identify the location of base feeds according to furniture drawings. The furniture installer will provide base feeds at wall or partition.

-END OF SECTION-

Emergency Systems

- A. EMERGENCY SYSTEMS: All occupied buildings over 5,000 square feet shall be generator-equipped 10,000 watt minimum with auto transfer equipment. Generator shall be a minimum of 125% of calculated load with a minimum of 24 hour fuel capacity at full load.
- B. Minimize use of battery packs. Requires approval of Plant Operations and Maintenance.
- C. Battery packs, when used, shall be 12 volt 50 watt minimum.
- D. Must include emergency power to all heating systems pumps and related control systems to maintain freeze protection for entire building during power outage.
- E. Must include emergency power to all sump pumps.
- F. Must include emergency power to all sewage ejector pumps.
- G. Generators shall have auto exercise.
- H. Provide a full tank of fuel prior to University acceptance.

PREFERRED MANUFACTURERS

Transfer switches-ASCO, Zenith

DO'S AND DON'TS**DO'S:**

- Use point systems in buildings less than 5000 square feet.
- Provide keys to cabinets to University.
- Provide emergency lighting in all transformer vaults, switchgear rooms, and elevators machine rooms.

DON'TS:

- DO NOT use battery pack self-contained fluorescent fixtures.
- DO NOT install self-powered radioactive exit signs under any circumstance.

-END OF SECTION-

Fire Alarm and Detection Systems

- A. The building fire alarm and security systems shall be tied into the University Police Station via a transmitter via conduit/fiber optics only.
- B. Electrical design drawings and specifications should clearly define the responsibilities for interconnections of elevator fire and smoke detectors into the building fire alarm system.
- C. See Exhibit No. 11, "Section 16722, Interior Fire Alarm System." This document was produced by the University of West Florida and may be used by the A/E as a guideline in the proposed Project Manual.
- D. Fire Alarm Systems to meet all standards of the Florida State Fire Marshall's Office, and current NFPA release.
- E. All Exposed junction boxes shall be painted red and labeled with zone or loop and device ID information. All junction box covers and couplings shall be painted red.
- F. All activating devices and alarms devices shall be tamper resistant with Tamper proof hardware.
- G. All addressable devices shall be numbered where the address number is visible on the outside of the device without removing the cover or the device.
- H. Placement of Fire Alarm Panel should be in the main telecom room with fiber optic connection. There should be a laptop computer tray and 120 volt outlet within two feet of panel opening side.

PREFERRED MANUFACTURERS

FIRE ALARM SYSTEMS: Siemens XLS Fire Alarm System tied to University Police station via fiber optic cable.

DO'S AND DON'TS

DO'S:

UNIVERSITY STANDARD COLOR CODE: 120/240 VAC Delta Systems A-Black, Center Phase Yellow, C-Blue, Grounded Phase-White. 120/208 VAC WYE Systems A-Black B-Red C-Blue, Grounded Phase White. 277/480 VAC Systems A-Brown, B-Orange C-Yellow, Grounded Phase-Grey. Including all 277 VAC branch circuits.

If building has elevator see section 2.2.J.1

DON'TS:

DO NOT use ungrounded Delta systems.
DO NOT locate fire alarm panels in high voltage switchgear rooms.
DO NOT mount smoke detectors or heat detectors on walls.
DO NOT use ceiling mounted horns strobes or speaker strobes.

-END OF SECTION-

Nautilus Card System/Access System

- A. The term “Nautilus Card System” describes the Universities One-Card “debit card” system. (Debit Card functions can include copiers, vending, laundry, POS and other financial readers.)
- B. The term “Access System” describes an integrated access system, serving occupants with a personal access card (Nautilus Card) instead of keys.
- C. The A/E shall coordinate with the University Project Manager during the layout and design of the “Nautilus” system to determine which doors and equipment shall be utilized by the “access system.”
- D. Wherever a “Nautilus” port is installed, there shall be an electrical power source directly adjacent to its location.
- E. The University shall purchase and provide all Heartland Campus Solutions equipment. The Contractor shall be responsible for providing all other labor, materials (including conduit, junction boxes and wiring) and services necessary to install, test and certify the Nautilus Card System/Access System is fully operational.
- F. See Exhibit No. 12, “Section 16727, Nautilus Card System/Access System. This document was produced by the University of West Florida and may be used by the A/E as a guideline in the proposed Project Manual.

-END OF SECTION-

Telecommunications Fiber Optic Cabling System

See Exhibit No. 13.

-END OF SECTION-

Structured Telecommunications Cabling System

- A. See Exhibit No. 14, “Section 16741, Structured Telecommunications Cabling System.” This document was produced by the University of West Florida and may be used by the A/E as a guideline in the proposed Project Manual.
- B. Telecommunications: Refer to section 6 for telecommunication requirements and specifications. The accepted scope of telecomm work provided by electrical contractor includes; furnish and install wall boxes, circuits (branch and main) and/or other type raceway such as cable tray.

END OF SECTION-

DIVISION 31 – EARTHWORK**Clearing and Grubbing**

- A. The A/E shall specify that debris resulting from stripping and demolition operations shall be removed from university property at frequent intervals to prevent debris from accumulating on the site.
- B. Removal of trees, shrubs, and groundcover shall be in compliance with the approved Tree Protection Plan.
- C. The removal of trees and shrubs shall include removal of stumps and roots to the extent that no root greater than three (3) inches in diameter remains within five (5) feet of and underground structure or utility line or under footings or paved areas. Grubbing in open areas shall include removal of stumps and three (3) inch roots to two (2) feet below finish grade elevations.
- D. Protection of existing trees – Contractor causing damage to trees saved will be assessed \$150 per inch diameter paid to the owner.

-END OF SECTION-**Earthwork**

- A. The A/E shall specify excavation, filling and grading for new construction as required to suit site appurtenances. Grading and filling shall be performed to lines and grades required by civil engineering. These grade lines will be integrated with the new paving and surfacing as well as landscaped areas. Removal of unsatisfactory or deleterious materials from the premises will be done as required for the work. Disposal of debris and waste material, temporary protection of work, barricades, rerouting requirements, signage, control of storm water drainage during construction of the project, etc. shall also be included.
- B. The finish floor elevation of concrete floor slabs on fill shall be at least 8-inches above the finish grade elevation at its highest elevation at any point around the building.
- C. Slopes shall not be greater than one (1) vertical to six (6) horizontal in grassed areas. Steeper slopes will be considered in unique circumstances and will be reviewed and approved by the University.
- D. The A/E shall specify a six (6) inch depth of topsoil for seeded/sodded areas and twelve (12) inch depth for planting areas. Topsoil shall be indigenous to general area in which the project is located and shall be suitable for planting and seeding.

-END OF SECTION-**Termite Control**

- A. Termite treatment is required for every building. The type of chemical treatment shall be specified, including the amount of application per unit area. Chemicals and application shall conform to EPA's Federal Insecticide, Fungicide and Rodenticide Acts.
- B. The Subcontractor for soil poisoning shall be required to furnish a service agreement stating the work performed will be guaranteed for a period of five (5) years from the date of substantial completion. In addition, the agreement shall state that the structure will be inspected yearly for infestation and treatment provided as necessary. The service agreement shall state that in the event of damage during the guarantee period, the Contractor shall make repairs to structurally damaged surfaces to a dollar value based on the size of the building.

DIVISION 32 – EXTERIOR IMPROVEMENTS – PAVEMENTS AND SITE FURNISHINGS**Landscaping**

- A. Trees, plants and ground cover work shall include planting, backfill, guying, irrigation, pruning, as well as, replacements and guarantees.
- B. All trees, plants, and groundcover work shall be in compliance with the approved Tree Protection Plan.
- C. Turf Considerations:
 - 1. Avoid excessive proportion of edge to be trimmed. Do not create narrow strips or inaccessible grass areas for mowing. Avoid breaking up grass areas with obstructions.
 - 2. Grass areas protected by fencing, trip rails, etc. should allow for a gate (approximately 10-feet) wide for gang mowers or 6.5-feet for rotary mowers.
 - 3. Grass or sodding adjacent to parking lot pavement which is less than 72-inches in width is not desirable. Sodding adjacent to parking lot pavement and bordered by wooded areas is not desirable.
 - 4. Turf type to be determined on a case by case basis depending on site conditions, as directed by the UWF Grounds Coordinator.
- D. Landscape Design Requirements: Incorporate native plant species into all plantings wherever possible. See following list of native plants preferred by the University.
 - 1. Merge planting beds where there are narrow strips of turf separating them.
 - 2. Create mulched beds surrounding tight groupings of shrubs, ornamentals, and shade trees. All mulch beds shall have a minimum thickness of 4-inches.
 - 3. Areas exceeding 20% slope should not be sodded, Groundcover is mandatory, unless prior approval is granted by the Director of Buildings and Grounds Management.
 - 4. Native plant areas that are fully established or incorporated as part of the design do not need irrigation.
 - 5. Effacement trees should be used to incorporate the building into the landscape proportionately; the enfacement trees must suit the size of the structure. Tree selection must be from preferred list. Plant selection should be based on zone 8 hardiness and those recommended in the UWF preferred list.
 - 6. Soil amendments added as a pre-plant treatment are not recommended. Selection of plants that grow and develop quickly must be tempered by considerations of wood strength, longevity, and eventual size. Colors and textures in the fruits and booms are less important than the physical characteristics in the foliage because leaves are present during more of the year.
- E. Planting Techniques:
 - 1. Planting holes should be dug 3X the size of the root ball in width or 12-inches wider than root ball.
 - 2. Planting hole depths should not exceed root ball vertical height. Set rootball so that it is 1-2" above surrounding grade at time of planting.
 - 3. Amendments such as peat moss or manure are not necessary or desirable. Mulch should be organic in nature and should not exceed 3" in depth. Pine products mulch is recommended. Pull mulch away from tree trunks; do not pile mulch against tree trunks.
 - 4. Prune out dead, broken, or diseased branches but do not prune any living branches.
 - 5. Do not attempt to balance the roots and crown through pruning or fertilize at time of planting.
 - 6. Do not wrap the trunk or trunks with paper wrap or paint the trunk.
 - 7. Stake and guy any tree 3" caliper or larger. Remove staking and guying 1 year post installation.
 - 8. Containerized plants must be "Grade A" Florida Fancy. Rootbound, stunted, diseased, or mechanically injured plant material will not be accepted.

9. Utilize gator bags on all new trees in non-irrigated areas and contractor must keep filled for 3 months after planting.
10. All plant material shall be watered in at the time of installation.

F. Trees; Native Preferred List:

- Acer sp. – all adapted species
- Betula sp. – all adapted species
- Celtis Laevigata – Hackberry – Sugar
- Chamaecypris thyoidea – White Cedar
- Chioanthus virginica – Fringe Tree
- Crataegus aestivalis – May haw
- Crataegus flava – Summer hawthorne
- Cornus florida – Dogwood (2 year warranty required)
- Diospyros virginiana – Persimmon
- Fagus grandifolia – Beech
- Gordonia Lasianthus Loblolly Bay
- Ilex cassine – Dahoon Holly
- Ilex opaca – American Holly
- Ilex vomitoria – Yaupon Holly
- Ilex sp. – all other adapted
- Liquidambar styraciflua Rotundiloba – Fruitless Sweetgum
- Magnolia sp. – all adapted species
- Nyssa sylvatica – Blackgum
- Pinus sp. – all adapted species
- Platanus occidentalis – American sycamore
- Prunus augustifolia – Chickasaw plum
- Quercus sp. – all adapted species
- Taxodium distichum – Bald Cypress
- Ulmus Alata – Winged Elm
- Vaccinium arboreum – Sparkleberry
- Viburnum sp. – adapted native species

G. Trees; Other Preferred List:

- Aesculus sp. – adapted species
- Butia capitata – Pindo palm
- Cedrus sp. – adapted sp.
- Carya sp. – adapted sp.
- Eriobotrya japonica – Loquat
- FrankLinia alatamaha – Franklinia
- Ginkgo biloba – Gingko
- Halesia Carolina – Snowdrop
- Juniperus Virginiana – all adapted varieties
- Juniperus Scopulorum – Rocky Mt. Juniper
- Lagerstroemia fauriei – no indica species
- Liriodendron tulipifera – yellow popular
- Ostrya Virginiana – American hornbeam
- Oxydendrum arboreum – Sourwood
- Parrotia persica – Parrotia
- Pistacia chinensis – Pistachio
- Rhus sp. – adapted species
- Sabal palmetto – Cabbage palm
- Sassafras albidum – sassafras
- Sophora japonica – Pagoda tree

- Stewatia sp. – all adaptable sp.
- Styra japonicus – Snowbell
- Symplocos tinctoria – Sweet Leaf
- Trachycarpus fortune – Windmill palm
- Ulmus parviflora – Bosque elm
- Vitex agnus-castus - Vitex

-END OF SECTION-

Paving and Surfacing

- A. Asphaltic Concrete Paving: Provide materials and installation to comply with requirements of the Florida Department of Transportation and as determined by the civil engineer. Minimum new installation shall consist of one 2-inch plant mixed type S-1 asphaltic concrete surface course over six (6) inch compacted base over ten (10) inch stabilized soil, unless civil engineers determine otherwise with approval from the University Project Manager.
- B. Concrete Paving/Sidewalks: Provide concrete with a minimum compressive strength of 4000 psi in 28 days. All products, materials, and execution shall comply with applicable ANSI and ASTM standards. Concrete paving shall be floated, troweled, and medium broom finished. Consult DIVISION 3 – CONCRETE for additional requirements.
 1. Expansion Joints shall be pre-molded type, 1/2-inch thick, full depth of concrete, spaced 30-feet 0-inch o.c. maximum and at junctions with vertical surfaces. Expansion joints shall be shown on the drawings as well as indicated in the specifications.
 2. Control joints shall be saw-cut to squared relief (e.g. for 6-feet-0-inch wide sidewalk provide joints at 6-feet-0-inch o.c. between). Joints shall be aligned to avoid new stress points.
- C. The A/E shall specify that boring under existing paved areas for underground utilities shall be standard procedure. Saw-cutting of finished surfaces shall be used only as a last resort, and as approved by the University Project Manager. If concrete sidewalks are to be cut, they shall be cut and replaced from joint-to-joint, and doveled into the remaining slab.

Exterior Site Furnishings

- A. Bicycle Ribbon Loops to be Thomas Steele, (Madrax) “5” loop challengers plus (4-bike). Model number CHP-5 SF, painted Hunter Green to match other campus ribbon bike racks. Bike rack to be mounted on concrete pad.
- B. Benches to be Thomas Steele Carnival benches; painted green to match others on campus and mounted to a concrete pad.
- C. Trash Receptacles to be Thomas Steele Carnival Trash Receptacle, 38 gallon, painted green with University Logo to match others on campus and mounted to a concrete pad. Project Manager to determine location.
- D. Picnic Tables to be Thomas Steele Carnival, 42” dia top, 4 vertical strap packed seats. Model number CRT-B-P. Painted Hunter Green to match others campus tables on concrete pad.

-END OF SECTION-

DIVISION 33 – UTILITIES – STORM, SANITARY, ELECTRICAL, COMMUNICATIONS, POTABLE WATER, & WELLS

General Site Work Guidelines

- E. Storm water retention design for each new building or site work project shall be coordinated with the University of West Florida Master plan and with the location of future campus regional ponds.
- F. The A/E shall specify that compaction, pipe leakage, hydrostatic, and other related testing shall be conducted and paid for by the Contractor.
- G. Avoid steps in walks between the street and a building entrance, especially steps midway in the walk. Instead of steps, a ramp may be used, provided that the length of the gradient is short, that the slope is not more than 1:12 ratio and that a handrail is provided alongside the walks if they are sloped more than 1:20 ratio percent. All Florida Accessibility Code for Building Construction requirements must be followed. Exposed aggregate shall not be used for sidewalks except for ADA code requirements.
- H. Utility Shutdown: In order to provide the University community with thorough and timely notification of pending utility outages, the procedures detailed below shall be adhered to for all but emergency situations. Emergency situations are ones in which rapid action is required to shut off a utility service to prevent personnel injury, to ensure public safety, and/or to prevent significant damage to a building or equipment. For other than emergency situations, the University's policy is to make all reasonable efforts to minimize the impact any outage would have on the buildings occupants and operations, while at the same time avoiding project delays. To meet both of these goals, effectively planning and communication are critical.
 - 3. At least five working days prior to a proposed outage, notification must be made to Project Manager. The written notification must include the following information; the proposed date (s) and time, the location and areas affected, the utility to be shut off, the reason for the outage, a broader range of dates and times within which the outage could be scheduled in the event that the proposed date(s) are not feasible (if broader window is not possible, provide justification), and the name and telephone number of your organization point of contact for scheduling.
 - 4. The Work Control Center will provide you, you via the Project Manager, with a response to your request no later than two working days prior to the proposed outage date. It is recommended that you not wait to provide the University with notification prior to that five working day limit would facilitate the process.

Water Distribution System

- A. Water main materials, for pipe size 4-inches in diameter or larger shall be ductile iron pressure pipe and/or AWWA Standard C-900 PVC pressure pipe (for pipe sizes 3-inches in diameter and smaller, use AWWA Standard C-160 PVC pressure pipe). All new branches, fire hydrants, backflow prevention devices and meters shall be provided with gate valves. The A/E shall confer with the university regarding location of valves as well as installation details for valve boxes, direct burial, and ground level access to valve operator. Water lines shall be disinfected according to AWWA Standard C-601. All pipes shall be tested for leakage. Detectable plastic marking tape shall be installed underground above buried utility lines, as required, to facilitate the location of the lines before damage to the lines can occur during required excavation. Specify 12 gauge tracer wire for all underground distribution and branch piping to building.

- B. The A/E shall specify water meters with reed switch pulse output (AMCO or equivalent) for building and irrigation water services. Irrigation and building water services to be measured separately. It is preferable to install meters inside the building in a dedicated plumbing and or mechanical room. In general backflow shall be RPZ type and also specified to be installed inside the building where possible. Make provisions in design documents to indicate that electrical conduit from meter location to Building BAS system panel is required for pulse output communication conductors. In general specify to provide shut-off valve, water strainer, water meter with bypass and flushing port prior to backflow preventer for building domestic water piping entrance. Irrigation service can be a sub-meter off the building main meter. See exhibit 16 for general building entrance schematic.
- C. Isolation Valves: Provide a 2 inch minimum AWWA resilient wedge valve on all water taps for distribution and irrigation lines
- D. Flush Valves: Provide on dead-end side of water supply in building for flushing the buildings' water system.
- E. No water taps shall be made without a Plant Operations and Maintenance Representative on site. After the tap is made, the Contractor shall provide the University of West Florida with tap coupon. NO EXCEPTIONS.
- F. DEP clearance approval is required of piping and it must be submitted to Plant Operations and Maintenance before water will be turned on.

-END OF SECTION-

Storm Drainage System

- A. Catch basins and inlets shall be pre-cast (conforming to ASTM C 478) or cast-in-place concrete.
- B. Grates and frames shall be cast iron, conforming to ASTM A 48, Class 35B or ductile iron, conforming to ASTM A 536.
- C. Drainage pipe shall be concrete meeting ASTM C 76, Class III or PVC pipe and fittings meeting AWWA C 900.
- D. All piping into catch basins shall be grouted inside and outside of box around pipe.

-END OF SECTION-

Sanitary Sewer System

- A. Sanitary sewers shall be PVC pipe and fittings meeting ASTM D 3034, Type PSM, with joints as recommended by pipe manufacturer.
- B. Frames and covers shall be cast iron conforming to ASTM A 48, Class 20B, or ductile iron conforming to ASTM A 536.
- C. Grease interceptors are required for locations where food preparation occurs and residence hall with cooking capabilities in rooms.
- D. Provide exterior underground concrete interceptors: contact Plumbing Services for location, design, etc.
- E. Float control sequences for duplex pumps:
 1. 1st float energizes control circuit
 2. 2nd float starts lead pumps
 3. 3rd float energizes alarm
 4. 4th float starts lag pump

PREFERRED MANUFACTURERS

Drainage products

J. R. SmithAncon

Josam

Zurn

Acid-Resistant Systems

Endfield

Fuseal II

Storm and Sewage Pumps

Peerless

Weil

Peabody-Barnes

Hydromatic

Zoeller

Flygt

Gorman Rupp

DO'S AND DON'TS**DO'S:**

Do have a discussion with the Owner not later than the Advanced Schematic Design Phase to analyze if internal storm drains can be avoided.

Do provide submersible pumps only.

Do connect building sewer to street at a manhole

Do connect all sewage ejector pumps to emergency power system. Refer to section 2.2.H.1.

DON'TS:

DO NOT use cast iron piping in food services area.

-END OF SECTION-**Underground Irrigation System**

- A. Provide professionally designed drawings prior to start of construction. Design drawings shall be clearly readable, to reasonable scale, show the entire site to be irrigated, including all improvements, and shall include but not be limited to: date, scale, revisions, legend, specifications which list all aspects of equipment and assembly thereof, water source, water meter and/or point of connection, backflow prevention devices, pump station size, pump station location, design operating pressure and flow rate per zone, locations of pipe, controllers, valves, sprinklers, sleeves, resilient wedge gate valve, etc. All irrigation plans will note the Building Design and Construction Standards Reference in the details, to be followed when installing the system. The Plans and Specifications shall be prepared by, and each sheet shall bear the impress seal of a Professional Engineer or Landscape Architect, registered in the State of Florida, or other recognized certified design professional, who is competent in this field of expertise.
- B. Irrigation work will be built and completed to include all areas specified on design drawings. Source for irrigation water is the existing wells and main servicing the college. The UWF Utilities unit will approve all water taps (no exceptions). The UWF Project Manager will coordinate relocation of existing valve boxes to new locations, if necessary.
- C. Manufacturer Qualifications: Provide underground irrigation system as a complete unit produced by a single acceptable manufacturer, including heads, valves, controls, and accessories. Exceptions are provided and can be approved by UWF as needed.
- D. Materials:
 - a. PVC Pipe:

1. Pressure and circuit pipe will be Poly (Vinyl chloride) (PVC) and will comply with ASTM D 1785, Class 40 (schedule 40).
2. Riser pipe will be (PVC schedule 80).
- b. Pipe fittings:
 1. Poly (Vinyl Chloride) (PVC) Plastic pipe fittings, schedule 40 will comply with ASTM D 2466.
 2. PVC solvent cements will comply with ASTM D 2564. Make all pipe joints and connections according to manufacturer's recommendations. Perform all solvent-weld connections in accordance with ASTM D 2855.
 3. A PVC primer will be used on all cemented pipe and fittings.
- c. Valves: Isolation valve will not be smaller than 2" slip PVC Ball valve. An isolation valve shall be placed on the upstream side of every electric remote-control valve. The isolation valve shall be placed in a separate valve box. Isolation valves shall be placed to leave ample room for changing out remote valves in the future. No less than 2 feet of pipe shall be used between the isolation and remote valves.
- d. Electric Remote-Control Valves:
 1. Use PVC schedule 80 male adapters for the inlet and outlet of all electric remote-control valves
 2. Rain Bird 200 PGA-2" Plastic Globe/Angle Valve or Industrial-strength 200 PEB-2" glass-filled nylon globe valve or approved equal.
 3. Circuit valves will be marked to identify their controller zone identification number.
- e. Control Wires:
 1. 14 gauge AWG UF or PE wire suitable for irrigation use will be used for control wires between the control timer and the electric control valves.
 2. Proper connections will be made using direct barrel splices (DBY).
 - a) White – common wires
 - b) Blue – spare wires
 - c) Red, Black, Yellow, Orange, Brown, Green, etc. will be individual zone wires. Each zone on all systems will be a different color to facilitate wire repair and identification.
 - d) Furnish and install one spare conductor parallel to the common wire throughout the system. Loop the spare into each electric control valve box.
 - e) For every five zone conductor wires there will be an additional spare wire.
- f. Tracer Wire: A continuous 14 gauge AWG UF or PE wire suitable for irrigation will be placed in the trench throughout the entire system. The tracer wire will be tested at the time of the operation test to ensure proper function. Direct barrel splices (DBY) will be used to ensure the tracer wire continues to work properly. This will facilitate system location
- g. Backflow Preventer:
 1. Required if not already protected.
 2. Use a resilient wedge gate valve on any taps made to the potable water supply.
 3. Reduced Pressure Zone (RPZ) Unit will be used.
- h. Sprinkler Heads:
 1. Exact style sprinkler heads to be used can be requested by UWF during the pre-bid process.
 2. Pop-Up Sprays will be Rain Bird 1800 – PRS series with a minimum 6" pop-up riser or approved Equal.
 3. Rotors will be Rain Bird 5004 Plus – PC – SS – SAM (6" and 12" 5000 heads can be used), Falcon 6504 – SS, 7005 – SS, and 8005 – SS series or approved equal.
 4. Rotors will have a stainless steel covered riser stem.
 5. Seal-a-matic (SAM) heads will be used. System will be designed to eliminate low head drainage. On grades where drainage may occur, valves should be placed closer to the zone to minimize elevation pressure and improve SAM performance.
- i. Drip Irrigation Systems: Install according to manufacturer requirements.

1. Drip system will be supplied by the main line independent of rotor and pop-up spray zones.
 2. System will have a Rain Bird Automatic Filter Kit to consist of a commercial grade, 150 psi pressure rated Y-filter with the proven Rain Bird PESB “scrubber” valve for reliable, long-term automatic filtration or approved equal.
 3. Xeri-Bug Multi-outlet Emission devices will be used to deliver irrigation to individual plants.
 4. Inline Pressure Regulators will be used to ensure operating pressure.
 5. An air relief valve kit is vital for sub-surface installations. It allows air to escape the pipeline to prevent water hammer or blockage and also air to enter the lines at shutdown to prevent suction of dirt into the system.
 6. Pressure-compensating modules and Xeri-Bug Emitters will be installed to irrigate shrubs, plants, and trees.
 7. Distribution, Black Strip, and drip tubing will be staked as needed, using appropriate stakes. Drip systems are the only approved use for tubing. Tubing should be kept to a minimum to lessen the future repairs of the system.
 8. Emission devices will be adjusted to deliver proper flow rates and eliminate over watering.
- j. Valve Boxes: Valve installation shall allow enough clearance for proper operation and maintenance. Install valve boxes so that they do not rest on the pipe allowing a minimum 1 inch space, the box cover does not conflict with the valve stem or interfere with valve operation, they are flush with the ground surface and do not present a tripping hazard or interfere with routine maintenance of the landscape.
1. 12” Standard rectangular valve cover box will be the minimum size used for Rain Bird PGA control valves and Rain Bird Automatic Filter Kit or approved equal.
 2. 10” circular cover box will be the minimum size used for isolation ball valves and wire splices.
 3. Valve Box standard used in Ametek, Rain Bird, or equal.
- k. Swing assembly for spray heads and rotors:
1. Swing Joints will be made of Marlex street 90 degree and PVC SCH 80 nipples.
 2. Swing Joints shall be sized according to the sprinkler head inlet.
 3. No tubing (funny pipe) will be used at UWF.
 4. Risers for shrub heads will be schedule 80 PVC pipe, with schedule 80 PVC threaded fittings.
- l. Automatic Control System
1. ESP-MC Rain Bird controller will be used. Follow manufacturer’s instructions supplied by Rain Bird to install the controller.
 2. Power supply to the MC controller must be performed by a licensed electrician.
 3. All zones on a system will be designed to have balanced flow rates.
 4. 9 Volts UNIK systems are not to be installed at UWF.
 5. Exterior control enclosure:
 - a) Manufacturer’s standard weatherproof enclosures with locking cover.
 - b) Rain Bird stainless steel (SS) pedestal or approved equal.
 - c) Rain Bird powder coated steel cabinet or approved equal.
 - d) Equipment and installation will comply with NFPA 70 (National Electric Code).
 6. System will have a properly operating Rain Bird, Hunter, or other equal rain sensor installed. The rain sensor can be a wireless unit, if necessary. Rain sensors are easy targets for vandalism at UWF, and need to be placed accordingly.
 7. The UWF Project Manager will approve the location of the controller.
- m. Preferred Manufacturers
1. Manufacturer: Subject compliance with requirements, provide products of the following: Rain Bird Sprinkler Manufacturing Corporation
 2. Rain Bird products are the standard currently being utilized by UWF.
- E. System Design:
- a. Main lines will not be smaller than 2 inch PVC.

- b. Lateral lines on rotor zones will not be down sized smaller than 1 1/2 inch PVC.
- c. Lateral lines on spray zones will not be down sized smaller than 1 inch PVC.
- d. Design Pressures: Verify pressure prior to beginning work on irrigation system. Notify Project Manager if existing pressure and volume is less than design requirements.
- e. Location of Heads: Make minor adjustments as necessary to avoid plantings and other obstructions. Place and adjust sprinkler heads to protect Electric transformers from being sprayed. Place heads so they will be flush with the finish grade.
- f. Minimum Coverage
 - 1. All spray heads and rotors will have head to head coverage – 100% overlap.
 - 2. If necessary, layout may be modified by adding or moving heads to obtain proper coverage. Do not decrease the number of heads indicated unless changes are accepted by the UWF Project Manager.

F. Trenching and Backfilling:

- a. General: The trench bottom must be uniform, free of debris, and of sufficient width to properly place pipe and support it over its entire length.
- b. Trench Depth: Excavate trenches to a depth that will allow for the pipe and the minimum cover. Pipe shall be installed at sufficient depth below ground to protect it from hazards such as vehicular traffic or routine occurrences which occur in normal use and maintenance of property.
- c. Minimum Cover: Shall be provided to maintain the minimum pipe depths. Depths of cover shall meet or exceed SCS Code 430-DD, Water Conveyance, as follows:
 - 1. Vehicle Traffic Areas.

Pipe Size (inches)	Depth of Cover (inches)
½ - 2 ½	18 – 24
3 – 5	24 – 30
6 and larger	30 – 36

2. Non-traffic and Non-cultivated Areas.

Pipe Size (inches)	Depth of Cover (inches)
½ - 1 ¼	12
1 ½ - 2	12 – 18
2 ½ - 3	18 – 24
4 and larger	24 - 36

- d. Backfill: Backfill with clean material from excavation. Remove organic material as well as rocks and debris larger than 1" diameter. Place acceptable backfill material over excavated area and compact to obtain level finished grade. Improper backfilling will result in a hazardous condition for pedestrian traffic and will not be allowed.
- e. Minimum clearances: Clearances shall be maintained between irrigation lines and other utilities. In no case shall one irrigation pipe rest upon another.

G. Installation:

- a. General: Unless otherwise indicated, comply with requirements of Uniform Plumbing Code
- b. Connection to Main: Connect to existing college irrigation main. Irrigation water will be supplied by existing wells.
- c. Backflows added to the potable system must be approved by the UWF water department. Location placement will be chosen by the UWF water department.
- d. Any placement changes made during the installation will be approved or requested by the UWF Project Manager. The installer will make adjustments, if requested.
- e. Piping:
 - 2. Lay pipe on solid sub base, uniformly sloped without humps or depressions

3. Pipe sleeves must be used to protect pipes or wires installed under pavement or roadways. Use pipe sizes larger than the carrier pipe or twice the diameter of the wire bundle to be placed under the paving or roadway, and extending a minimum equal to the thickness of schedule 40.
 4. Install PVC pipe in dry weather when temperature is above 40 degrees Fahrenheit (4 degrees Celsius) in strict accordance with manufacturer's instruction.
 5. Allow joints to cure at least 24 hours at temperatures above 40 degrees Fahrenheit (4 degrees Celsius) before testing, unless otherwise recommended by manufacturer.
- f. Sprinkler Heads:
1. Flush circuit lines with a full head of water and install heads.
 2. Install lawn heads at manufacturer's recommended heights.
 3. Install shrubbery heads at heights indicated.
 4. Locate part-circle heads to maintain a minimum distance of 4" from walls, curbs, and other boundaries, unless otherwise indicated.
- g. Dielectric Protection: Use dielectric fittings at connections where pipes of dissimilar metal are joined.
- H. Testing: All materials and installations covered by the Irrigation Code and the UWF Building Design and Construction Standards shall be inspected by the governing agency, including the Irrigation Department, to verify compliance with the code and standards. Rough inspections will be performed throughout the duration of the installation. These inspections will be made to ensure that the installation is in compliance with the design intent, specifications, and the Irrigation Codes. Inspections will be made on the following items at the discretion of UWF:
- a. Sprinkler Layout and Spacing: This inspection will verify that the system is accurately installed in the field. It will also provide for alteration or modification of the system to meet field conditions. To pass this inspection, sprinkler/emitter spacing must meet the coverage requirement previously described in this standard.
 - b. Pipe Installation Depths: All pipes in the system shall be installed to depths previously described in this standard.
 - c. Mainlines upstream of zone valves will be checked for leaks. Fill the completely installed pipeline slowly and expel the air. Allow the pipe to sit full of water for 24 hours to dissolve remaining trapped air. Check the charged line for any leakage. The solvent-welded pipe will have no leaks. The UWF Project Manager can require the contractor to perform a test using a metering pump, elevate the water pressure to the maximum static supply pressure expected and hold there for a period of 2 hours. No leakage shall be allowed.
- I. Guarantee: Upon completion of the installation, furnish the Owner with the following warranty on company letter head, signed as indicated.
- J. Irrigation Warranty:
- The undersigned warrants that materials furnished and work performed in the installation of the irrigation system for * _____ will be free of defects and remain in satisfactory condition one year from ** _____, 20____. During this period, any item not found so will be promptly replaced in the manner specified for the original system, at no additional cost to the owner. Defects will not include normal wear and tear.
- (Name of Irrigation Firm)
 (Signed) _____
 Title
 *Name of Project
 ** Date of Substantial Completion

PREFERRED MANUFACTURER

- A. Manufacturer: Subject compliance with requirements, provide products of the following;
 Rain Bird Sprinkler Mfg. Corp. or Approved Equal Substitution

-END OF SECTION-

EXHIBITS

Exhibit No. 1	State of Florida Department of Management Services Professional Services Guide Division of Building Construction and Facilities Management, November 2005.....	114
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EXHIBIT 1

Revised 6/30/2016

PROFESSIONAL SERVICES GUIDE

It is incumbent upon the A/E to verify the most current revision of the “State of Florida Department of Management Services, Design Professional Fee Guideline.” The current Guide is March, 2015. The Guideline can be found at the following link:

<https://fp.state.fl.us/docs/DMSAEFeeGuidedefinition.asp>

STATE OF FLORIDA, DEPARTMENT OF MANAGEMENT SERVICES A/E FEE GUIDELINES

Design Professional Fee Guidelines For "Basic" Architectural and Engineering Services

State of Florida
Department of Management Services



Version Posted: March 2015

The competitive negotiation of A/E fees represents some of the most important proactive dollars expended on a project. These funds are an investment that affects both the quality and successful completion of a project. It is for this reason that the schedules used as a guideline for determining fees by the Department have been updated to reflect the current market conditions. The original fee guidelines were generated in 1969 when the Engineering News Record (ENR) Construction Cost Index was 1,269. The published 2014 ENR yearly average Construction Cost Index was 9,846 which represents a 776% rise in inflation and, subsequently, a significant shortfall in the fee guideline calculation. As a result the formulas used in the fee guidelines have been updated in order to be marketplace relevant and will be reviewed on a three year basis.

DEFINITIONS:

Basic Services: The fee guides shown on the following page labeled "Fee Calculator" are for "basic" architectural and standard engineering services including full service phases for design, bidding and construction. The fee is only to be used as a guide, with the actual fees justified by the architect or engineer via a detailed proposal in accordance with the format established by the Division of Real Estate Development and Management.

Additional Services: Additional services are not included within the "basic" fee guides. Additional services may include any special consultants required by the project and are typically those furnished beyond what is shown in the Form of Agreement Between Owner and Architect-Engineer used by the Division of Real Estate Development and Management. Additional services, including but not limited to those itemized on the next page labeled "Fee Calculator" shall have additional fees/expenses negotiated based on the project specific scope of services.

Formulas: ("Fee Calculator" formulas are provided for informational purposes.)

"A" Curve - $0.187547 - (0.01836 * \text{LOG}(\text{Construction Cost}/7.76))$

"B" Curve - $0.164145 - (0.015303 * \text{LOG}(\text{Construction Cost}/7.76))$

"C" Curve - $0.142432 - (0.010594 * \text{LOG}(\text{Construction Cost}/7.76))$

"D" Curve - $0.141419 - (0.01236 * \text{LOG}(\text{Construction Cost}/7.76))$

"E" Curve - $0.118011 - (0.009279 * \text{LOG}(\text{Construction Cost}/7.76))$

"F" Curve - $0.09521 - (0.006301 * \text{LOG}(\text{Construction Cost}/7.76))$

"G" Curve - $(\text{EXP}(-0.460517 * \text{LOG}(\text{Construction Cost}/7.76))) + (0.0075 * \text{LOG}((\text{Construction Cost}/7.76)/100000))$

Proceed to Fee Guide Calculator

Proceed



<https://fp.state.fl.us/docs/DMSAEFeeGuidedefinition.asp>

EXHIBIT 2

PROFESSIONAL SERVICE EVALUATION FORMS



University of West Florida
Board of Trustees
Facilities Planning & Construction

Exhibit 2
AEH7

CONTRACTOR PERFORMANCE EVALUATION

Firm: _____

Project: _____

Total Construction Amount: _____

Contract Completion _____

Project Manager: _____

Date: _____

CATEGORIES		NOT APPLICABLE	PERFORMED NOTABLY WELL	SATISFACTORY PERFORMANCE	INFERIOR PERFORMANCE
1	Performing Construction Work				
	a. Conformance w/Construction Doc's.				
	b. Quality of Work				
	c. Finishing/Clean-up				
2	Meeting Schedules				
3	Maintaining Safety Practices				
4	Working with Subcontractors				
	a. Control				
	b. Coordination				
	c. Payments				
5	Cooperating				
	a. With Permitting Authority				
	b. With A&E Svcs.				
6	Administration of Project Paperwork				
7	Providing Close-Out Paperwork				

Recommendation for future contracts : Yes No

Comments:

Name, Title and Signature of Reviewing Official:

Project Manager: _____

Signature: _____

Date: _____

Director: Mark Pursell

Signature: _____

Date: _____

EXHIBIT 3

CONTRACTOR SAFETY PROGRAM DOCUMENT

CONSTRUCTION AND RENOVATION PROJECTS

The following represent minimum conditions that shall be met by all contractors and sub-contractors performing work for the University of West Florida. The contractor is responsible to ensure compliance with all state and federal safety regulations as specified in University contract documents. Reported or observed violations of OSHA (29 CFR 1910 or 1926) and other regulations will be brought to the attention of the UWF project manager and shall be immediately corrected by the contractor. Items that go uncorrected or that are disputed by the contractor may be referred to either the project insurance coordinator or the DLES, Division of Safety for inspection or interpretation.

The contractor shall take reasonable precautions for safety, and shall provide reasonable protection to prevent damage, injury, or loss to employees on the work-site and other persons who may be affected. **DON'T:** Park on the grass or next to the building unless temporarily delivering materials.

MINIMUM PROJECT SAFETY REQUIREMENTS

1. The contractor shall prominently define and ensure the security of the work-site. Security shall include appropriate fencing, barricades, covered walkways, and warning signs. In no cases shall a work-site be accessible, without obvious warning, to University students, staff, and visitors. **The use of warning tape is not an acceptable barrier.** At a minimum, the project site shall be posted with the appropriate trespass warning sign as specified in Florida Statutes Chapter 810.09(2)(d), (THIS AREA IS A DESIGNATED CONSTRUCTION SITE, AND ANYONE TRESPASSING ON THIS PROPERTY SHALL, UPON CONVICTION, BE GUILTY OF A FELONY), "DANGER CONSTRUCTION SITE. AUTHORIZED PERSONNEL ONLY" and other general safety warning signs (i.e. HARD HAT AREA) as deemed necessary by the contractor.
2. In the event barricading of the work-site is not feasible, alternative measures may be used upon prior approval by the University. Alternative measures may include, but are not limited to, working during "off" hours such as nights, weekends, or holidays; temporary accommodations for building occupants (to be pre-arranged if necessary at the discretion of the University), etc.
3. The contractor shall establish and maintain an access control system, including a daily sign-in log, to the project, for all visitors, including UWF and regulatory personnel. Prior to commencement of construction, the project manager may designate specific individuals for routine access so that adequate inspection is performed. All visitors not pre-approved must be escorted through the project by either a contractor representative or by the project manager or his designee.
4. The contractor shall provide any safety equipment necessary for UWF employees and visitors to enter the site. This may include hard hats, hearing protection, safety glasses, etc. or any other safety equipment deemed necessary by the contractor or required by state or federal safety regulations.

5. Construction vehicles shall be operated in a safe manner. The contractor shall take appropriate actions to ensure the safety of University students, staff, faculty, and visitors while operating vehicles outside the "controlled" construction site. Where conditions warrant, or at the request of the University, temporary barriers shall be established for these areas.
6. Prior to the commencement of the project, the contractor and all sub-contractors shall provide the University a written copy of their respective safety plans and safety training records as part of the pre-submittal package.
7. The contractor shall ensure compliance with all fire codes, especially in regards to egress requirements during the construction phase of an occupied facility. In no cases (except where impractical and with the prior approval of the University and the Office of the State Fire Marshal) shall the fire safety components of an occupied facility be reduced.
8. A set of plans, with a stamp of approval by the Office of the State Fire Marshal, shall be on each construction site and available for inspection.
9. Parking on the campus of the University of West Florida is regulated by FAC 6C6-5.001, Safety and Traffic Control. Contractors shall register all vehicles with the Departments of Parking and Transportation Services, Building 92, and Public Safety in Building 19 by providing the type of vehicle, tag number, name of company and driver, and length of time on campus. Specific parking locations will be provided prior to the commencement of each contract.
10. State traffic regulations are strictly enforced by UWF Police Officers. Tickets for traffic violations on campus are issues on State of Florida Traffic Violation forms.
11. All emergency notifications, including fires and medical emergencies, on campus should be made through the Department of Public Safety. The campus emergency number is X2911 from a campus phone (474-2911 from off campus or a resident phone). The caller should state the location and nature of the emergency and specifically indicate if an ambulance or the fire department is needed.
12. All University construction sites are subject to inspection by the Office of the State Fire Marshal, Florida DLES, Division of Safety, OSHA, Florida Department of Environmental Protection, EPA, and any other state or county regulatory agency.

PROTECTION OF BUILDING OCCUPANTS

The protection of building occupants from the hazards of the construction, including UWF faculty, staff, students, and visitors is the responsibility of the contractor. The presence of barricades and warning signs may not always provide sufficient protection. Noise, dust, and the use of chemical products may create unnecessary health hazards or concerns to building occupants. Indoor air quality complaints and issues are serious and will not be taken lightly. The contractor shall adhere to the following guidelines as a minimum:

1. Open communication with all parties involved is the key to ensure that unnecessary events do not occur. The contractor shall establish open communication with each sub-contractor as to scheduling of events that may pose hazards or inconveniences to building occupants. The contractor shall also ensure that appropriate information is conveyed to the project manager.
2. Material Safety Data Sheets (MSDS) shall be provided for all hazardous substances used on the project or brought on the campus. These products include, but are not limited to, paints, solvents, roofing compounds, and cleaning compounds.
3. The contractor shall initiate construction and engineering controls to minimize exposure of dusts, noise, and chemical odors to building occupants. This may involve the construction or use of temporary walls, plastic barriers, mechanical ventilation, elimination of make-up air returns from work areas, pressurizing occupied areas, etc., or a combination of several methods. The contractor shall coordinate all engineering efforts with the project manager and any control measures shall have prior approval of the University. In cases where these efforts may not be feasible, alternative work schedules on evenings and weekends may be the most appropriate method. The contractor is reminded that respirable crystalline silica, contained in many building products, is a potential carcinogen. Control of dusts from these types of products and operations in order to protect University personnel is essential.
4. Welding by-products, cutting/drilling concrete and masonry, and the operation of internal combustion engines produce hazardous dusts and fumes. Appropriate precautions shall be taken to prevent occupant exposure to these products.
5. Contractors should be aware of other buildings adjacent to their work areas and be prepared to take necessary actions to prevent the incursion of dusts and fumes to these areas.

ENVIRONMENTAL COMPLIANCE

1. The contractor shall provide an adequate refuge container for the disposal of construction debris. Refuge shall not be accumulated on the ground. The contractor shall ensure that the container is emptied on a regular basis.
2. Water run-off/erosion from the project site shall be controlled. Uncontrolled run-off of storm water from a construction site may be regulated by the Florida Department of Environmental Protection.
3. Use of organic solvent-based paints and stains, shall be used only where absolutely necessary and with approval of the University. Water-based products shall be used in the place of solvent-based products where the application permits.
4. Contractors shall properly manage and dispose of water based paint and related products. Paint brushes and trays shall not be washed on the ground or in storm drains. Non-hazardous water based products may be washed in a sink connected to the sanitary sewer.
5. Lead containing paints shall not be used or specified for any application at the University. If the use of lead containing paint is essential for a specific application, prior approval from the University shall be obtained.
6. The use of any products containing toxic metals, especially those regulated by RCRA (i.e. lead, chromium, barium, silver, arsenic, cadmium, mercury, and selenium) shall be avoided. Prior approval for use of these metals shall be obtained from the University.
7. The use of any radioactive sources on campus shall be pre-approved. Copies of appropriate certifications, licenses, training, testing, and inspection records shall be provided to the University.
8. Hazardous Waste Management - The proper management of hazardous wastes by contractors is essential for protecting the environment and complying with the law. Violation of RCRA, the Resource Conservation and Recovery Act, are serious violations, possibly resulting in large monetary fines and jail terms for willful and non-willful violations of the rules. Contractors should be aware of the rules governing hazardous wastes and their proper disposal. Many contractors may not be aware that a product they use may be a hazardous waste if disposed. The contractor, who may generate a hazardous waste, shall provide written evidence that he has received appropriate training in the identification, management, and disposal of hazardous wastes.
9. Lighting Ballasts and Fluorescent Tubes - Lighting ballasts and fluorescent tubes have recently been targeted as potentially hazardous to the environment. Ballasts manufactured prior to 1979 typically contain polychlorinated biphenyls (PCB's) which are regulated by TSCA. Ballasts manufactured between 1979 and 1985 may contain DEHP which is regulated by RCRA. Fluorescent tubes contain enough mercury to be regulated by RCRA. Contractors shall disassemble lighting fixtures by removing the bulbs and ballasts and placing them in appropriate containers. The bulbs and ballasts shall be turned over to the University in a pre-arranged manner and location.
10. Used Batteries - Any used lead-acid or nickel-cadmium batteries that are found or collected as part of demolition and renovation work shall be turned over to the University for proper disposal or recycling.

11. Asbestos Containing Materials - The University maintains programs for the identification and abatement of asbestos containing building products. Asbestos abatement can only be performed by state licensed asbestos abatement contractors under the auspices of the State Asbestos Management Program. Contractors are not authorized to remove or disturb any asbestos containing materials. Although, efforts are made to identify or remove asbestos materials prior to renovations, the possibility exists that asbestos materials may be encountered. Contractors who encounter materials that may contain asbestos should immediately stop that activity and notify the project manager or project superintendent.

SUMMARY

These guidelines represent minimum expectations and actions that shall be taken by contractors while under contract for the University of West Florida or the Board of Trustees on the campus of the University of West Florida. These guidelines are by no means totally inclusive and will be revised as necessary. In the event these guidelines conflict with other contract documents, the most stringent application shall apply. Any questions or disputes shall be brought to the immediate attention of the University Project Manager.

EXHIBIT 5

**PROCEDURES TO IDENTIFY AND MANAGE ENVIRONMENTAL ISSUES DURING
DEMOLITION, RENOVATION, AND NEW CONSTRUCTION PROJECTS AT THE UWF**

It is incumbent upon the A/E to verify the most current revision of the University of West Florida's "Contractor Hazardous Waste Management Program." The document can be found at the following link:

http://uwf.edu/envhs/PDFfiles/UWF_Hazardous_Waste_Management_Program_01-2013.pdf

OR

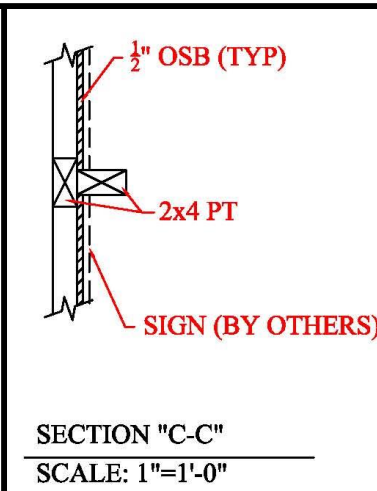
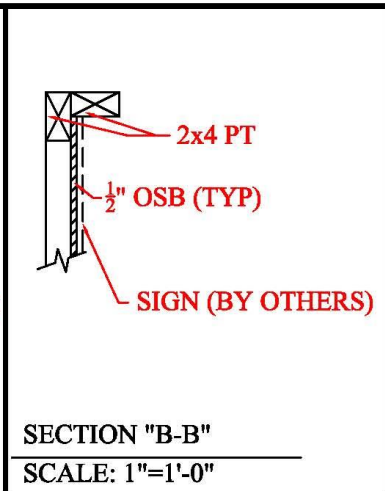
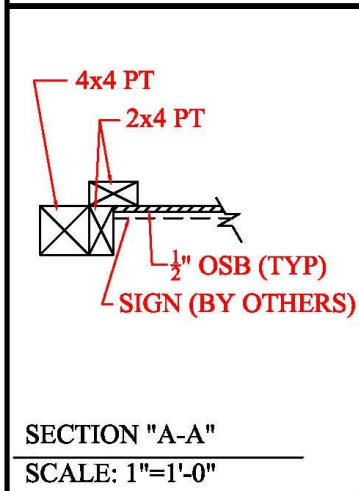
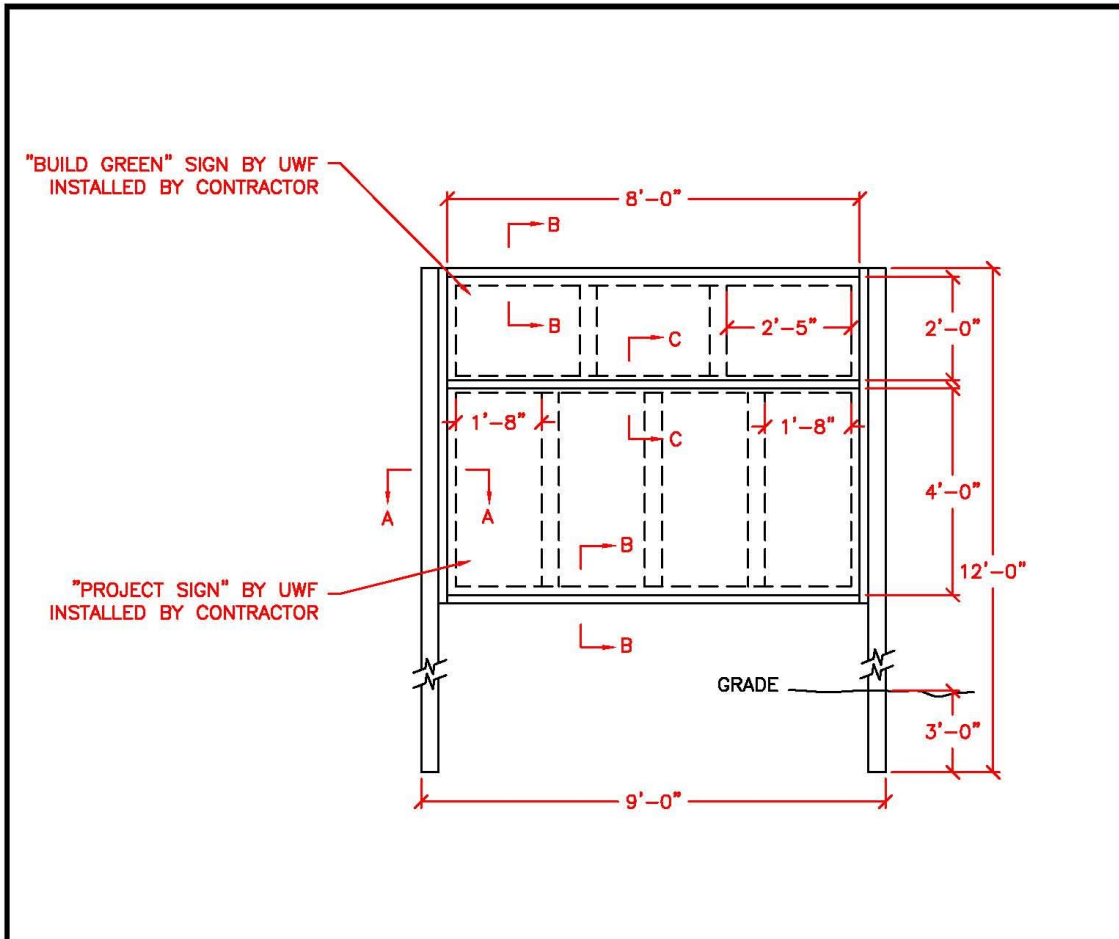
<http://uwf.edu/Envhs/>

Scroll down to the Environmental Compliance. Select the second sub-item:
"Hazardous Waste Management Program"

Contractor should view the university's Procedures to identify and Manage Environmental Issues During Demolition, Renovation and New Construction Project on the Environmental Health and Safety website at <http://uwf.edu/Envhs/>. Contractor may obtain full copy from the university's Environmental Health & Safety Department at 850/474-2177 or e-mail probinso@uwf.edu.

EXHIBIT 6

PROJECT SIGN



 University of West Florida Architectural & Engineering Services	PROJECT SIGN STRUCTURE		
	DRAWN: D. LEUENBERGER	DATE: 03/02/09	FILE: STANDARDS

EXHIBIT 7

CLOSE OUT DOCUMENTATION

PROJECT _____
 PROJECT NO. _____
 GC _____
 PROJECT REP. _____

SPEC SECTION	RESPONSIBLE SUB-CONTRACTOR	DESCRIPTION	# OF CC	DATE RECEIVED	DATE TO UWF

EXHIBIT 8

TREE PROTECTION POLICY

UNIVERSITY POLICY AA- 02.00-12/03

TO: The University of West Florida Community

FROM: Dr. John Cavanaugh, President

SUBJECT: Tree Protection on campus

Responsible Office: Administrative Affairs

POLICY/PURPOSE: To ensure the preservation and replacement of trees as a part of the University's planned growth and development.

Background and Philosophy

The University of West Florida, a state-designated preserve, is committed to the preservation of existing trees and advocates new tree plantings to promote the education, public health, general welfare, the environment, and aesthetics of the University. The purpose of this policy is to ensure the preservation and replacement of trees as a part of the University's planned growth and development.

General Policy

UWF will:

- Provide resources in a consistent and adequate program for maintaining, watering, and preserving trees.
- Plant trees only in the appropriate season.
- Consider placement of the trees in relation with all federal and state regulations, including the needs of the disabled, utilities, emergency vehicles, and trucks.
- Promote the diversity of its existing campus forest to avoid devastation of an individual species and to create a campus wide distribution.
- Install automatic irrigation systems where watering is likely to be difficult.
- Utilize strategies to encourage long tree life by maintaining long-lived trees, planting trees in a manner to maximize adequate growth, by structural soils, and root growth.
- Encourage the development of innovative strategies in places with limited space for the roots or the canopy and provide guidelines for root pruning.

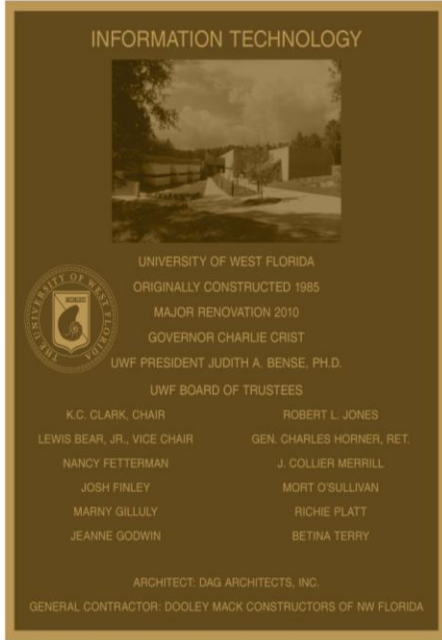
A Tree Protection Plan shall be submitted with the other drawings and documents as part of all construction, rehabilitation, and utilities projects.

Approved: Dr. John Cavanaugh, President Date: 12/15/03

EXHIBIT 9

Building dedication Plaque

Perfect Impression Landscape



Color reference is not to scale.
Colors are a representation and
may vary on final product.

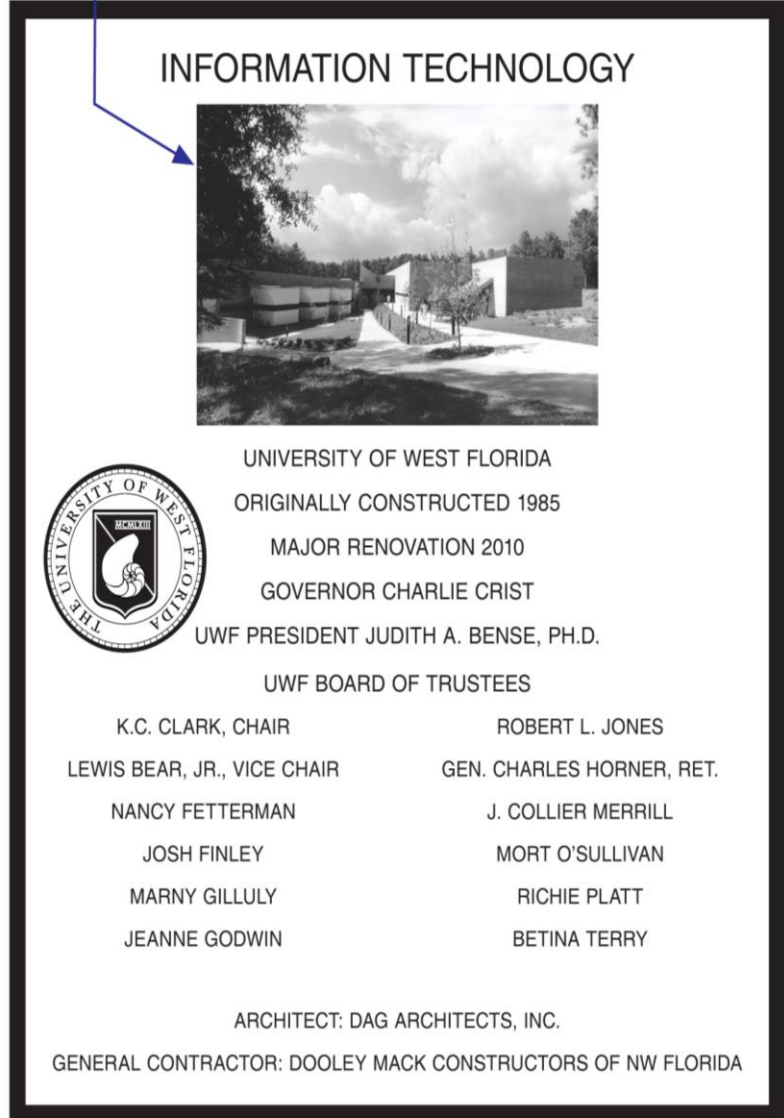
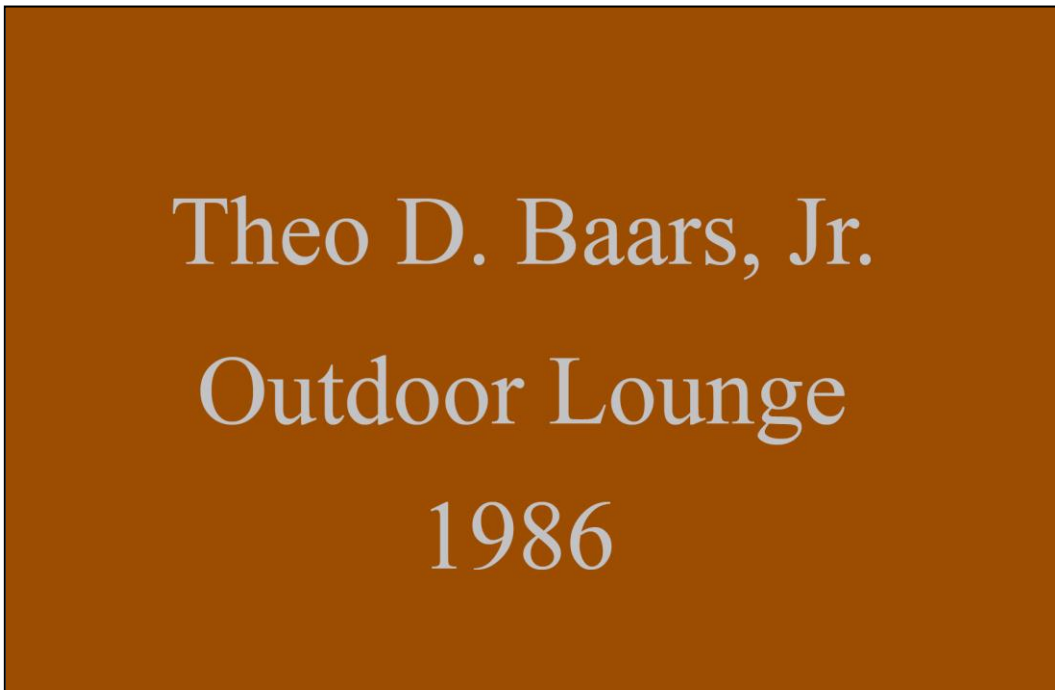


Exhibit 9A

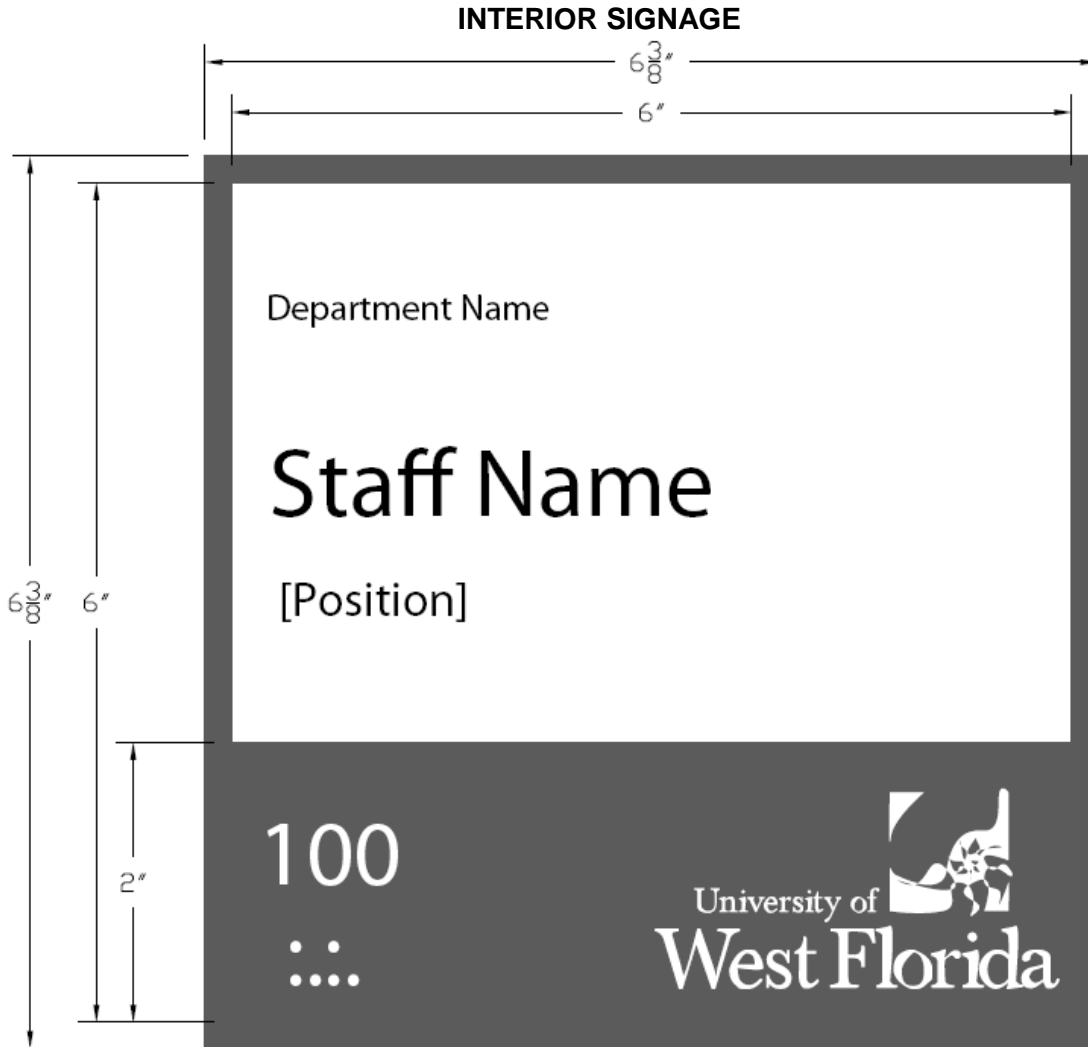
Donor Plaque

Size: 4X6
Material: Brass Plate
Text: Engraved Black Lettering



Theo D. Baars, Jr.
Outdoor Lounge
1986

Exhibit 9B



GENERAL NOTES:

Signs are equivalent to APCO type A signage.

Frame:

Size: 6 3/8" x 6 3/8"
 Color: Medium Grey

ADA:

Size: 6" x 2"
 Color: Medium Grey
 Tactile/Braille Text: 5/8" or greater as per ADA specs
 Logo: UWF Standard logo

Removable Cover:

Size: 6" x 6"
 Color: Clear Plastic

Paper Insert:

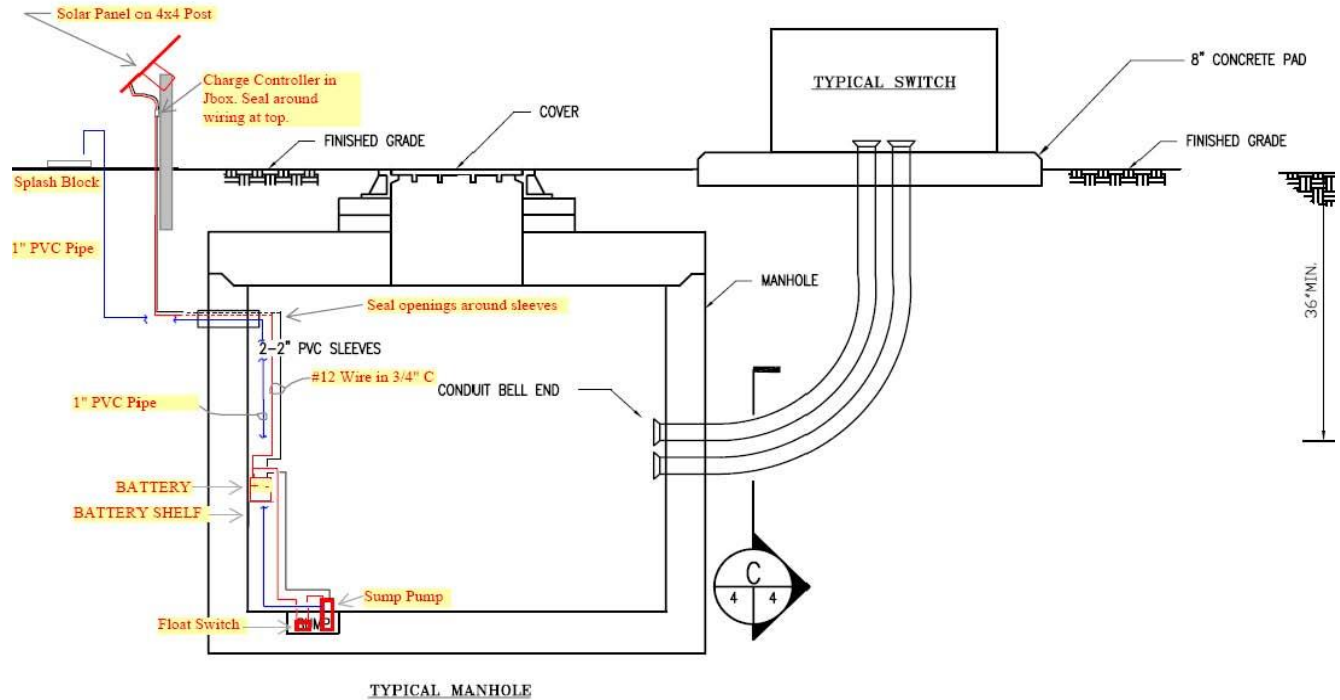
Size: 6" x 6"
 Color: White

EXHIBIT 9C

Building Directory

Office of Associate Vice President		
Dr. Jim Barnett	111	
Pat Cravatt	112	
Business Manager		Architectural & Engineering Services
Patricia Pursell	121	Robin Anderson 119
Les Wicker	120	Richard Hinton 109
		Jessie Mayo 104A
		Dan Parker 101
		Terri Perry 103
		Karon Pursell 101
		Myles Sampson 104B
		Earl Smith 105

Exhibit 10-1



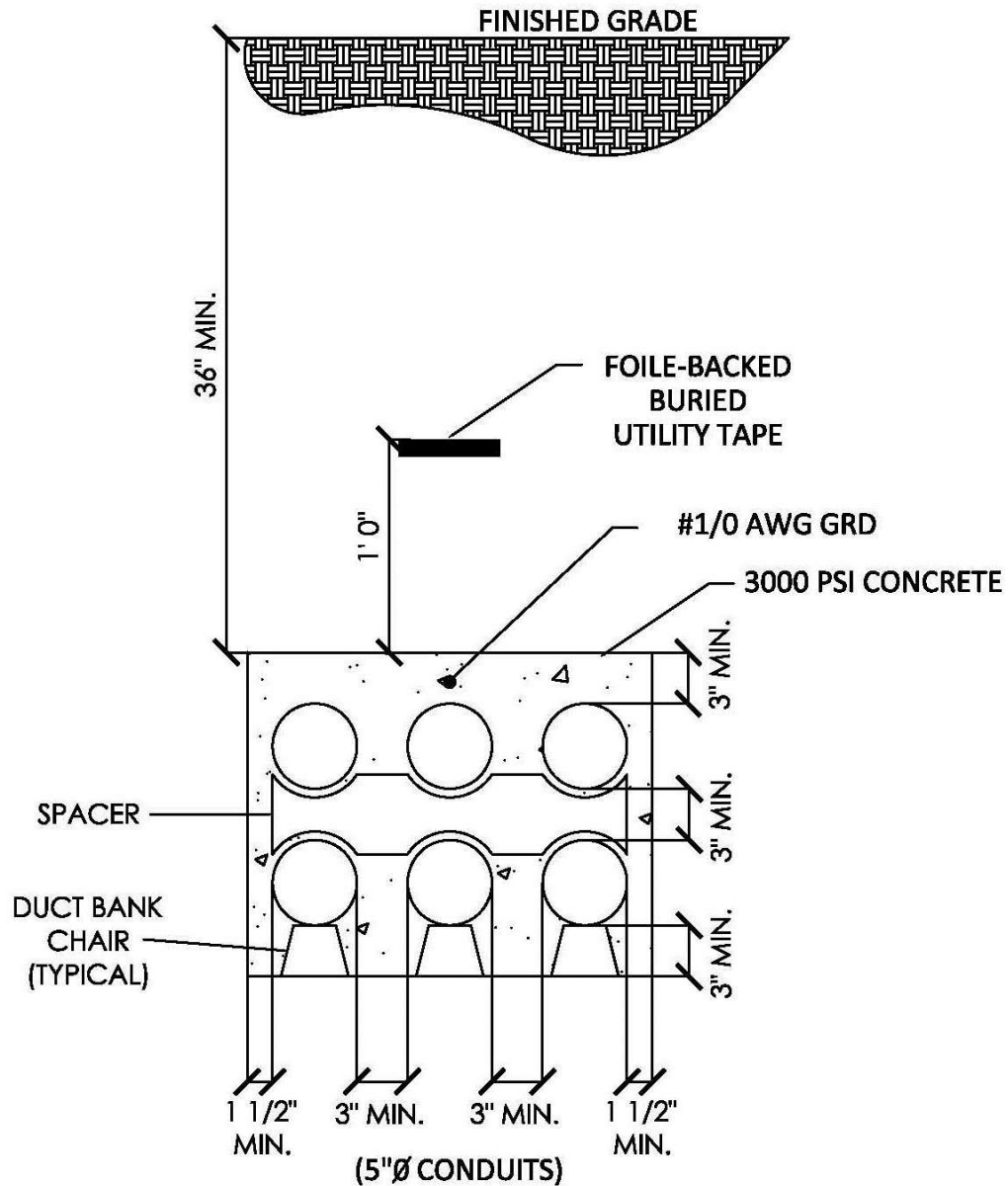
ALL CABLES LOOP THROUGH MANHOLE.
NO CABLES RUN DIRECTLY TO SWITCH
WITHOUT RUNNING THROUGH MANHOLE.

Notes: Solar Panel and Sump Pump Installation:

1. Mount panel location per UWF.
2. Install battery rack and battery below medium voltage conductors in manhole as not to interfere with future access to cables.
3. Charge Controller will mounted in J-Box on 4x4 Support Post. Connect positive lead to positive terminal and negative lead to negative terminal on charge controller. Seal wiring penetration at top of box.
4. Route 12 gauge wiring positive and negative conductors in 3/4" conduit from charge controller to battery in manhole.
5. Route positive and negative conductors in 3/4" conduit from battery to sump. Break positive wire and route through float switch. Negative wire connects directly to sump pump negative lead. Use water proof connectors.
6. Mount pump and float switch in sump pit if possible.
7. Run 1" pvc water discharge pipe from pump through sleeve to above ground to splash block. Coordinate discharge location with UWF.

Electrical Manhole Details

Exhibit 10-2



A SIX-WAY DUCT BANK SHOWN IN DETAIL.
ACTUAL DUCT BANK SHALL BE TOTAL
NUMBER OF REQUIRED CONDUITS PLUS
TWO SPARES.

1 SECTION C
4 4 SCALE: NONE

ELECTRICAL DUCTBANK DETAIL

**SECTION 16722
INTERIOR FIRE****ALARM SYSTEM
DR971****PART 1 GENERAL****1.01 QUALIFICATIONS OF INSTALLER**

- A. The installation and testing of all components of the system shall be performed by a contractor holding a current certification issued by the State of Florida Department of Professional Regulation. The contractor shall be certified as either an alarm system contractor Type I or an unlimited electrical contractor in accord with Florida Statutes and the rules of the State of Florida Department of Professional Regulation Electrical Contractors Licensing Board.
- B. The fire alarm contractor shall be an experienced firm regularly engaged in the layout and installation of automatic fire alarm systems. The contractor shall have warranty of systems of the scope of the largest system on this project at least three years prior to bid, and have been regularly engaged in the business of fire alarm systems contracting continuously since.
- C. The fire alarm contractor shall have been certified by the State of Florida Department of Professional Regulation to install fire alarm systems and certified by the fire alarm system manufacturer to perform installation, software programming, testing, adjustment, maintenance, and repair on the manufacturer's equipment prior to the date of bid.
Refer to paragraph "system warranty" for additional requirements for contractor qualifications.
- D. The fire alarm contractor for this project shall be Siemens or an authorized Siemens distributor with a Florida certification to provide and install fire alarm systems. The fire alarm contractor shall program, test, and provide written certification of system operation. The fire alarm contractor shall provide a one year warranty during which they will maintain, repair or replace any defective equipment at no additional cost to the owner.

1.02 GENERAL REQUIREMENTS

- A. Section 16011, "Electrical General Requirements", applies to this section, with the additions and modifications specified herein.

1.03 SCOPE OF WORK

- A. The work consists of all labor, materials, equipment and services necessary to provide, install, test and certify a new microprocessor based interior fire alarm system.
- B. The Electrical Contractor for the project shall install the indicated conduits, junction boxes, pull string, and all associated equipment and appurtenances as required for a fire alarm system “rough-in”. The Electrical Contractor shall also provide dedicated power supplies as indicated on the contract drawings. Provide wiring materials for this work as specified in Section 16402, “Interior Wiring Systems”, with the additions and modifications specified herein.
- C. The university will obtain a separate cost from the university’s designed Insight contractor, Siemens, to perform the indicated work of updating the Insight system maps and point locations for this project.
- D. The system shall include but not be limited to: control panel and power supply, standby power supply and battery, alarm initiating and indicating devices, monitoring and supervision devices, system wiring, and all accessories and appurtenances required to provide and install a complete and operational system. Any material not specifically mentioned in these specifications or not shown on the drawings, but required for proper performance and operation of the system shall be furnished and installed at no additional cost to the Owner. All equipment and the installation shall comply with the requirements of these specifications and the related drawings. Items specified by either shall be as if specified by both.
- E. The system including all equipment, materials, installation, workmanship, inspection, and testing shall be in strict accordance with the required and advisory provisions of NFPA 72, the Florida Administrative code - Chapter 4A, the Standard Building Code, the Life Safety Code (NFPA 101), and the National Electrical Code (NFPA 70). In the case of any discrepancy between these specifications, the project drawings, or any applicable codes, the system shall comply with the most stringent requirement. In the NPFA publications referred to herein, the advisory provisions shall be considered to be mandatory, as though the word “shall” had been substituted for “should” wherever it appears; reference to the “authority having jurisdiction” shall be interpreted to mean the State Fire Marshal.
- F. The system and all components shall be listed by Underwriters Laboratories for specific application as fire alarm equipment. A nationally recognized testing laboratory or UL label shall be prima facie evidence of compliance with this requirement. Any equipment not bearing a UL label will be unacceptable and will be removed and replaced with labeled equipment at the contractor’s expense.
- G. All fire alarm equipment shall be the standard cataloged products of one manufacturer. System appliances and devices not manufactured by the control panel manufacturer shall be products regularly distributed by the control panel manufacturer and cross-listed by a UL for compatibility with the system control panel.
- H. Materials shall be the best of their respective kinds. All materials shall be new. Work shall be accomplished in a workmanlike manner in keeping with the best practices and highest standards of the fire alarm trade.

- I. The award of this contract to a fire alarm contractor shall also include unit costs for replacement parts and programming of existing Siemens devices previously installed at the University. All requirements such as response time and warranties shall apply to servicing existing systems. Selected contractor shall retain the programming rights for all Siemens devices installed at this institution until such time the Owner formally requests:
 - 1) transfer of said rights to another contractor meeting the qualifications of this specification or
 - 2) such time the Owner's designated fire alarm maintenance and repair personnel are formally trained and certified in the software.

1.04 SYSTEM DOCUMENTATION

A. Pre-installation Submittals:

Submit four (4) copies for approval in accordance with the General Conditions of these specifications. Submit two (2) additional copies for Owner approval.

No equipment shall be purchased by the contractor for the fire alarm system until the A/E and the Owner have approved the required submittals in their entirety and returned them to the contractor.

It is the contractor's responsibility to meet the intent of the specifications. Approved submittals shall only allow the contractor to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications.

1) Qualifications of contractor:

Refer also to paragraph "Qualifications of Installer".

The proposed fire alarm contractor shall commence no work on the project until he furnishes evidence, satisfactory to the owner, that he holds the required certifications, meets all other requirements of these specifications, and receives notice to proceed with the installation from the A/E and the Owner.

- a. Evidence of certification of the proposed fire alarm contractor by both the State of Florida Department of Professional Regulation and the fire alarm system manufacturer as required by paragraph 1.01 of these specifications.
- b. Submit data showing that the Contractor has successfully installed interior fire alarm systems of the same type and design as specified herein. The data shall include the names and locations of at least two installations where the Contractor has installed such systems. The Contractor shall indicate the type and design of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 3 months.
- c. Certification of Warranty Service Requirements: See requirements under paragraph "SYSTEM WARRANTY".

2) Design Data:

- a. Battery power calculations: Verify that battery capacity exceeds supervisory and alarm power requirements.

- 3) Manufacturer's Catalog Data:
Furnish complete data sheets bearing the printed logo or trademark of the manufacturer for the following pieces of equipment:
 - a. Control panel
 - b. Manual stations
 - c. Cabinets
 - d. Batteries
 - e. Battery charger
 - f. Heat detectors
 - g. Smoke detectors
 - h. Alarm horns/strobe combinations
 - i. Alarm strobes
 - j. Remote annunciator panel (if panel is indicated on drawings)
- 4) UL Certification: Evidence of listing of all proposed equipment for application as fire alarm equipment.
- 5) Drawings: Drawings shall provide a complete and detailed graphical and text based description of the fire alarm system. The floor plans, wiring diagrams, description of components, sequence of operation, and software description shall be cross referenced, and they must use uniform descriptions for acronyms, abbreviations, symbols, products and process references.

Drawings shall be produced using Autodesk Inc. AutoCAD Release 12 or later version. Format shall be furnished in standard 24" x 36" or 30" x 42" blueprint form at the submittal stage.

Furnish the following drawings:

- a. A custom wiring diagram of the system showing point to point wiring to each individual system component, and showing wiring identification by number coding and color coding. The wiring diagrams shall clearly define all points of interconnection or interlock to the HVAC system.
 - b. A scaled floor plan of the building showing the location of the fire alarm panel, placement of each individual item of fire alarm, raceway/conduit size and routing, location of all pull boxes and junction boxes, and conductor size, quantity, and color in each raceway.
 - c. A detailed description of each fire alarm system component on the drawings.
 - d. A detailed sequence of operation for each system and subsystem on the drawings.
 - e. A detailed software description of all routines programmed into the system.
- B. Post-installation Submittals:
- 1) Operation and Maintenance Manuals: Furnish six copies of Operation and Maintenance Manuals for the fire alarm system. Operation and Maintenance Manuals for the fire alarm system shall be separate from the manuals for the other building systems.

The Operation and Maintenance Manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the fire alarm system. This documentation shall include specific parts numbers and documentation for software and field programming. A complete recommended spare parts inventory list shall be included.

- a. Quantity: four (4).
 - b. Format: 8-1/2" x 11" loose leaf 3-ring binders with clear vinyl overlay designed to receive identification inserts. Furnish identification on the front cover and the back spline.
 - c. Contacts: Provide a list with name, address, contact person, phone number, and fax number for the following:
 - Fire alarm contractor. A 24 hour emergency number shall be provided for the fire alarm contractor, who shall, upon being called by authorized University personnel, be required to respond within a 4 hour time period to commence repairs, including software programming, to the fire alarm system.
 - Fire alarm system manufacturer
 - Local source(s) of supply for parts and repair (within 50 mile radius), including items not normally furnished by the fire alarm manufacturer.
 - d. Sections: All sections shall be separated with a tabbed section divider with the section title clearly indicated on the tab.
 - e. Contents:
 - Copies of approved submittal data
 - Installation instructions
 - Operating and maintenance instructions
 - Recommended spare parts inventory list
 - A list indicating all routine maintenance procedures based on recommended interval.
 - User's Guide
 - Programming Reference Guides
 - Software Documentation
2. As-built Drawing: Furnish all drawings required under paragraph "Pre-installation Submittals" above. Modify to reflect the actual installation. As-built drawings shall define the system exactly as it is installed. Floor plans shall show the actual installed location of each component of the fire alarm system, conduit, and junction/pull boxes to an accuracy of plus or minus one foot. Format shall be as follows:
 - a. Furnish one set of drawings plotted on permanent reproducible mylar media, size 24" x 36" or 30" x 42".
 - b. Furnish two sets of drawings in AutoCAD Release 13 format on 3-1/2" high density floppy diskettes.
 3. Final report of Final Acceptance Test and Certification including Contractor's letter of certification and NFPA document title "Fire Alarm System Certification and Description". Quantity (4).

1.05 SPARE PARTS

- A. Spare parts shall be directly interchangeable with the corresponding components of the installed system. Spare parts shall be suitably packaged and identified by nameplate, stamping, or tagging. Keys and locks for equipment shall be identical where possible. Furnish the following:
 - 1) Four keys or tools for resetting manual stations
 - 2) Four keys for locks of control panels or cabinets
 - 3) Two of each type heat detector
 - 4) Two of each type smoke detector

PART 2 PRODUCTS**2.01 MATERIALS AND EQUIPMENT**

- A. Materials, equipment, and devices shall be new and shall be UL listed for the intended use.

2.02 WIRING

- A. Wiring for intelligent/analog devices shall be two conductor copper twisted pair in accordance with the system manufacturer's written recommendations. Conductors shall be color-coded and number coded in accordance with UWF Physical Plant Standards.
- B. Identification of conductors (for number coding) shall be accomplished using numbered heat shrink type sleeves.

2.03 SYSTEM DESIGN

- A. System Arrangement and Operation: Provide a complete, microprocessor based, electrically supervised, noncoded 24 volt DC, power limited, manual and automatic, annunciated fire alarm system. The system shall be capable of having all initiation devices in alarm at one time, up to system capacity.

The separate items of fire alarm equipment shall be arranged and interconnected to provide an integrated system for: the early detection of fire; the notification of building occupants; the override of normal HVAC system operation; the activation of other auxiliary systems as shown on the drawings for specified herein to inhibit the spread of smoke and fire. To facilitate the safe evacuation of building occupants; and the transmission of an alarm signal to the authorized receiving station.

The fire alarm system shall be fully supervised for the detection and reporting of the derangement of any component or circuit on the system. Initiating device circuits shall provide the level of performance designated as style D by UL and the NFPA. Indicating circuits shall provide the level of performance designated as style X UL and the NFPA.

The fire alarm system shall include the alarm initiating and indicating devices shown on the project drawings. These devices shall be connected to the zones designated on the drawings. The operation of initiating device shall cause the system to go into the alarm mode. This in turn shall cause the illumination of the corresponding zone indicator on the system control panel the energizing of the indicating circuits for the notification of building occupants; the activation of auxiliary circuits to override the normal operation of building HVAC systems and release doors; and the performance of any other function indicated on the project drawings or specified herein.

The system shall latch into alarm mode so that it can only be reset by restoring the activated device to its normal condition and operating the system reset switch, except that the indicating the circuits may be de-energized by operating the silence switch. The operation of the silence switch, however, shall not prevent the re-energization of the indicating circuits if an initiating device on another zone should be subsequently activated. Neither shall the operation of the silence switch cause the zone alarm lights on the control panel and remote annunciators to be extinguished. The operation of the silence switch shall also not reset any auxiliary control functions such as door release, or the functional override of HVAC controls.

The system shall be returned to normal supervisory mode after an alarm by restoring the activated initiating device to its normal condition and operating the system reset switch.

- B. Supervision: A ground fault condition which prevents system operation or a single break or open condition in any circuit shall result in activation of system audible trouble signals. Loss of AC power shall also result in operation of system trouble signals. Trouble signals shall sound continuously until system has been restored to normal at the control panel or manually switched to a trouble indicating lamp. Upon correction of the trouble condition, trouble signals shall automatically resound until the control panel is restored to the normal position. System shall be electrically supervised for:
 - 1) Signal initiating circuits.
 - 2) Alarm signal notification (audio or visual) circuits.
 - 3) Battery supply circuits, including low and no voltage across the standby battery terminals.
- C. Primary Power: The project Electrical Contractor shall provide a dedicated 120 volts AC power supply from a dedicated circuit breaker to the fire alarm control panel. The Fire Alarm Contractor shall protect the power supply with a surge protector mounted immediately adjacent to the fire alarm panel. The surge protector shall be approved for use in this application by both the manufacturer of the fire alarm control panel and by any/all code/agencies previously cited in this specification.

2.04 COMPONENT DESIGN

- A. Colors: Provide finish colors under this section in accordance with FED-STD-595.
- B. Main Control Panel: Modular type, installed in a surface-mounted steel cabinet with hinged door and cylinder lock. Mount panel such that operator controls and visual readout are 5 feet A.F.F. Control panel shall be a factory-wired assembly containing components and equipment necessary to perform specified operating and supervisory functions of the system.

The main control panel shall be a Siemens Model XLS as determined by number of devices required for the installation.

- 1) The control panel shall be modular in construction, and shall contain all modules necessary to operate according to these specifications and the drawings. The system shall be capable of reading, displaying, and adjusting at the control panel the sensitivity of remote intelligent/analog smoke detection devices. Intelligent/analog devices shall be individually identified by the system. The control panel shall be capable of supporting conventional detectors as well as intelligent/analog detection devices.
- 2) The panel shall be furnished with an integral annunciator. The annunciator shall be an 80 character backlit and supertwist alphanumeric display, which shall provide a 32 character user definable message associated with each detection device or zone. The display shall provide custom message and give readings of detector sensitivity. Each device on an intelligent circuit shall be checked continuously for the following: sensitivity, response, opens, shorts, ground faults, functionality and status.

Exhibit 11

- 3) The control panel shall operate from a dedicated 120 volt AC power supply, and internal 24 volt DC back-up battery. Provide a minimum of 24 hours of battery back-up. All power connections whether AC or DC shall be separately fused within the control panel.
 - 4) Furnish an output module for central reporting of an alarm condition to the campus proprietary station. The module shall be system interconnected by card edge connector, and shall be operable by the control panel. The module shall be supervised by the control panel for open and shorted circuits. Open and short circuits shall report trouble only and respond with circuit identification. The output module shall be a Controllable Signal Module, Network Interface Card, Siemens NIC-C.
 - 5) Furnish additional modules, system interconnected by card edge connector, and operable by the control panel, for monitoring of conventional devices or shorting type contact devices, and for relay control of interlocked equipment such as HVAC air handling units.
- C. Manual Stations: Furnish intelligent noncoded manual fire stations which shall operate on any intelligent/analog detection circuit. Stations shall be individually annunciated on the control panel. Stations shall be Siemens Model HMS-S. Stations shall be semi-flush mounted. Mount stations with the base at 42 inches above the finished floor or as required by ADA and NFPA.
- D. Heat Detectors: Furnish intelligent/analog thermal detectors of the rate compensated fixed temperature type. Detectors shall be individually annunciated on the control panel. Heat Detectors shall typically be a Siemens Model HFPT-11 with a DB-11 base, unless the environment conditions are not suitable for this device as determined by the manufacturer.
- Mount detectors at the underside of ceilings or roof decks unless otherwise indicated. Detectors shall be semi-flush mounted. Each detector shall be designed for outlet box mounting, shall be supported independently of wiring connections, and shall be connected by separate screw terminal for each conductor. Temperature rating of detectors shall be in accordance with NFPA 72. No detector shall be located closer than 12 inches to any part of any lighting fixture.
- E. Smoke Detectors: Furnish intelligent/analog smoke detectors designed for detection of abnormal smoke densities by the photoelectric principle. Detectors shall be individually annunciated on the control panel. An automatic gain control circuit shall be provided to maintain correct sensitivity by compensating for detector aging and dirt accumulation. It shall be possible to adjust and/or electronically measure the sensitivity of each individual detector from the control panel. The intelligent/analog detectors shall provide complete supervision of the detector optics. The detector shall be supervised for failure of the LED light source or a critical reduction of light output by the LED light source or a critical reduction of light output caused by excessive dirt which could not normally be compensated for by the automatic gain control circuit.
- Smoke detectors shall typically be a Siemens Model HFP-11 with a DB-11 base unless installed environmental conditions exceed manufacturers recommendations.

- F. Duct Smoke Detectors: Detectors in ducts shall be photoelectric type and shall consist of an intelligent/analog smoke detector mounted in an air duct sampling assembly and sampling tube that protrudes across the duct of the air system. The duct smoke detector shall have all the features specified above for space mounted smoke detectors, and shall be installed in strict accordance with the manufacturer's printed instructions. Duct smoke detectors shall be Siemens Model HFP-11 and shall be mounted in a Siemens Model AD2-P housing with a Siemens Model ST 10, ST 25, ST-50, sampling tube.
- G. Alarm Horn/Strobes: Combination horn/strobe units shall be Siemens Model ZH-MC-R or as required to satisfy the requirements of NFPA 72 when installed.
- H. Strobes: Strobe light units shall be Siemens Modes ZR-MC-R or as required to satisfy the requirements of NFPA 72.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Equipment, materials, installation, workmanship, inspection, and testing shall be in strict accordance with all applicable codes and standards, the conditions of the system manufacturer's UL listing, and these specifications.
- B. Wiring and Equipment Installation: Wire the alarm initiating and notification signal devices so that removal will cause the system trouble device to sound.

All circuits shall be identified by using a unique conductor insulation color throughout the system for each type of circuit. The color-code shall be submitted on the drawings required by the "Submittal" section of these specifications. Transposing or changing circuit colors will not be permitted. Additionally, all circuits shall be neatly labeled (number coded) with heat shrink type sleeves at each junction box, at each connected device or appliance and at the system control panel.

Termination of conductors shall be by means of factory wiring terminals or factory pigtails. Pigtails fabricated in the shop or field will not be allowed. "T" tap connections will also not be allowed on wiring serving conventional (non-intelligent) devices.

Fire alarm conductors shall not be placed in any enclosure, conduit, compartment, outlet box, junction box, or similar fitting containing conductors of electric light or power, or any other low voltage system.

Junction Boxes and Splices: Wiring slices are to be avoided to the extent possible. Where splices are necessary, they shall be made in junction boxes that contain the minimum volume per conductor required by Table 370-6(b) of the NEC. A maximum of two extension rings will be permitted on 4-inch square boxes which contain splices. Where greater volume is required by the NEC or for ease of wiring, manufactured UL labeled junction boxes shall be used. Splicing of conductors shall be by means of UL listed connectors. All circuits contained in junction boxes shall be neatly tagged with legible labels.

The Electrical Contractor shall identify all fire alarm junction boxes and outlet boxes with red paint, and shall identify all fire alarm conduit with red paint at every 10 feet on center.

Exhibit 11

Installation of Initiating and Indicating Appliances: Installation of system appliances and devices shall be in strict compliance with the equipment manufacturer's written instructions. Installation of appliances and devices shall not commence before all splices are made and all circuits have been tested for faults and shorts.

The circuit shall again be tested for faults and shorts after all manual stations, audible/visual indicators, heat detectors, and smoke detector bases are installed and before the circuits are connected to the fire alarm control panel.

Installation of Control Panel and Related Equipment: Installation of the fire alarm control equipment shall be in strict compliance with the manufacturer's written instructions. The control equipment shall not be installed until all wiring and system appliances and devices have been installed and all circuits checked for faults and shorts as required in these specifications.

The contractor shall neatly lace all circuit conductors in the gutter spaces of the control panels and secure the wiring away from the circuit boards and components. All circuits shall be neatly and legibly labeled in the control panel. No wiring except homeruns from fire alarm system circuits and system power supply circuits shall be permitted in the control panel enclosure. Additionally, no wiring splices will be permitted in the control panel enclosure.

3.02 FINAL ACCEPTANCE TEST AND CERTIFICATION

Note: Final acceptance testing and certification of the fire alarm system, including approval by a representative of the State Fire Marshal's Office, shall be completed prior to full or partial occupancy of the building.

- A. System Test and Certification: The completely installed fire alarm system will be fully tested in compliance with Testing Procedures for Signaling Systems (NFPA 72) and manufacturers recommendations. The contractor shall test every alarm initiating appliance and device for proper response and zone indication; every indicating appliance for proper operation and audible/visual output; and all auxiliary control functions such as door release, and functional override of HVAC controls.
- B. Before final acceptance of the work and after the system has been completely tested to the satisfaction of Owner; the contractor shall complete the Fire Alarm System Certification and description form published by the NFPA. In compliance with published NFPA standards, parts 1, 2, and 4 through 10 shall be completed after the system is installed and the wiring has been checked. Part 3 shall be completed after the operational acceptance tests have been completed. The completed form signed by the Qualifying Agent (as defined by the State of Florida Department of Professional Regulation) of the alarm system contractor shall be delivered to the Owner with the other system documentation required in these specifications.
- C. All records of testing and compliance shall be recorded on approved NFPA 72 forms. All information/data recorded shall be numerical values or initials, no exceptions. Information recorded as OK, X, or check mark will not be accepted.

3.03 INSTRUCTION OF OWNER

Instruction of Owner: The contractor shall schedule a time to provide not less than two (2) hours of formal training to the Owner's representatives in the operation of the fire alarm system. The instruction shall also cover the schedule of maintenance required by NFPA 72H and any additional maintenance recommended by the system manufacturer.

Exhibit 11

The instruction shall be presented in an organized and professional manner by a person factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.

3.04 DELIVERY OF SYSTEM DOCUMENTATION

The contractor shall deliver to the Owner the following documents after the fire alarm system has been completely installed and tested. Refer to paragraph "SYSTEM DOCUMENTATION" for additional instructions.

- A. Operation and Maintenance Manuals.
- B. As-Built Drawings.
- C. A letter certifying that the installation is in strict compliance with all applicable codes and in strict compliance with the requirements of these specifications. The letter shall also clearly explain any discrepancies between the originally submitted system drawings and the as-built system drawings.
- D. Two (2) originals and four (4) copies of the NFPA document titled Fire Alarm System Certification and Description completely filled-in and signed as required in these specifications.
- E. Two (2) originals and four (4) copies of the document titled Fire Alarm System Warranty (attached to these specifications as Appendix No. 2) completely filled-in and signed by the alarm system contractor's Qualifying Agent (as defined by the State of Florida Department of Professional Regulation).

The contractor shall deliver the above documents to the Owner at one time.

Final payment of the contractor will not be authorized until the complete documentation specified herein is delivered to the Owner.

3.05 SYSTEM WARRANTY

The contractor shall warrant the installed fire alarm system to be free from any defects of material and installation for a period of one year from final acceptance by the engineer. Any deficiencies shall be immediately corrected at no additional cost to the owner.

The fire alarm contractor shall have the necessary facilities to provide the Owner complete warranty service that includes routine on-site inspection, software programming, and seven days a week, 24 hours a day emergency repair service. The contractor shall maintain a service organization with adequate spare parts stock within 50 miles of the installation.

Repairs of any defects, including software defects, shall be commenced within 4 hours of the Owner notifying the contractor, and repairs shall be completed within 24 hours of the owner notifying the contractor. All warranty service shall be provided under emergency repair service provisions.

All service work, including software restoration, modifications and upgrades, shall be performed by service personnel in the direct employ of the fire alarm contractor. The service technicians shall be factory trained and certified by the fire alarm system manufacturer to be competent in all aspects of the installed system and shall be authorized by the factory to provide software programming. Third party service or service only during specific working hours is not acceptable.

Exhibit 11

During the warranty period the contractor shall schedule two follow-up inspections of the fire alarm system with the building owner. The inspections shall be scheduled at semi-annual intervals and shall be conducted in strict compliance with Testing Procedures for Signaling Systems (NFPA 72H at the time of these inspections at no additional cost. The fire alarm system contractor shall also perform any routine semi-annual maintenance required by NFPA 72H at the time of these inspections at no additional cost.

At each of the follow-up inspections and after the system has been completely tested to the satisfaction of the building owner, the contractor shall complete the Fire Alarm System Certification and Description form published by the NFPA (attached to these specifications as Appendix No.1). The completed form signed by the Qualifying Agent (as defined by the State of Florida Department of Professional Regulation) of the alarm system contractor shall be delivered to the building owner.

The warranty period will not expire until the second semi-annual inspection and maintenance service to the system has been performed to the satisfaction of the Owner, any deficiencies in the system have been fully corrected, and the referenced documentation of such has been delivered to the owner.

System modifications made during the warranty period, including software modifications, shall be incorporated into the as-built documentation.

A software upgrade program shall be implemented on the anniversary of the warranty period. The upgrade shall provide all enhancements offered by the Manufacturer for programs in the accepted system, and shall be provided at no cost to the Owner.

- END OF SECTION -

Exhibit 12

Section 16727

Nautilus Card System/Access System

Part 1- General

This section titled, “Nautilus Card System/Door Access” includes information pertaining to all uses of the University’s “OneCard” System, which includes; University ID, Library Card, Access Card, Debit Card and more. See 1.2, definitions for common descriptions.

1.1 References

Underwriter’s Laboratories (UL)

National Electrical Code (NEC)

National Fire Protection Association (NFPA)

Refer to Exhibits No. 13 and 14 for Telecommunications Standards

1.2 Definitions

- A. The term “Nautilus Card System” describes the Universities OneCard “debit card” system. (Debit Card functions can include copiers, vending, POS and other financial readers).
- B. The term “Access System” describes an integrated access system, serving occupants with a personal access card (Nautilus Card) instead of keys.
- C. Contractor – Contractor responsible for completed project.
- D. Door Hardware Contractor - Contractor responsible for providing and installing door hardware devices.
- E. Access System Contractor – Contractor that works with Nautilus Card Office to install Heartland Campus Solutions equipment and other equipment needed for door access.
- F. Heartland Campus Solutions – The University of West Florida has standardized and works through sole source supply with this vendor to supply the Nautilus Card equipment.

1.3 System Description

- A. The work consists of all labor, materials, equipment* and services necessary to provide, install, test and certify a system including associated equipment and appurtenances necessary for a fully operational system. *(The University will purchase and provide the Heartland Campus Solutions equipment and Fiber Transceivers).

- B. Any materials not specifically mentioned in these specifications or not shown on any drawings, but required for proper performance and operation of the system shall be included, furnished and installed at no cost to the Owner.
- C. The system including all equipment installations, materials, workmanship, inspection and testing shall be in strict accordance with the required and advisory provisions of The Standard Building Code, the Life Safety Code (NFPA101) and the National Electrical Code (NFPA 70). In the case of any discrepancy between these specifications, the project drawings, or any applicable codes, the system shall comply with the most stringent requirement. In the NFPA publications referred to herein, the advisory provisions shall be considered to be mandatory. The system and all components shall be listed by Underwriter's Laboratories for intended use.
- D. The A/E shall coordinate with the University Project Manager and the Nautilus Card Manager during the layout and design of the Nautilus Card system to determine where cabling and equipment shall be installed. In the case of door access; the final layout will depend on the type doors being used, distance of doors from telecom room and the number of doors to be controlled. This makes coordination efforts vital for the success of the installation.
- E. Refer to Exhibit 12-1 thru 12-9. Exhibit 12-1 shows standard Nautilus Card System Layout. Exhibit 12-2 shows typical Nautilus Card Cabinet Layout. Exhibits 12-3 thru 12-8 shows possible arrangements for door access using standard door types. Exhibit 12-9 shows typical Wiring Gauge chart. Exhibit 12-10 shows typical Laundry Equipment Layout.

- 12-1 Standard Nautilus Card System Layout
- 12-2 Nautilus Card Cabinet Layout
- 12-3 Door Access – Single (Solid) Door with Mortise Lock
- 12-4 Door Access –Single (Solid) Door with Crash Bar
- 12-5 Door Access – Double Fixed (Solid) Door with Mortise Lock
- 12-6 Door Access – Single (Glass/Pinned) Door with Crash Bar
- 12-7 Door Access – Single (Glass/Pinned) Door with Handicap Door Opener and Crash Bar
- 12-8 Door Access – Single (Solid) Door with Handicap Door Opener and Mortise Lock
- 12-9 Wire Gauge Chart
- 12-10 Laundry Equipment Layout

- F. The University shall purchase and provide all Heartland Campus Solutions equipment. The Contractor shall be responsible for providing all labor, and materials necessary to install cabling and other related equipment and material. The University and Nautilus Card Office shall work with the Contractor to complete installation of Heartland Campus Solutions equipment, and testing of completed system to be sure it is fully operational. (Door access installations will also require coordination with the Access System Contractor used by Nautilus Card Office.)

- G. Also refer to Exhibit No. 13, Section 16740 “Telecommunications Fiber Optic Cabling System” and Exhibit No. 14 Section 16741, Structured Telecommunication Cabling Systems.” These documents were produced by the University of West Florida and may be used by the A/E as a guideline in the proposed Project Manual.

1.4 Submittals

- A. Provide information within bid package of cut sheets/manufacture’s catalog data bearing the printed logo or trademark of the manufacturer for products listed. Products deviating from original cut sheets shall be approved by the Project Manager before installation.
- B. Contractor will be required to provide pre-installation drawings (hard copy) before the project commences and modified as-built drawings to the Project Manager upon completion of each installation. Drawings will include a floor plan with conduit layout and risers. In addition, two copies of an O&M manual will be required and shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement information (with specific part numbers).

1.5 Quality Assurance

- A. Materials shall be the best of their respective kinds. All materials shall be new. Work shall be accomplished using UWF standards and in keeping with best practices and highest standards of the trade.
- B. The Contractor shall be an experienced firm regularly engaged in the layout and installation of similar systems. The contractor shall have successfully completed the installation, testing and warranty of systems similar to the scope of work requested and have been regularly engaged in the business of contracting similar work.
- C. The Nautilus Card Access System installations shall be installed by a Contractor who is certified by the State of Florida Department of Professional Regulations and be registered at a minimum of a low voltage electrical contractor or security contractor.

1.6 Warranty

- A. The Contractor shall warrant the system installation for a period of one year. Warranty will include all parts and labor of the system with the exception of any Heartland Campus Solutions equipment.
- B. The Access System Contractor will be responsible for not only new installations but warranty and service work as well. Service work will include assistance in troubleshooting problems if necessary. The contractor shall maintain a service organization with an adequate stock of spare parts and be located within 50 miles of the installation. Third party service is not acceptable. The Access System contractor shall be prepared to complete maintenance work within at least 24 hours of the call if requested by the University.

- C. Contractor and Access System Contractor may also be asked to attend, at no charge, a one-day training session provided by the University. Training will include information on installation and maintenance of the Heartland Campus Solutions equipment.

1.7 Commissioning

- A. Installation of devices and equipment shall not commence before all circuits have been tested for faults and shorts.
- B. The Contractor shall be fully responsible for commissioning the system. Accordingly the Contractor shall include as part of each project, the material and manpower necessary for system commissioning as described below. Nautilus Card staff, along with Contractor will be required to be present for testing/commissioning. (Door access installations will also require coordination with the Access System Contractor used by the Nautilus Card Office.)
- C. The commissioning process shall include a thorough checkout/testing of the system and a complete exercise of the equipment and software programs such that the fully commissioned system is operational in every detail and at all levels. Commissioning shall be complete prior to final acceptance of work completed.

Part 2 – Products

2.1 Materials and Equipment

Materials, equipment, and devices shall be new and be UL listed for the intended use.

- A. Cabling, devices and equipment - shall be in accordance with UL, NFPA 70, NEC, UWF Standards, and the system manufacturer's specifications and recommendations. Refer to Division 16, Sections 16150, 16740 & 16741. Also refer to Part 2.1 – D thru S in this document for Nautilus Card specifics.
- B. System arrangement and Operation – Nautilus Card and Access system installations- Although the university will be supplying the Heartland Campus Solutions equipment, the Contractor will be responsible for a complete system, ready for operation. (Door access installations also require coordination with the Access System Contractor used by the Nautilus Card Office.)
- C. Products and installation - shall be in accordance with NFPA 70, UWF Standards and the system manufacturer's specifications and recommendations.
- D. Fiber Connectivity - Nautilus Card signal is carried from Network Manager to other buildings using campus fiber backbone, and fiber transceivers. (Fiber Transceivers and fiber patch cables supplied by Nautilus Card Office). One fiber transceiver shall be located at Network Manager location and the other in the building where the system is being installed. See Exhibits 12-1 and 12-2 for specific equipment layouts.
- E. Cabling - shall be category 6E UTP terminated on 110 Patch Panel with C-4 connectors, configured 568B. Cabling should be home runs from Patch Panel to outlets. Door access is the exception. See Additional Requirements for Door Access.

- F. Patch panel – Ports of origin shall be 110 type terminations EIA/TIA 568B configured and segregated from all other patch panels within the telecom room. Port labeling shall begin with “N” and the outlet number and display the room number. Example N1/100, N2/101, etc.
- G. Last termination on the punch block - shall have a 120 ohm resister (provided by Nautilus Card office).
- H. Outlets - shall be Leviton 625B4, modular wall jack, and/or Leviton 625B3 wall jack or Equivalent (RJ11). Cable pairs blue and orange shall be terminated on pins 1 and 3 on outlet. (White/Blue and White/Orange terminate on pin 1 and Blue/White and Orange/White terminate on pin 3). Outlet faceplates or housings shall contain the letter “N” and the patch panel port of origin number and room number. All labeling shall be permanently affixed to the terminated outlet faceplate or housing. Example N1/100, N2/101, etc.

Note: Patch Panel and Device labeling shall consist of a permanent label from a labeling machine. Permanent markers, pens or pencil shall not be permitted.

- I. 120v power outlet – shall be installed near each Nautilus Card Outlet to supply power to the equipment being installed.
- J. Conduit, fittings and boxes - Minimum conduit size shall be $\frac{3}{4}$ inch trade size. No conduit shall exceed fill ratio recommended by NFPA 70. Conceal conduit in finished area of construction. Fittings for EMT shall be stellset screw type. Fittings enclosed in concrete shall be steel compression type. Cast fittings are not allowable. All outlet boxes shall be 4” X 4” X 2 1/8” deep unless larger boxes are required. Install plastic insulating bushings at each point of termination. Refer to Division 16, Sections 16150, 16740 & 16741. All junction boxes for door access shall be 6” X 6” or larger and mounted above door to be controlled, inside protected area.

Additional requirements for Door Access:

- Metal secured (lockable) cabinet with back plate shall be installed in telecom room. 110 block and fiber transceiver should be installed in cabinet. Shall have one cable (Cat 6E) ran from 110 block to an RJ11 jack mounted inside cabinet for door access connectivity. Jack should be terminated as per Nautilus Card wiring standards. See Exhibit 12-2 for Standard Nautilus Card Cabinet Layout.
- Shall have one dual data jack installed in Secured cabinet. See Exhibits No. 13 and 14 for Telecommunications Standards. This is a new requirement and does not show on Nautilus Card Exhibits.
- Shall have one dedicated 120v-20a circuit installed inside the secured cabinet.
- Refer to Exhibits 12-3 thru 12-8 for standard door access layouts. For any other door configurations/types contact Nautilus Card Manager for layout.

Note: Controller type is determined by Nautilus Card Manager based on number of doors being connected and distance of each from telecom room. Consult with Nautilus Card Manager before installing cabling to insure that proper configuration is being followed.

- Refer to ADA requirements for mounting heights of Card Readers and Handicap Buttons.
 - Secured cabinet and door controller should both be grounded to same grounding grid (bus bar) to insure they both have common ground.
- K. Hardware/Equipment requirements: If contractor deviates from recommended equipment they must obtain approval from UWF Project Manager and/or Nautilus Card Manager prior to installation.
- L. See Section/Exhibit # for specific Door Hardware requirements. When Nautilus Card Door Access System is being installed, Contractor must insure door hardware and door layout /type is compatible with Access System. If there are problems with installation it is the responsibility of the Contractor to correct.
- M. Contractor shall provide and install Secured (lockable) Cabinet in Telecom Room. See Exhibit 12-2 for specific requirements of Cabinet.
- N. Plywood back board shall be mounted inside Secured Cabinet by Contractor.
- O. All Nautilus Card wiring should be home runs from Secured Cabinet to device locations. Door Access is an exception. See Exhibits 12-3 thru 12-8 for more detail on Door Access wiring layouts. Wiring shall be furnished and installed by contractor but coordinated with Nautilus Card Office and Access System Contractor, if applicable. See Exhibit 12-9, Wiring Chart, for more details on wiring needs.
- P. 110 Block – Shall be provided and installed in Secured Cabinet by Contractor. See Exhibit 12-1 & 12-2 for specific equipment layout.
- Q. 110 cross connect cables shall be provided by Nautilus Card Office and installed by Access System Contractor (or other Nautilus Card Contractor if door access is not applicable). If door access is applicable, door access wiring should be on a segregated loop and all other Nautilus Card wiring on another loop.
- R. 120 ohm resister shall be terminated at each end of line (last connection) on the 110 block. This will be provided by Nautilus Card Office and installed by Access System Contractor (or other Nautilus Card Contractor if door access is not applicable).
- S. Fiber Transceivers & Fiber Patch cables shall be provided by Nautilus Card Office and installed in Secured Cabinet by Access System Contractor (or other Nautilus Card Contractor if door access is not applicable). See Exhibit 12-2 for equipment layout. There should be one pair of Fiber Transceivers per loop that is terminated on 110 block. Example: One for door access and one for other Nautilus Card equipment.

T. Heartland Campus Solution equipment (including Door Access equipment) shall be provided by University. University shall coordinate purchase of equipment with Nautilus Card Office. Access System Contractor shall install Door Access Equipment. Other Heartland equipment shall be installed by either the Nautilus Card Office (POS, Financial Readers, etc.) or University Contracted Vendor (Vending and Laundry). See Exhibit 12-10 for Laundry equipment layout.

Note: Common solutions for Door Access equipment include: 4 door controller (controls up to 4 doors) or Multi Door Controller (that can control up to 32 doors. This device has stackable boards that control up to 8 doors per board).

U. Heartland Input/Output device (I/O) is installed by Access System Contractor. This device releases door mechanism as card is swiped and access is granted. Depending on Door Controller being used this device is normally located above the door or in the Secured Cabinet. If this device is located above the door there is a distance limitation from the I/O to the swipe. The junction box installed above the door should be within 9 foot of Nautilus Card door swipe.

V. Heartland Door Access Card Reader shall be mounted at door by Access System Contractor. Nautilus Cards are swiped through this device and access is granted or denied. **See ABA requirements for card reader mounting heights.**

W. The University shall provide the Power Supply needed for the Door Access Controller and any mortise style or recessed strike type devices. This Power Supply shall be installed by the Access System Contractor in the Secured Cabinet.

Note: Any power supplies required for equipment being provided and installed by the Door Hardware Contractor must also be provided by the Door Hardware Contractor. Power supplies provided by Door Hardware Contractor must be compatible with door hardware and recommended by manufacture of equipment to work with door hardware being provided. Any specialized power supplies needed shall be installed above the door being controlled. Each application of this type will need a power outlet available in the ceiling area near the device.

X. Batteries & UPS are used in case of power outages. This equipment is provided by Access System Contractor and University and is located in the Secured Cabinet. See Exhibit 12-2 for Nautilus Card Cabinet Layout.

Part 3 – Execution

3.1 Execution

- A. The Nautilus Card Readers (Financial & Access) communicate with the Nautilus Card front-end computer (Network Manager) using the campus fiber backbone. Connectivity will be coordinated through the Nautilus Card Office as to comply with the UWF computing network standards.
- B. All devices shall be installed using conduit and junction/pull boxes such that the device and the wire/cable serving it can be replaced or repaired without disturbing or removing building components or finishes.
- C. All conduit and fittings and the installation of such for the system shall comply with UWF standards and the National Electrical Codes.

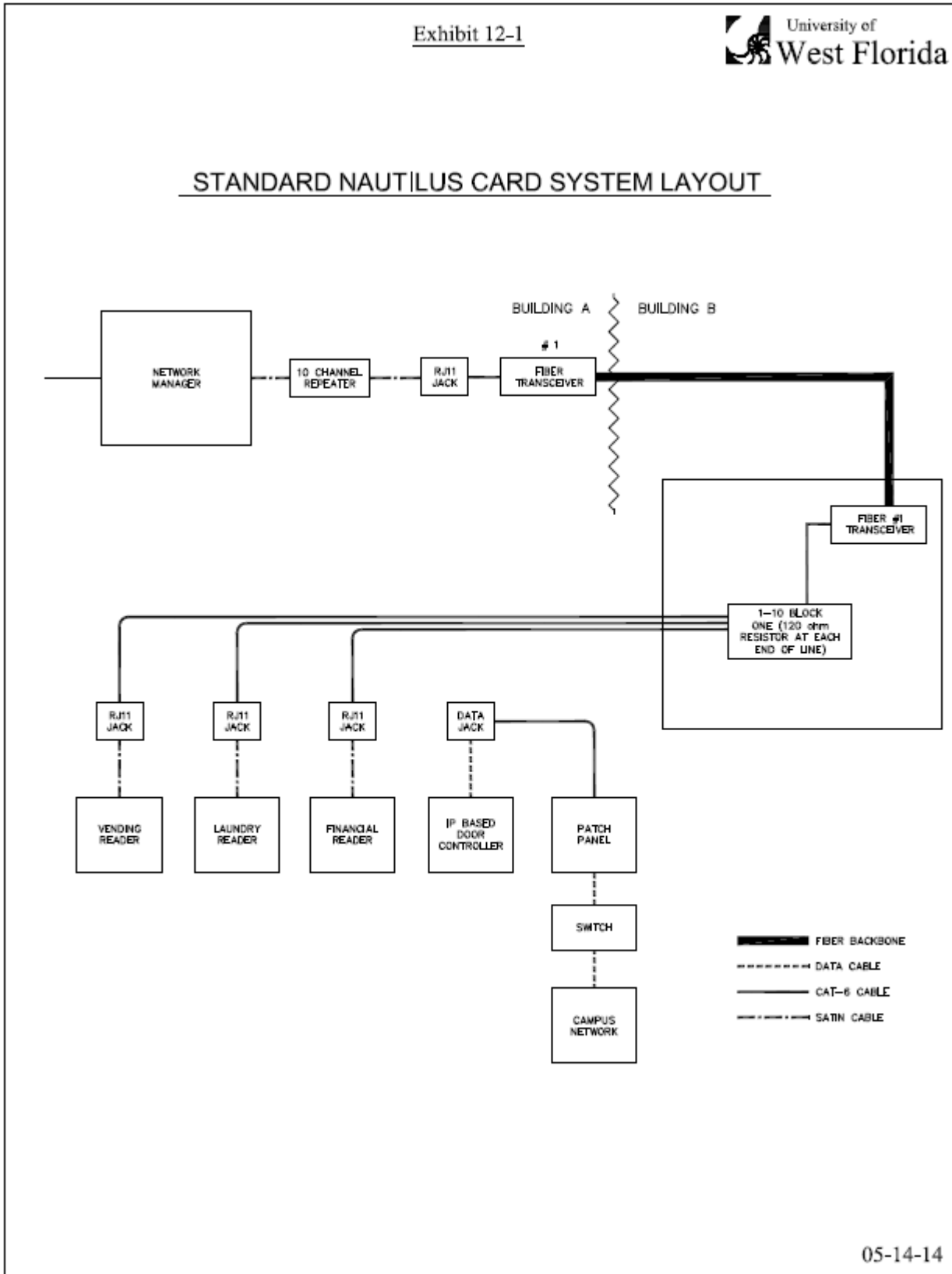
- D. Make all terminations of cabling on device terminals or within device boxes unless specific approval in writing from Project Manager has been given. Cable terminations shall not be made in junction boxes. **Cable splices are not permitted. Each cable should be a home run from Patch Panel (Secured Cabinet) to equipment location. The exception is Door Access. See Exhibits 12-3 thru 12-8 for addition information.**

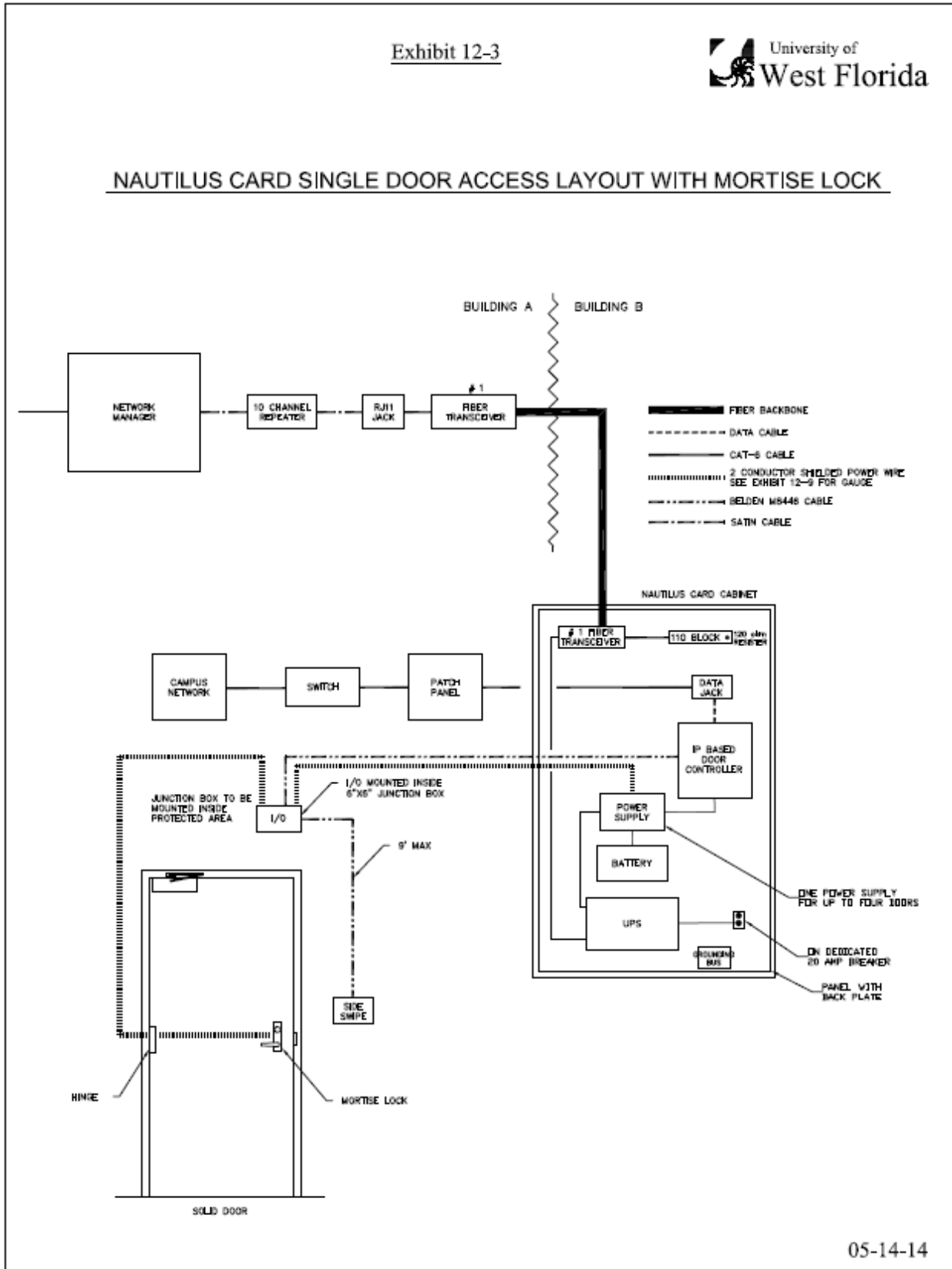
Note: The Nautilus Access system is NOT a security system and should be viewed as access control only.

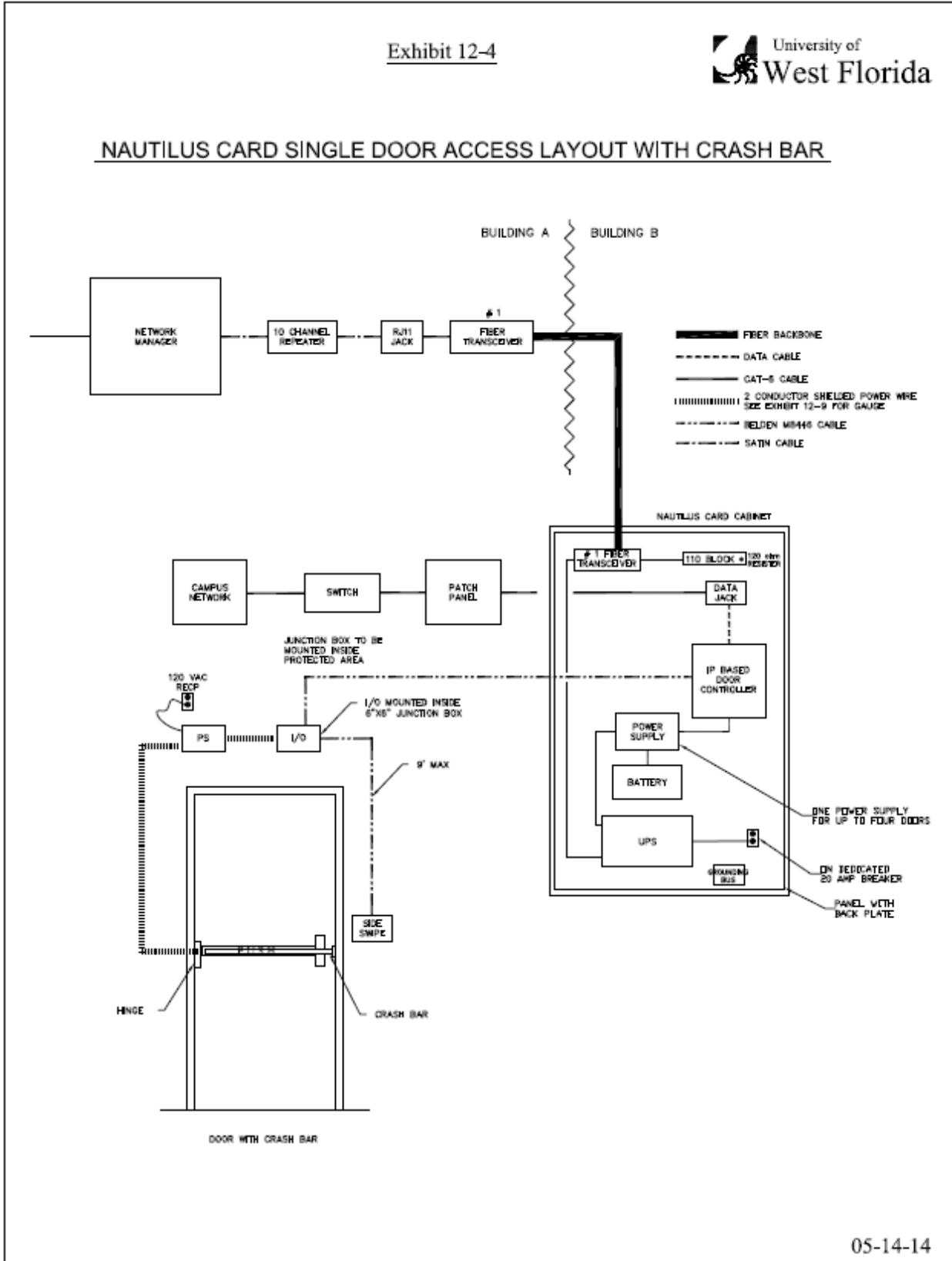
3.2 Final Testing and Acceptance

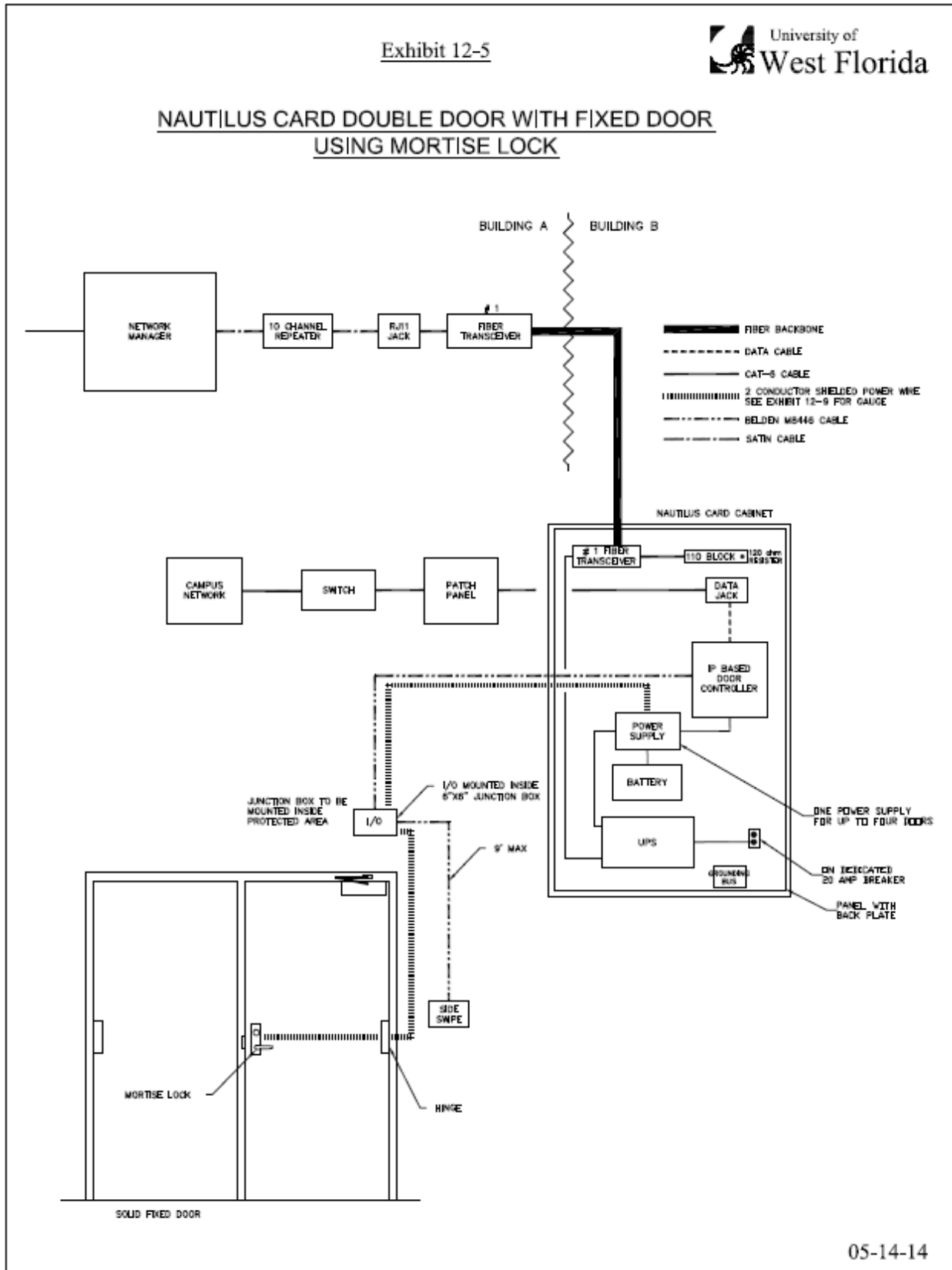
The completely installed and commissioned system shall be tested to demonstrate proper operation. Contractor, Nautilus Card Staff and Access Contractor, (if applicable) should be present for final testing and acceptance.

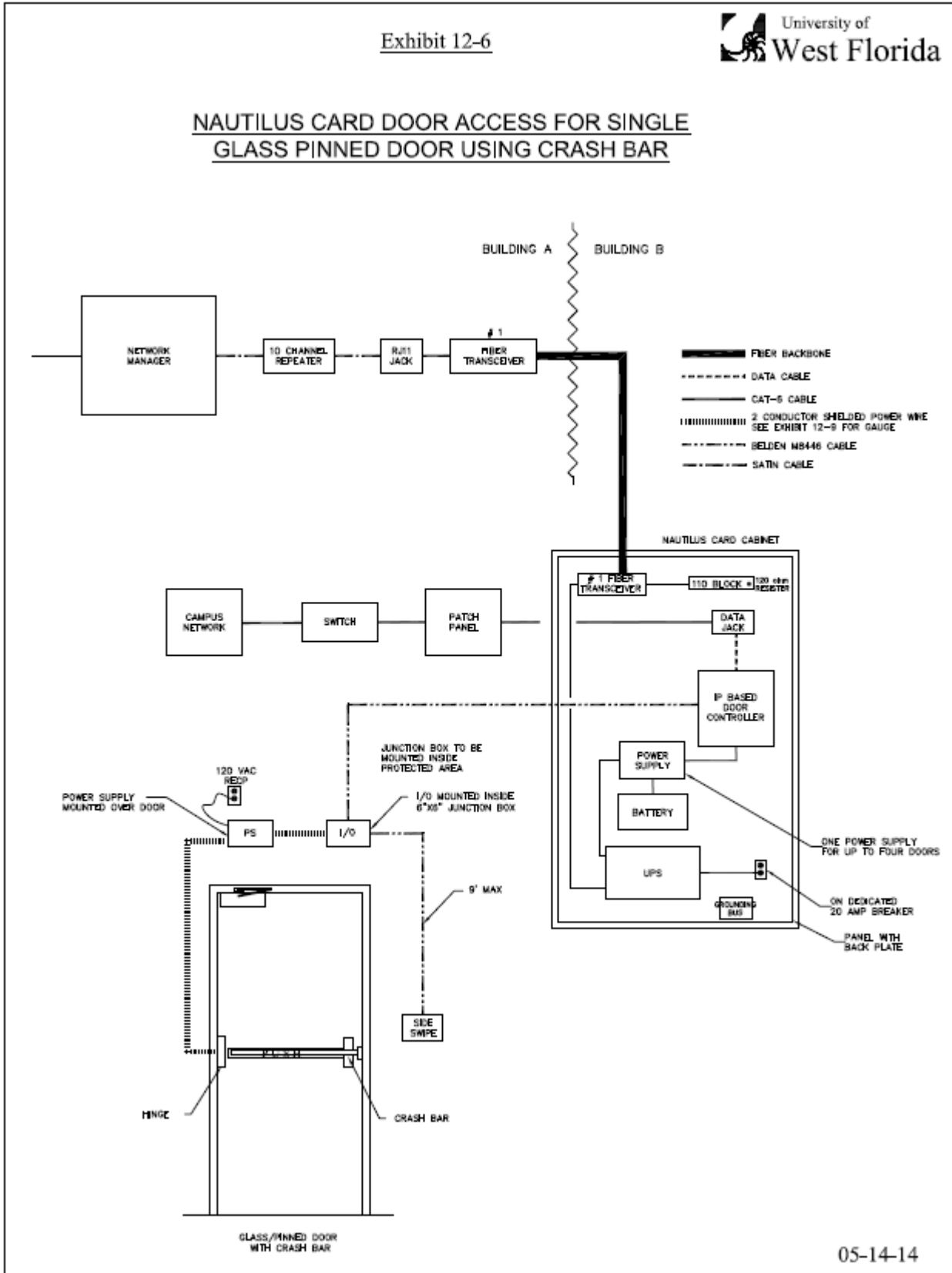
-End of Section-

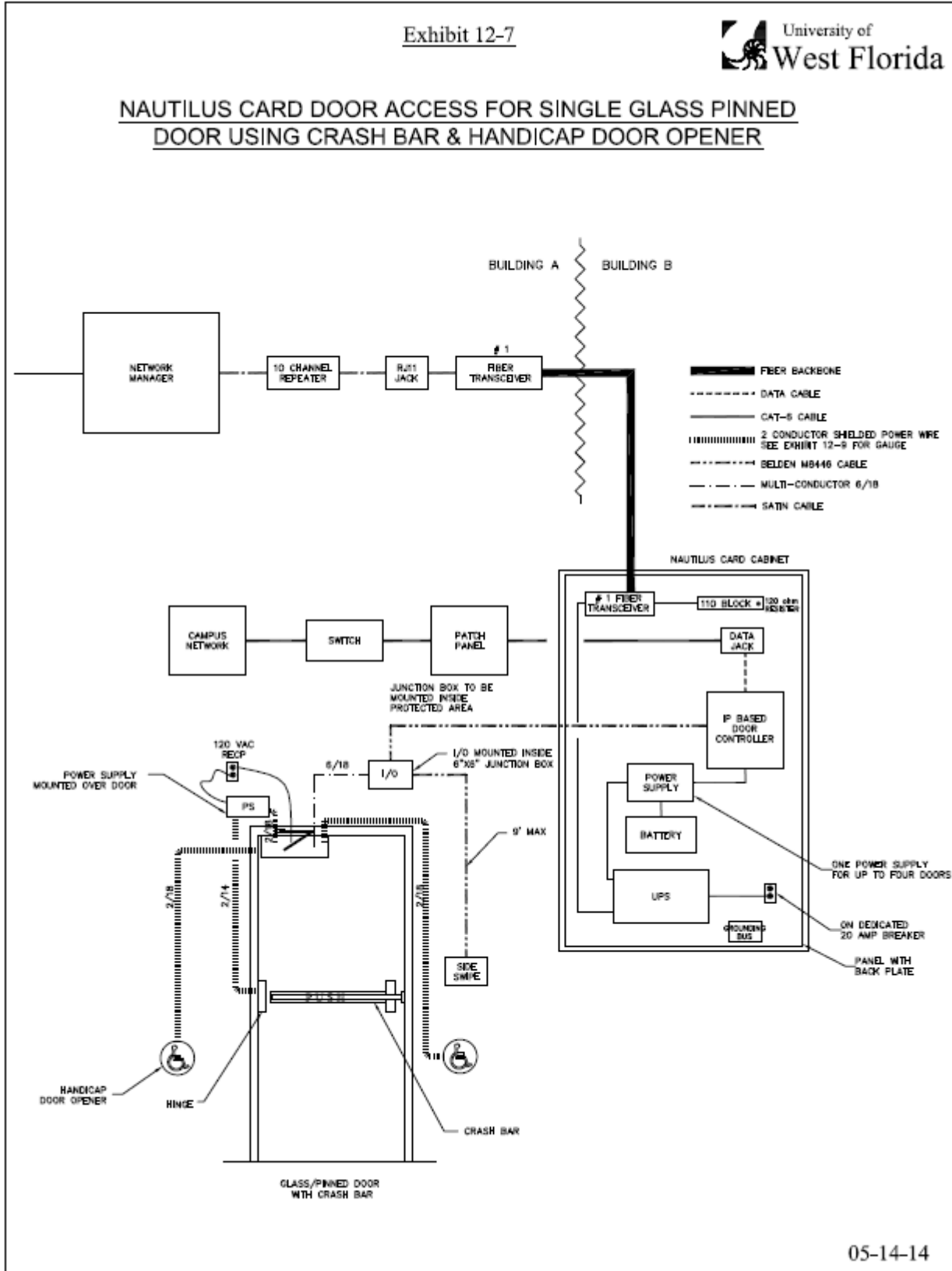












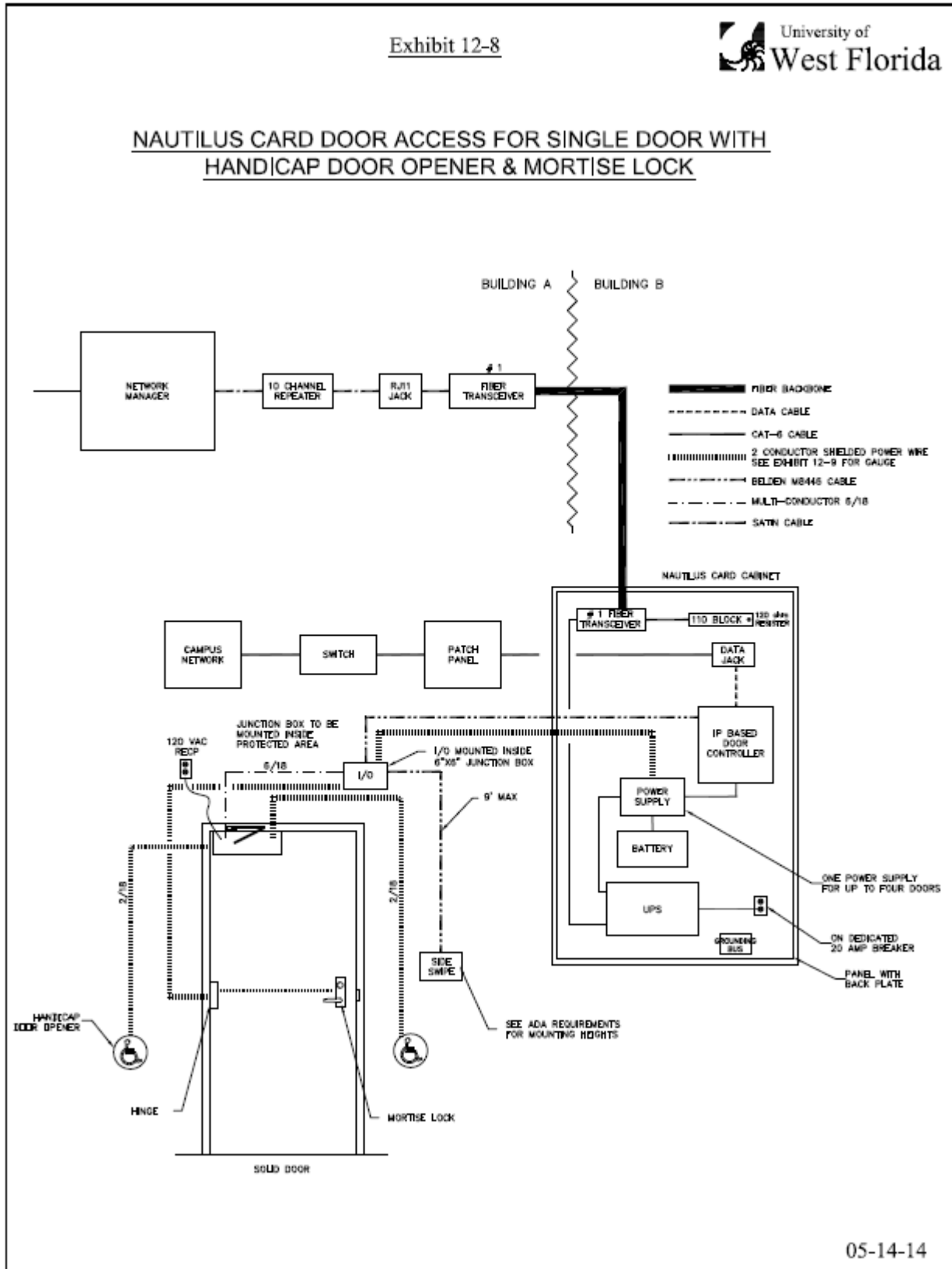


Exhibit 12-9

**Nautilus Card Door Access
Wire Requirements**

Wire to Door Access Card Swipe must be:

**Belden Cable – M8446,
No Substitutions allowed**

Note: All wire to Door Access Card Swipe must be home run from Nautilus Card Secured Cabinet to 6 X 6 junction box located above door

Power Wire – Gauge Chart

Lengths - Wire Gauge

10 to 200 feet – use 18 awg
200 to 300 feet – use 16 awg
300 to 400 feet – use 14 awg

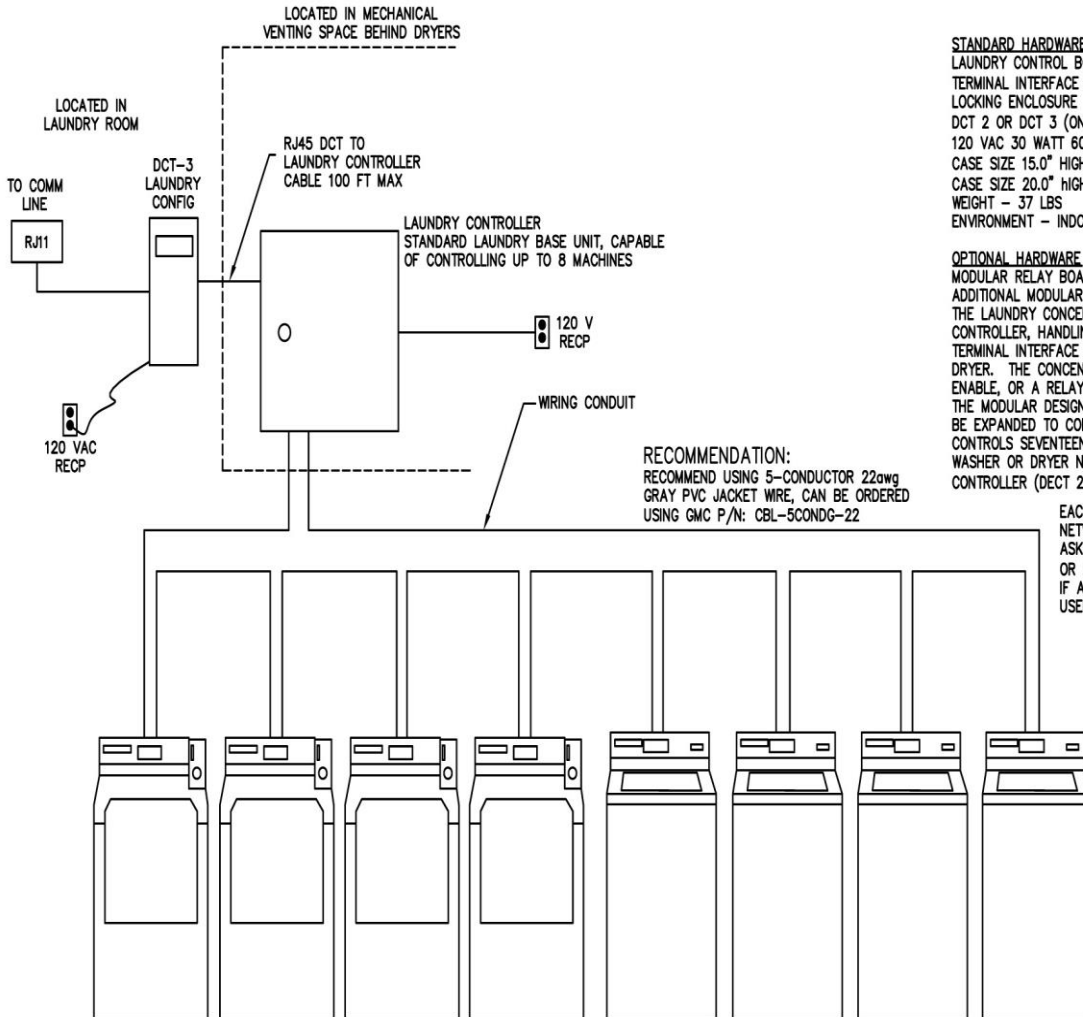
Runs greater than 400 feet - contact Nautilus Card Office

Note: All power wire must be shielded.

Exhibit 12-10



LAUNDRY CONTROL
"ON THE SURFACE"



RECOMMENDATION:
RECOMMEND USING 5-CONDUCTOR 22awg
GRAY PVC JACKET WIRE, CAN BE ORDERED
USING GMC P/N: CBL-5CONDG-22

STANDARD HARDWARE

LAUNDRY CONTROL BOARD WITH RJ 45 NETWORK INTERFACE PORT MODULAR TERMINAL INTERFACE BOARD(S) WITH SCREWLESS TERMINAL BLOCKS HINGED, LOCKING ENCLOSURE
DCT 2 OR DCT 3 (ONE REQUIRED PER LAUNDRY ROOM)
120 VAC 30 WATT 60 HZ INPUT/9VDC 1 AMP OUTPUT POWER SUPPLY
CASE SIZE 15.0" HIGH X 11.0" WIDE X 4.0" DEEP; 10 LBS. (4 16 UNITS)
CASE SIZE 20.0" HIGH X 16.0" WIDE X 6.0" DEEP; 37 LBS. (17 32 UNITS)
WEIGHT - 37 LBS
ENVIRONMENT - INDOOR LAUNDRY ROOMS

OPTIONAL HARDWARE

MODULAR RELAY BOARD FOR UNITS WITH MECHANICAL ENABLE REQUIREMENTS
ADDITIONAL MODULAR TERMINAL INTERFACE BOARDS
THE LAUNDRY CONCENTRATOR IS A HIGHLY ADAPTABLE LAUNDRY ROOM CONTROLLER, HANDLING UP TO 32 LAUNDRY MACHINES. EACH OF THE TERMINAL INTERFACE POINTS CAN BE CONFIGURED TO CONTROL A WASHER OR DRYER. THE CONCENTRATOR CAN SUPPLY A PULSE SIGNAL FOR ELECTRONIC ENABLE, OR A RELAY CLOSURE FOR UNITS REQUIRING MECHANICAL ENABLE. THE MODULAR DESIGN ALLOWS CONCENTRATORS WITH ONLY A FEW UNITS TO BE EXPANDED TO CONTROL UP TO SIXTEEN UNITS. A LARGER VERSION CONTROLS SEVENTEEN TO THIRTY TWO UNITS. THE USER ENTERS THE WASHER OR DRYER NUMBER TO BE ENABLED ON THE LAUNDRY ROOM CONTROLLER (DECT 2 OR DCT 3).

EACH USER TRANSACTION REQUEST IS SENT TO THE NETWORK FOR APPROVAL AND PROCESSING. THE DCT 1 ASKS THE USER HOW MANY WASH OR DRY CYCLES WASHER OR DRYER. AN "IN USE" MESSAGE IS SENT TO THE DCT 2 IF A USER ATTEMPTS TO SELECT A UNIT THAT IS BEING USED.

GMC PART LIST AND OPTIONS:

- PRIMARY (CHOOSE 1):
DCT-2
• DCT2 SIDE PORT GMC NET: RTS-DCT2BLKPS-NET
• DCT2 BACK PORT GMC NET: RTS-DCT2BLKPB-NET
DCT-3
• GMC NET: RTS-DCT3BLK-NET
• IP: RTS-DCT3BLK-IP
• MODEM: RTS-DCT3BLK-SMDM

LAUNDRY CONCENTRATOR (CHOOSE 1):

- LAUNDRY-8: RTS-LNDCNT-8
- LAUNDRY-16: RTS-LNDCNT-16
- LAUNDRY-24: RTS-LNDCNT-24
- LAUNDRY-32: RTS-LNDCNT-32

- * NOTE:
- EACH GROUP OF 8 CAN BE EITHER MAYTAG OR SPEEDQUEEN. IF THE ROOM IS MIXED, YOU WILL NEED ADDITIONAL 8-PORT LAUNDRY BOARDS. 1 FOR MAYTAG CONTROL, AND 1 FOR SPEEDQUEEN CONTROL.
 - WASHER AND DRYERS CAN RUN FROM SAME 8-PORT, PROVIDED THEY ARE THE SAME MANUFACTURER.
 - ** CONTRACTOR TO INSTALL CONDUIT FROM CARD READER TO LAUNDRY CONTROLLER AND FROM LAUNDRY CONTROLLER TO MACHINES. LAUNDRY CONTRACTOR TO INSTALL WIRE FROM CONTROLLER TO MACHINES.

COPY OF GENERAL MOTORS CORP. DMC
1935 DOMINION WAY ON THE SURFACE
SUITE 202 RTS-LNDCNTX-OV REV A
COLORADO SPRINGS, CO 80918 01-04-2007 TT SHEET 1 OF 1

EXHIBIT 13**SECTION 16740 - TELECOMMUNICATIONS FIBER OPTIC CABLING SYSTEM****Issue date: December 2003****Revision A - December 2013****DT971FO.DOC****1.0 GENERAL****1.1 SCOPE OF WORK**

The work consists of all materials, equipment, and labor necessary to install, terminate, test, and certify various segments of outside plant fiber optic cabling at the main campus of The University of West Florida. These various segments of fiber optic cabling shall include but not be limited to, both outside plant multimode and singlemode types of fiber optic cabling. Also included will be compatible types of inside fiber optic cabling such as riser cabling, patch cables and termination units as described to complete a path of fiber optic connectivity. The basis for award shall be the summation of the items from the unit pricing tables provided by the bidders and shall become the fixed pricing for all additional work under this term contract. The term "Owner" in this document will be used to identify Architectural Engineering Services (AES) and/or Information Technology Services/Networks and Telecommunications (ITS/NAT).

- A. Work may include the clearing and rerouting of existing cabling as directed or indicated by the AES and/or ITS/NAT.
- B. Work may include the installation of a cable management system within the campus ductbank as directed or indicated by AES and/or ITS/NAT. See the Products section of these specifications for a description of acceptable products.
- C. The contractor's on staff R.C.D.D shall provide design review services prior to installation and execution of contracted work. A written review report of the proposed work shall be furnished to the University project manager along with a formal quotation to perform the proposed work utilizing the furnished unit pricing for this contract. The contractor is advised that all submitted quotations will be carefully scrutinized for accuracy employing previously documented fiber optic segment lengths and field verification of proposed work. The requirement for an on-staff R.C.D.D. will be determined and authorized by ITS/NAT based upon the complexity of the scope of work.
- D. Omissions and oversights of the documented scope of work for a particular described segment of fiber optic cabling shall be the sole responsibility of the contractor without recourse to this institution. A complete and functional fiber optic path meeting the requirement of this specification must be provided.

1.2 REFERENCES

- A. Electronic Industries Association/Telecommunications Industry Association (EIA/TIA) 568A-Commercial Building Telecommunications Wiring Standards.
- B. EIA/TIA-569-Commercial Building Standard for Telecommunications Pathways and Spaces.

- C. EIA/TIA-72-Centralized Optical Fiber Cabling Guidelines, latest edition.
- D. EIA/TIA PN-3398 (Cabling practices for Open Offices), latest edition.
- E. International Standards Organization/International Electrotechnical Commission (ISO/IEC) DIS 11801, latest edition.
- F. Underwriters Laboratories (UL®) Cable Certification and Follow Up Program.
- G. National Electrical Manufacturers Association (NEMA).
- H. American Society for Testing Materials (ASTM).
- I. National Electric Code (NEC®)/National Fire Protection Association.
- J. EIA/TIA-606- The Administration Standard for Telecommunications infrastructure of Commercial Buildings, latest edition.
- K. EIA/TIA-607- Commercial Building Grounding and Bonding Requirements for Telecommunications, latest edition
- L. EIA/TIA-758-Customer Owned Outside Plant Telecommunications Cabling Standards.
- M. EIA/TIA-TSB-75-Additional Horizontal Cabling Practice for Open Offices.
- N. Building Industry Consulting Service International (BICSI)
 - a. Telecommunications Distribution Methods Manual.
 - b. Telecommunications Installation Manual.
 - c. Customer Owned Outside Plant Design Manual.
- O. Underwriters Laboratories (UL)
- P. Federal Communications Commission (FCC)
- Q. Americans with Disabilities Act Requirements
- R. Occupational Safety and Health Administrative Regulations (OSHA)
- S. Florida Statutes and Florida Administrative Codes
- T. Institute of Electrical and Electronics Engineers (IEEE) Applications Standards including, but not limited to:
 - a. LAN Standard for Ethernet IEEE 802.3
- U. Society of Cable Television Engineers (SCTE)
- V. National Electrical Manufacturers Association (NEMA)
- W. The State Uniform Building Code for Public Education Facilities Construction (UBC) State requirements for Educational Facilities
- X. ISO/IEC- International Standard organization and International Electrotechnical Commission
- Y. Manufacturers shall be ISO-9001 Certified where applicable

1.3 SUBMITTALS

A. Provisioning Section

Submittals shall include all items called for in this section and manufacturer's cut sheets for the following:

1. All fiber optic cabling to include outside plant, riser, and patch cords.
2. All connectors and required tooling.
3. All termination system components for each cable type.
4. All hardware utilized.
5. All grounding and surge suppression system components.

B. Product Data:

Provide manufacturer's catalog information showing dimensions, colors, and configurations.

C. Manufacturer's Instructions:

1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.
2. Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.
3. A technical data sheet from the cable manufacture should be included with the response for each brand of cable proposed. This data sheet shall include the physical cable specifications as well as the following transmission characteristics at two rated transmission windows:
 - a. Continuity
 - b. Attenuation

1.4 FACTORY TEST

Vendor shall submit all factory test information prior to installation to the Project Manager. If equivalent product(s) are substituted, the equivalent product(s) must show demonstrated and documented equivalence to the product(s) specified. See above.

1.5 MATERIAL GUARANTEE

The wiring vendor (installer) shall guarantee at the time of the bid that all fiber optic cabling and components meet or exceed specifications (including installation) of TIA/EIA-568A and 569.

1.6 MATERIAL PROVIDED

Vendor shall be certain that all correct parts are ordered and installed. Vendor shall submit complete parts and part numbers prior to installation of equipment.

1.7 MANUFACTURER'S QUALIFICATIONS

The company specializing in manufacturing products specified in this Section with a minimum of seven (7) years experience and shall be ISO 9001 Certified.

1.8 CONTRACTOR'S QUALIFICATIONS

The contractor selected to provide the installation of this system shall be certified by the manufacturing company in all aspects of design, installation and testing of the products described herein, and have a minimum of five (5) years experience on similar outside plant cabling systems. Indicate whether the contractor is a certified Value Added Reseller of the product manufacturer. Criteria for contractor's qualifications stipulated in 1.8 (A), (B), (C), will be determined and authorized by ITS/NAT based upon the complexity and nature of the scope of work.

A. Contractor Selection

The contractor selected for this Project must be certified by the manufacturer of the products, adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels in provisioning this Project.

B. Contractor Experience and Training

The contractor shall be experienced in all aspects of this work and shall be required to demonstrate direct experience on recent systems of similar type and size. The contractor shall own and maintain tools and equipment necessary for successful installation and testing of fiber optic distribution systems and have personnel who are adequately trained in the use of such tools and equipment.

C. Contractor Resume

A resume of qualification shall be submitted with the Contractor's proposal indicating the following:

1. A list of recently completed projects of similar type and size with contact names and telephone numbers for each.
2. A list of test equipment proposed for use in verifying the installed integrity of metallic and fiber optic cable systems on this project.
3. A technical resume of experience for the contractor's Project Manager and the on-site installation supervisor who will be assigned to this project. The Project Manager shall hold a current BICSI R.C.D.D. Registration and the Installation Supervisor shall possess a current BICSI Cabling Installation Registration.
4. A list of technical product training attended by the contractor's personnel that will install the system shall be submitted with the response.
5. Any Sub-Contractor, who will assist the prime contractor in performance of this work, shall have the same training and certifications as the prime contractor.

1.9 CABLING AND BASIC REQUIREMENTS

A. Fiber Optic Cable

Cable shall either singlemode or multimode as designated or Owner approved equal. It shall be used to extend the Campus LAN from building to building. All fiber optic cable shall meet/exceed Gigabit Ethernet standards as set forth in IEEE 802.3z

B. Cable Pathway

Extension of all data and voice cables shall be within the Campus Telecommunication ductbank. Upon entering a building no more than 50 feet of exposed cabling is allowed as per NFPA and NEC. Cabling lengths in excess of 50 feet must be run in EMT conduit. All riser fiber optic cabling must either be plenum rated or run in EMT conduit.

C. Hardware

Required hardware includes, but is not limited to, terminating LIU's/LDS's and/or Fiber optic terminating enclosures, fastening devices, and associated transition connections.

1.10 GROUNDING AND BONDING

Communication bonding and grounding shall be in accordance with the NEC and NFPA. All terminating LIU's/LDS's and/or Fiber optic terminating enclosures must be grounded whether wall mounted or rack mounted. Provide telecommunications bonding utilizing a #6-AWG or larger bonding conductor that provides direct bonding to the furnished ground plate located in each telecommunication room.

1.11 WARRANTY

A fifteen-(15) year Extended Product Warranty and System Assurance Warranty for this wiring system shall be provided.

A. Extended Product Warranty

The Extended Product Warranty shall ensure against product defects, that all approved fiber optic cabling components exceed the specifications of TIA/EIA 568A and ISO/IEC IS 11801 for a fifteen (15) year period. The warranty shall apply to all passive structured communications components.

B. System Assurance

The System Assurance shall cover the failure of the cabling system to support the application which it was designed to support, as well as additional application(s) introduced in the future by recognized standards or user forums that use the TIA/EIA 568A or ISO/IEC IS 11801 component and link/channel specifications for cabling, for a fifteen (15) year period.

C. Extended Product Warranty

The Extended Product Warranty and the System Assurance shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective product(s).

D. System Certification

Upon completion of the installation and testing certification, the customer shall be provided with a numbered certificate, from the manufacturing company, registering the installation.

1.12 SPECIAL REQUIREMENTS FOR CABLE ROUTING AND INSTALLATION

A. Cabling

All communications cabling used throughout this project shall comply with the requirements as outlined in the National Electric Code (NEC) article 760 and the appropriate local codes. All cabling shall bear CMP (Plenum Rated), CM/CMR (Riser Rated) and/or appropriate markings for the environment in which they are installed

B. Fire Stopping Sealing of openings between floors, through rated fire and smoke walls, existing or created by the contractor for cable pass through shall be the responsibility of the contractor. Sealing material and application of this material shall be accomplished in such a manner, which is acceptable to the local fire and building authorities having jurisdiction over this work. Creation of such openings as are necessary for cable passage between locations as shown on the drawings shall be the responsibility of the contractor's work. Any openings created by or for the contractor and left unused shall also be sealed as part of this work.

C. Contractor Responsibility

The contractor shall be responsible for damage to any surfaces or work disrupted as a result of his work. Repair of surfaces, including painting, shall be included as necessary. Damaged ceiling tiles shall be replaced with identical materials.

1.13 WORK EXTERNAL TO THE BUILDING

The provisions of this specification and the applicable details as shown on the drawings shall govern any work external to the confines of this building.

1.14 SYSTEM DESCRIPTION

The system shall utilize a network of fiber optic cables and the associated fiber optic patching. Cables and terminations shall be provided and located as shown and in the quantities indicated on the drawings. Fiber cables shall terminate in LIU's, and/or modular patch panels located in all demarcation and termination points shown on the drawings. All cables and terminations shall be identified at all locations. All cables shall be terminated in an alphanumeric sequence at all termination locations. Available and unused pairs shall be terminated and identified as spare at each location.

PART 2 - PRODUCTS

2.1 EQUIVALENT PRODUCTS

Equivalent product(s) may be considered for substitution for those products specified, however, the Owner must approve the equivalent product(s) and the contractor must show demonstrated and documented equivalence to the product(s) specified in performance and warranty. The request for product substitution, and supporting documentation, must be submitted, in writing, prior to submitting the bid. Written approval for product substitution from the Owner must be submitted with the bid.

2.2 EMT CONDUIT

Electrical metallic tubing shall be installed as indicated on single line diagrams of the contract drawings. Metal flex conduit must be pre-approved by the Owner, based upon the scope of work. No section of conduit shall be longer than 100 ft., contain more than two 90-degree bends between pull points, or pull boxes. The inside radius of a bend in

conduit shall be 10 times the internal diameter. When conduit is greater than 2 inches, the inside radius shall be at least 10 times the internal diameter of the conduit. Conduit shall be sized as per EIA/TIA-569 Table 4.4-1. Pull boxes shall be sized as per EIA/TIA-569 4.42.6.4. All conduits shall be marked 10' on center with blue paint. Plastic bushings shall be installed at each end of the conduit terminations and in all junction boxes.

2.3 FIBER OPTIC CABLING

Fiber optic cabling shall be provided between facilities and furnished with the quantity and type of fibers as designated on the contract drawings. All fiber optic cabling shall meet/exceed Gigabit Ethernet standards as set forth in IEEE 802.3z.

All fibers in a cable run shall be from the same manufacturer and shall be the same type. A mix of fibers from different manufacturers may not be used without written permission

A. MULTIMODE FIBER OPTIC CABLING

All fiber optic cables indicated to be multimode, outside plant, shall be graded-index fibers with 62.5-micron cores only.

Fibers must comply with EIA/TIA 492 specifications and ISO/IEC DIS 11801 standards.

Fibers will have dual wavelength capability; transmitting at 850 and 1300nm ranges.

All fibers shall be color coded to facilitate individual fiber identification. Fibers will have D-LUX[®] coating or approved equivalent to ensure color retention, minimize microbending losses and improve handling. The coating shall be mechanically strippable.

No metallic stiffening allowed in the fiber optic cable.

Core	62.5 $\mu\text{m} \pm 3 \mu\text{m}$
Core Non-Circularity:	<6%
Core/Cladding Concentricity Error:	<3.0 μm
Numerical Aperture:	0.275 ± 0.015
Cladding diameter:	125 $\mu\text{m} \pm 1 \mu\text{m}$
Cladding Non-Circularity:	<2.0%
Colored Fiber Diameter:	250 $\mu\text{m} \pm 15 \mu\text{m}$
Buffering Diameter:	890 mm ± 50 mm
Minimum Tensile Strength:	100,000 psi
Fiber Minimum Bending Radius:	.75 in. (1.91 cm)
Cable Minimum Bending Radius: During Installation: After Installation:	20 times cable diameter 10 times cable diameter
Operating Temp. Range:	32°F to 122°F (0°C to 50°C)
Storage Temp. Range:	-40°F to 149°F (-40°C to 65°C)
Maximum Fiber Loss:	3.4 dB/km at 850 nm (typical range 2.8 to 3.4 dB/km) 1.0 dB/km at 1300 nm (typical range 0.5 to 1.0 dB/km)
Minimum Bandwidth:	200 MHz at 850 nm 500 MHz at 1300 nm

B. Sheath Construction:

Outside Plant Cables: Non-metallic Express Entry (DNX)

Building Cables: Plenum Rated, Riser Rated

1. Design Selection - Outside Plant

Lucent Technologies 3DNX-nnn-HXM (multimode) or approved equal

2. Design Selection - Inside Building:

a. Plenum: Lucent Technologies ACCUMAX® LGBC-nnnD-LPX (multimode) or approved equal

b. Riser: Lucent Technologies ACCUMAX® LGBC-nnnD-LRX (multimode) or approved equal

3. Fan-out Kits: All loose tube, filled cables shall be provided with fan-out kits at each termination point

C. SINGLEMODE FIBER OPTIC CABLING

All fiber optic cables indicated to be singlemode shall be graded-index fibers with 8.3-micron cores only.

Fibers must comply with EIA/TIA 492 specifications, ISO/IEC DIS 11801

Standards, and Gigabit Ethernet Standards as set forth in IEEE 802.3z.

Fibers will have dual wavelength capability; transmitting at 1310 and 1550 nm ranges.

All fibers shall be color coded to facilitate individual fiber identification. Fibers will have D-LUX[®] coating or approved equivalent to ensure color retention, minimize microbending losses and improve handling. The coating shall be mechanically strippable.

No metallic stiffening allowed in the fiber optic cable.

Core	8.3 $\mu\text{m} \pm 3 \mu\text{m}$
Clad Non-Circularity:	<1%
Core/Cladding Concentricity Error:	<0.8 μm
Numerical Aperture:	0.275 \pm 0.015
Cladding diameter:	125 $\mu\text{m} \pm 1 \mu\text{m}$
Cladding Non-Circularity:	<2.0%
Colored Fiber Diameter:	250 $\mu\text{m} \pm 15 \mu\text{m}$
Buffering Diameter:	890 $\mu\text{m} \pm 50 \mu\text{m}$
Tensile Load Rating:	600 lb.
Fiber Minimum Bending Radius:	.75 in. (1.91 cm)
Cable Minimum Bending Radius: During Installation: After Installation:	20 times cable diameter 10 times cable diameter
Operating Temp. Range:	-40°F to 158°F (0°C to 50°C)
Storage Temp. Range:	-40°F to 149°F (-40°C to 65°C)
Fiber Curl	> 2 meters
Attenuation:	0.40 dB/km @ 1310 nm 0.30 dB/km @ 1550 nm

D. Sheath Construction:

Outside Plant Cables: Non-metallic Express Entry (DNX)

1. Design Selection - Outside Plant
2. Underground, buried, OSP

Lucent Technologies 4DNX-*nnn*-BXD (singlemode) or approved equal

E. Fan-out Kits:

All loose tube, filled cables shall be provided with fan-out kits at each termination point.

2.4 FIBER PATCH PANELS

A. Lightguide Interconnection Unit (LIU), fiber optic terminating enclosure or approved equal

Please note that LIU (Lightguide Interconnection Unit) is being used as a generic description and not to be construed as an endorsement by UWF for a particular brand or manufacturer. For the purposed of this document (unless otherwise specified), the term LIU will be used to define fiber optic terminating enclosures in a wall mounted capacity.

Provide and install wall mounted LIU (fiber optic terminating enclosure) as indicated on the contract drawings. Bond cabinet to telecommunication room ground with #6 AWG green insulated copper wire. The LIU shall be wall-mounted as indicated on drawings and shall be manufactured by Corning WCH-12p (preferred if space permits) and/or Corning WCH 06p for wall mounting, or approved equal, Color: Black

1. The LIU shall provide cross-connect, inter-connect, and splicing capabilities and include support hardware to properly terminate and ground the cables, routing the fibers and jumpers and mount splices in a wall field.
2. The LIU shall have connector panels that snap into the side of the module and accommodate ST connectors.
3. The LIU shall provide terminating, cross-connecting or interconnecting capability of 96 fibers. The units may be stacked to provide additional fiber termination capacity.
4. The LIU shall be UL approved.
5. The manufacturer must be ISO 9001 certified.

B. Fiber Patch Panels - Lightguide Distribution Shelves (LDS)

Please note that LDS (Lightguide Distribution Shelves) is being used as a generic description and not to be construed as an endorsement by UWF for a particular brand or manufacturer. For the purposed of this document (unless otherwise specified), the term LDS will be used to define fiber optic terminating enclosures in a rack/shelf mounted capacity.

Provide and install a shelf mounted Lightguide Distribution Shelf (LDS) as indicated on contract drawings. LDS shall be manufactured by Corning, model numbers cch-01u for 48 ends, cch-02u for up to 96 ends, cch-03u for up to 144 ends, or approved equal.

1. The LDS shall be rack mountable. The units must fit into a 19" frame arrangement.
2. The LDS shall consist of a modular enclosure with front and rear accesses and be fully administered from the front or rear.
3. The LDS shall have a translucent, removable cover over the connector panels and connector panels that snap into the front of the shelf and accommodate ST connectors.
4. The LDS shall provide terminating capability of 24, 48, 72, 144 or 216 fibers.
5. The manufacturer must be ISO 9001 certified.

C. Labeling

1. All installed LIU's (Fiber Terminating Enclosures) shall have the following information displayed on the exterior door/lid
 - a) Point of Origin (Bldg Number)
 - b) Destination (Bldg Number)
 - c) Type of Fiber (Single Mode and/or MultiMode)
 - d) Fiber Count
2. The inside of the LIU (Fiber Terminating Enclosure) shall have the following information displayed on the interior door/lid and by each row of terminations
 - a) Each row of terminations shall be designated by a letter (alpha character A, B, C...)
 - b) Each termination within a row shall be designated by a number (1, 2, 3...)

2.5 FIBER PATCH CORDS

Provide fiber patch cords in the lengths and quantities indicated on the drawings. The patch cords shall consist of buffered, graded-index fiber with a 62.5-micron core and a 125-micron cladding for multimode. Aramid yarn and a jacket of flame-retardant PVC shall cover the fiber cladding. The connector shall be a multimode ST II as manufactured by AT&T or approved equal.

A. MultiMode Fiber Patch Cord

Specifications:

- Mated Connector Loss: $\mu = 0.3$ dB, $\sigma = 0.2$ dB
- Operating temperature: -4° to 158° F (-20 to 70° C)
- Cable Retention: 50-lb. (220 N) minimum
- Connection Repeatability: 0.20 dB maximum change per 100 reconnects
- Mating Coupler: ST II: 2000A1
- Operating temperature: -4° to 158° F (-20 to 70° C)
- ISO 9001 Certified Manufacturer

B. SingleMode, Single Fiber Jumper Cordage

Specifications:

- SingleMode 8.3 um. core
- 125 um. cladding
- 250 um. coating
- 900 um buffering
- Number of fibers 1
- Buffered fiber minimum bend radius 0.75 in.
- ST connectors shall be field installed and tested.
- Maximum fiber loss 0.4 dB/km. And 0.3 dB/km.

2.6 FIBER OPTIC CONNECTORS

MultiMode Fiber Optic Connectors

Provide a field installable multimode ST connector to terminate fiber optic cables from cable-to-cable, cable-to-equipment or equipment-to-equipment, and to make jumpers.

The connector must:

- Be field installable. Capable of mounting on either 0.9 mm buffered fiber or on 3.0 mm cordage.
- Utilize a PC polishing on the tip to provide high yield during installation.
- Meet EIA and IEC standards for repeatability.
- Have a locking feature to the coupler and assure non-optical disconnect.

The optical connectors shall meet or exceed the following specifications:

Specification	ST® mm
Loss (dB)	$\mu = 0.3$ $\sigma = 0.2$
Fiber OD	125 μm
Cable OD	2.4 / 3.0 mm
Loss Repeat (per 1,000 reconnects)	<0.2 dB
Axial Load, min.	35 lb. (15.9 kg)
Temp. Stability	-40°C to 85°C
Tip Material	Ceramic
Cap Material	Zamak #5
Body Material	Zamak #5

SingleMode Fiber Optic Connectors

As above, utilizing a ST connector designed to terminate singlemode fiber.

2.7 UNSPECIFIED EQUIPMENT AND MATERIAL

Any item of equipment or material not specifically addressed on the drawings or in this document and required providing a complete and functional fiber optic installation shall be provided in a level of quality consistent with other specified items.

2.8 GROUNDING SYSTEM AND CONDUCTORS

The Contractor shall provide a #6 AWG green insulated stranded copper wire cable between ground bars located in each telecommunication room and the furnished and installed equipment. This ground conductor shall be utilized for equipment, termination, rack and computer equipment grounding. Ground bars are provided in each telecommunications areas and are not part of this work

A. Bonding and Grounding

Communication bonding and grounding shall be in accordance with the NEC and NFPA. Horizontal cables shall be grounded in compliance with ANSI/NFPA 70 and local requirements and practices. Horizontal equipment includes cross connect

frames, patch panels and racks, active telecommunication equipment and test apparatus and equipment.

B. Telecommunications Bonding Backbone

A Telecommunications Bonding Backbone utilizing a #6-AWG, green insulated or larger bonding conductor that provides direct bonding between equipment and telecommunications closet bonding plate is to be furnished under this specification. This is part of the grounding and bonding infrastructure of the building and is independent of equipment or cable.

2.9 CABLE MANAGEMENT PRODUCTS

A. Inner Duct

Inner duct shall be ribbed, standard orange, and shall be AT&T Pyramid, Carlon, or approved equal. Innerduct shall be sized to allow maximum utilization of the manhole free areas. Multi-channel Inner duct may be utilized based upon the nature and complexity of the scope of work and must be pre-approved in writing by The Owner.

PART 3 - EXECUTION

3.0 WORKMANSHIP

Components of the fiber optic system shall be installed in a neat, workmanlike manner. Wiring color codes shall be strictly observed and terminations shall be uniform throughout the system. Identification markings and systems shall be uniform. TIA/EIA 568A wiring codes as shown on the drawings shall standardize all fiber optic cabling.

3.2 FIRE AND SMOKE PARTITION PENETRATIONS

Conduit sleeves shall be provided as a means of routing cables between various telecommunications rooms and multi floor buildings. Openings in sleeves and conduits used for the cables and those, which remain (empty) spare, shall be sealed with an approved fireproof, removable safing material. Sleeves, which pass vertically from floor to floor, shall be sealed in a similar manner using an approved re-enterable system. Additional penetrations through rated assemblies necessary for passage of cabling shall be made using an approved method and permanently sealed after installation of cables.

3.5 TESTING FIBER OPTIC CABLE

A. Testing Requirements

Each strand in fiber optic cables shall be tested for correctness of termination and overall transmission loss using an approved fiber optic transmission loss test instrument (OTDR) or Optical Loss Test Set (OLTS). The system loss measurements shall be provided at 850 and 1310 nanometers for multimode fibers and 1310 and 1550 for single mode fibers, of the completed installation.

B. Documentation

1. A certification report shall be provided listing the test results and both the calculated and measure loss for each fiber. The report shall be submitted with the test results as called for above.
2. As-built drawings shall be provided which indicate accurately all approved changes, labeling, actual device mounting locations, and all pertinent graphical information necessary to facilitate system administration, maintenance, and future moves. Contract drawings shall be furnished to the contractor on 3-½ inch diskette, using the latest Auto-Cad release and shall be returned, revised to reflect as-built conditions using the same format. The as-built drawing shall be returned no less than five (5) working days from the substantial completion of the project. Three sets of “as built” drawings shall be provided and one 3 ½ inch diskette or CD in the Auto-Cad drawing format.

3.6 INSPECTION

The Project Manager and/or the Installation Supervisor shall perform on-going inspections during construction. All work shall be performed in a high quality manner and the overall appearance shall be clean, neat and orderly. The following points will be examined and must be fully complied with:

1. Is the design documentation complete? Are all cables properly labeled, from end-to-end?
2. Have all terminated cables been properly tested in accordance with the specifications?
3. Is the cable type suitable for its pathway?
4. Have the pathway manufacturer's guidelines been followed? Are all cable penetrations installed properly and fire stopped according to code?
5. Have the Contractors avoided excessive cable bending?
6. Have potential EMI and RFI sources been considered?

7. Is Cable Fill Correct?
8. Are telecommunications closet terminations compatible with applications equipment?
9. Are identification markings uniform, permanent and readable?

**SECTION 16741
STRUCTURED TELECOMMUNICATIONS
CABLING SYSTEMS**

**May 2001
DT971PREMIS.DOC
Revision A January 2002
Revision B March 2003
Revision C February 2005
Revision D May 2006
Revision November 2010**

GENERAL

1.0 SCOPE OF WORK

- A. The work awarded will consist of all materials, equipment, and labor necessary to install, test, and certify a “Structured Cabling System” or portions of at various sites on the main campus and affiliated sites of The University of West Florida. Fiber optic cabling is described and awarded under a separate specification. It is the intent of this institution to award a “Term Contract” for a described period utilizing the furnished unit prices to the successful contractor who meets the requirements of this specification for all voice, data, and video cabling.
- B. Contractors are advised that they may be required to work with the selected contractors on major construction projects. The telecommunications contractor shall work in harmony with all contractors of major construction and will be held accountable for their workmanship and any damages caused by installation such as, but not limited to, ceiling tiles and finished portions of such structures. Site visitations and inspections are encouraged to familiarize contractors with the projects as directed; appointments may be arranged by calling either Architectural Engineering Services or Telecommunications.
- C. The contractor will be responsible for making every effort to retain all existing services and shall present a plan to perform the exchange of services with a minimum of interruptions to the services. Contractor shall be responsible for the removal of **all** unused and abandoned voice/data/video cabling once the new services are installed and functioning as specified.
- D. The structured cabling for this award includes all communications cabling, wireways, communications outlets, terminal blocks, racks, patchcords, cabinets, splitters, surge protectors, connectors, mounting hardware, identification devices, accessories, and appurtenances for the EIA/TIA Category 6 data cabling system / telecom cabling system. The contractors on staff Registered Communications Distribution Designer (R.C.D.D) shall provide design review services prior to the installation and execution of contracted work. A written review report of the proposed work shall be furnished to the University project manager along with a formal quotation to perform the proposed work utilizing the furnished unit pricing for this contract.

- E. The contractor is advised that all quotations submitted will be carefully scrutinized for accuracy. The requirement for an on-staff R.C.D.D. will be determined and authorized by UWF Telecommunications based upon the nature and complexity of the scope of work.
- F. Provide a complete telecommunications system, fully operational and ready for the occupants to use. The General Meters “One Card System” and CATV/video shall be fully operational also. The installation shall include all accessories, devices, and cutover from the campus PBX to provide a complete and functioning system. Any materials and devices not specifically mentioned in these specifications or indicated on the contract drawings that are required for a finished and operating system shall be furnished and installed at no additional cost to the owner.

1.1 REFERENCES/STANDARDS

- A. Electronic Industries Association/Telecommunications Industry Association (EIA/TIA) 568A-Commercial Building Telecommunications Wiring Standards.
- B. EIA/TIA-569-Commercial Building Standard for Telecommunications Pathways and Spaces.
- C. EIA/TIA-TSB-67-and 95 Transmission Performance Specifications for Field Testing of Unshielded. Twisted Pair Cabling Systems, October 1995.
- D. EIA/TIA-72-Centralized Optical Fiber Cabling Guidelines, October 1995.
- E. EIA/TIA PN-3398 (Cabling practices for Open Offices), March 7, 1995.
- F. International Standards Organization/International Electro Technical Commission (ISO/IEC) DIS 11801, January 6, 1994.
- G. Underwriters Laboratories (UL®) Cable Certification and Follow Up Program.
- H. National Electrical Manufacturers Association (NEMA).
- I. American Society for Testing Materials (ASTM).
- J. National Fire Protection Association, Latest Edition, NFPA 70, 101
- K. National Electric Code (NEC®).
- L. Institute of Electrical and Electronic Engineers (IEEE).
- M. SCTE Society of Cable Television Engineers
- N. American National Standards Institute (ANSI) X3T9.5 Requirements for UTP at 155 Mbps.
- O. Building Industry Consulting Service International (BICSI) Telecommunications Association.
- P. F.C.C. Rules, Part 76

1.2 SUBMITTALS

A. Provisioning Section

Provide to the Project Manager submittals that shall include all items called for in this section and manufacturer's cut sheets for the following:

1. All wire and cable.
2. All connectors and required tooling.
3. All termination system components for each cable type.
4. All ER and TC equipment frame types and hardware.
5. All grounding and surge suppression system components.

B. Product Data

Provide manufacturer's catalog information showing dimensions, colors, and configurations.

C. Manufacturer's Instructions

1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.
2. Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.
3. A technical data sheet from the cable manufacture should be included with the response for each brand of cable proposed. This data sheet shall include the physical cable specifications as well as the following electrical and transmission characteristics:
 - a. Mutual Capacitance
 - b. Impedance
 - c. DC Resistance
 - d. Attenuation
 - e. Worst Pair-to-Pair Near End Crosstalk
 - f. Error free Transmission Rates with up to 100 workstations

D. Factory Test

Vendor shall submit all factory test information prior to installation to the Project Manager. If equivalent product(s) are substituted, the equivalent product(s) must show demonstrated and documented equivalence to the product(s) specified.

E. Material Guarantee

The wiring vendor (installer) shall guarantee at the time of the bid that all Category 6 cabling and components meet or exceed specifications (including installation) of TIA/EIA-568B and 569.

F. Material Provided

Vendor shall be certain that all correct parts are ordered and installed. Vendor shall submit complete parts and part numbers prior to installation of equipment to the Project Manager.

1.3 MANUFACTURER'S QUALIFICATIONS

Manufacture

The company specializing in manufacturing products specified in this Section with a minimum of seven (7) year's experience and shall be ISO 9001 Certified.

1.4 CONTRACTOR'S QUALIFICATIONS

Contractor

The contractor selected to provide the installation of this system shall be certified by the manufacturing company in all aspects of design, installation and testing of the products described herein, and has a minimum of five (5) years experience on similar premises cabling systems. Indicate whether the contractor is a certified Value Added Reseller of the product manufacturer. Criteria for contractor's qualifications stipulated in 1.4 (A), (B), (C), will be determined and authorized by UWF Telecommunications based upon the complexity and nature of the scope of work.

A. Contractor Selection

The contractor selected for this Project must be certified by the manufacturer of the products, adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels in provisioning this Project.

B. Contractor Experience and Training

The contractor shall be experienced in all aspects of this work and shall be required to demonstrate direct experience on recent systems of similar type and size. The contractor shall own and maintain tools and equipment necessary for successful installation and testing of optical and Category 6 metallic premise distribution systems and have personnel who are adequately trained in the use of such tools and equipment.

C. Contractor Resume

A resume of qualification shall be submitted with the Contractor's proposal indicating the following:

1. A list of recently completed projects of similar type and size with contact names and telephone numbers for each.
2. A list of test equipment proposed for use in verifying the installed integrity of metallic and fiber optic cable systems on this project.
3. A technical resume of experience for the contractor's Project Manager and on-site installation supervisor who will be assigned to this project. The Project Manager shall hold a current BICSI R.C.D.D. Registration and the Installation Supervisor shall possess a current BICSI Cabling Installation Registration.
4. A list of technical product training attended by the contractor's personnel that will install the premises wiring system shall be submitted with the response.
5. Any sub-Contractor, who will assist the wiring contractor in the execution of this contracted work, shall be indicated to the owner at time of award.

1.5 CABLING AND BASIC REQUIREMENTS

A. Cable

Cable shall be category 6 unshielded twisted pair (UTP) rated for non-plenum installation that is extended from the network switch location and voice server to the data and voice outlets located at end user points.

B. Cable Pathway

Extension of all data and voice cables shall be within raceway, conduit, cable tray or other designated cable delivery system provided and installed by the contractor where concealed in walls and exposed above ceilings in plenum spaces.

C. Hardware

Required hardware includes, but is not limited to, termination blocks, fastening devices, data outlets, voice outlets and all required accessories to comply with this specification.

D. Communications Rooms

Communications Rooms for new construction shall be at least 10' x 10' to allow for proper equipment placement and Fire Code Clearance issues.

1.7 GROUNDING AND BONDING

All grounding and bonding shall meet the National Electrical Code (NEC) as well as local codes, which specify additional grounding and/or bonding requirements.

Bonding and Grounding

Communication bonding and grounding shall be in accordance with the NEC and NFPA. Horizontal cables shall be grounded in compliance with ANSI/NFPA 70 and local requirements and practices. Horizontal equipment includes cross connect frames, patch panels and racks, active telecommunication equipment and test apparatus and equipment.

Provide all telecommunications equipment bonding utilizing a #6-AWG or larger bonding conductor that provides direct bonding between equipment rooms and telecommunications closets back to the building ground.

1.8 WARRANTY

A fifteen (15) year Extended Product Warranty and System Assurance Warranty for this wiring system shall be provided.

A. Extended Product Warranty

The Extended Product Warranty shall ensure against product defects and that all approved cabling components exceed the specifications of TIA/EIA 568B and ISO/IEC IS 11801. The warranty shall also guarantee that the wiring system will exceed all requirements of TIA/EIA TSB 67, TIA/EIA TSB95 and ISO/IEC IS 11801 for cabling links/channels, and that the installation is warranted for a fifteen (15) year period. This warranty shall apply to all passive SCS components.

B. System Assurance

The System Assurance shall cover the failure of the wiring system to support the application which it was designed to support, as well as additional application(s) introduced in the future by recognized standards or user forums that use the TIA/EIA 568A or ISO/IEC IS 11801 component and link/channel specifications for cabling, for a fifteen (15) year period.

C. Extended Product Warranty

The Extended Product Warranty and the System Assurance shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective product(s).

D. System Certification

Upon successful completion of the installation and subsequent inspection, the customer shall be provided with a numbered certificate, from the manufacturing company, registering the installation.

1.9 DESCRIPTION**A. Structured Cabling System**

Furnish and install complete with all accessories a Structured Cabling System (SCS) wiring system. The SCS system shall serve as a vehicle for transport of data, video and voice telephony signals throughout the network from designated demarcation points to outlets located at various desks, workstation and other locations as indicated on the contract drawings and described herein.

B. Campus Telephone Connectivity

Wiring utilized for telephone voice service shall originate at owner furnished, contractor installed Siemens Telephone PBX System RCM (remote control module). Twenty-five pair Cat 6 50 pin Telco connector with gold plated contacts, gender to suit both block connectors and RCM connectors shall be provided and installed by the contractor as indicated on the contract drawings. The cross connect field shall be installed and terminated as indicated on the provided cross connect schedule. From the backbone blocks of the cross connect field, 25 pair Cat 6 cabling with 50 pin Telco connectors shall be provided and installed terminating on rack mounted pre wired voice patch panels, Cat 6, with (48) eight pin modular jacks.

C. Data and Voice

Wiring utilized for data and voice communications shall originate at owner provided switches in vertical free standing equipment racks, and/or enclosed wall mounted vertical equipment racks located in the Telecommunications Equipment Room (ER), the Main Cross-connect (MC), the Intermediate cross-connect (IC), and/or the Telecommunications Closet (TC) location(s). Wiring, terminations and patch bays between these designated demarcation points and outlet locations designated on the plans shall be considered part of the contact. Outlets (jacks) shall be furnished, wired and installed by the SCS system contractor. Outlets and patch panels shall be labeled IAW University specifications. (Reference section 1.10D2)

1.10 SPECIAL REQUIREMENTS FOR CABLE ROUTING AND INSTALLATION

A. Cabling

All communications cabling used throughout this project shall comply with the requirements as outlined in the National Electric Code (NEC) article 760 and the appropriate local codes. All cabling shall bear CMP (Plenum Rated), CM/CMR (Riser Rated) and/or appropriate markings for the environment in which they are installed.

B. Plenum Cable Bundling

IMPORTANT NOTE – This section is only applicable with previous written authorization from ITS/Networks and Telecommunications a.k.a. ITS/NAT.

In suspended ceiling and raised floor areas where duct, cable trays or conduit are not available, the Contractor shall bundle, in bundles of 50 or less, all cables every five (5) feet, between the “J” hooks. The cables shall be bundled utilizing Velcro wraps suitable for this installation and tensioned so as not to deform the cable geometry. The cable bundling shall be supported via "J" hooks attached to the existing building structure and framework at a maximum of five (5) foot intervals. Plenum rated cable will be used in all appropriate areas or as indicated on the contract documents. The contractor shall adhere to the manufacturers' requirements for bending radius and pulling tension of all data and voice cables.

C. Fire Stopping

Sealing of openings between floors, through rated fire and smoke walls, existing or created by the contractor for cable pass through shall be the responsibility of the contractor. Sealing material and application of this material shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work. Creation of such openings as are necessary for cable passage between locations as shown on the drawings shall be the responsibility of the contractor's work. Any openings created by or for the contractor and left unused shall also be sealed as part of this work.

D. Contractor Responsibility for Campus Voice Server Connectivity

- 1) Contractor shall be responsible for connectivity as described in 1.10 D, and damage to any surfaces or work disrupted as a result of his work. Repair of surfaces, including painting, shall be included as necessary. Damaged ceiling tiles shall be replaced with identical materials.
- 2) Cabling installed for voice service shall originate from owner furnished contractor installed Siemens RCM or IPDA shelf or shelves that are connected via 66 Blocks (if applicable). All 66 cross connect blocks shall be mounted on blue backboards with factory wiring spools (mounted on backboards) from end to end of Blue backboard on and/or bottom of backboards as required. See Figure 1 below. The 66 block cross connect field from the rack mounted patch panels to the backboard shall be installed and terminated to accommodate the maximum number of circuit cards in the shelf or shelves providing service as indicated on the drawings. 25 pair Cat 6 cabling shall be provided and installed from the 66 blocks terminating on rack mounted patch panels. Labeling for patch panels, cross connect blocks, protector blocks, etc. shall be engraved composite tags with the appropriate information listed on the tag.

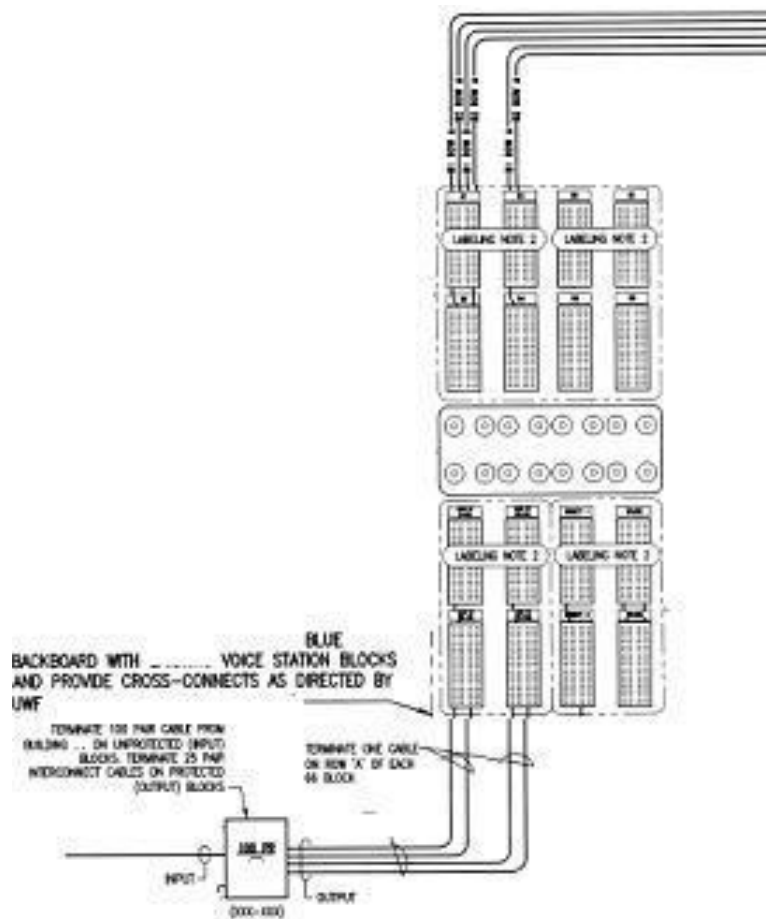


Figure 1

- 3) Patch panel and cross connect block requirements for communications cabling providing service for any location is as follows;

All cross connect blocks shall be mounted on blue backboards with factory wiring spools mounted on backboards from end to end on top and/or bottom of backboards as required. Labeling for cross connects blocks shall be installed over each backboard. Labeling for patch panels, cross connect blocks, protector blocks, etc. shall be engraved composite tags with the appropriate information listed on the tag. If service for one location is provided from another location via outside plant cabling 66 blocks shall be provided, installed, and cross connected for all pairs of the protector block(s) present at each location. See figure 1 above. If service is provided from within the location itself from an internal shelf or shelves 66 blocks shall be provided and installed as described in section 1.10 D for the maximum number of circuit cards for each shelf. Patch Panels installed in equipment racks shall be minimum 48 ports and shall have corresponding 66 blocks provided and installed as described in section 1.10 D, These blocks shall be located next to the service providing blocks. Cross connecting blocks extending service from one location to another shall have fifty percent of the service providing pairs terminated on SLMO circuit cards and fifty percent of the pairs terminated on SLMA circuit cards.

- 4) Telecommunications Structured Cabling Systems labeling for patch panels cross connect blocks and outlets shall be as follows:
- a) Patch panel port terminations for campus Voice Data and Video infrastructure shall be labeled as follows: Rack Number using numbers starting with 1,2,3...etc, on each individual Rack, starting with the highest placed patch panel to the lowest, an alpha character starting with A, B, C...etc, then use the factory labeled number for each port. Each patch panel port shall have the corresponding room number served underneath each port. Labeling for patch panels, cross connect blocks, protector blocks, etc. shall be engraved composite tags with the appropriate information listed on the tag. Labeling at branch locations shall follow either the termination schedule established at each location or default to the university's labeling scheme as defined in section 16741 1.10 D. of the University Design and Constructions Standards.
 - b) Cross connect blocks allocated for SLMA or SLMO port equipment circuit cards for the campus PBX or Remote Communication Modules (RCMs) the numbering shall be 0-23 for a total of twenty four (24) pairs beginning with the first pair unless otherwise specified. Labeling for patch panels, cross connect blocks, protector blocks, etc. shall be engraved composite tags with the appropriate information listed on the tag. All circuit protector blocks shall be labeled with distribution pair count and point of origin, i.e. equipment, building or company providing service, point of termination, and local distribution pair count to coincide with site location and numbering scheme. All cross connect blocks shall be mounted on blue backboards with factory wiring spools mounted on backboards from end to end on top and/or bottom of backboards as required. Labeling for cross connects blocks shall be installed over each backboard.
 - c) Outlet terminations for Voice, Data and Video infrastructure, with the exception of the campus identification card system (Nautilus Card), shall be labeled as follows: XXX-X-X-XX (From left to right), Communications Equipment Room Number XXX, Rack Number X, Patch Panel Letter X, Port Number XX (Labeling shall be permanently affixed to the terminated outlet faceplate or housing.)
- 5) General Meters campus identification card system (Nautilus Card)
- a) patch panels, cabling and outlets shall be installed and labeled as follows: Patch panel ports of origin shall be 110 type terminations EIA/TIA 568B configured and segregated from all other patch panels within the communications room. Each patch panel port shall have the corresponding room number served underneath each port. Labeling for patch panels, cross connect blocks, protector blocks, etc. shall be engraved composite tags with the appropriate information listed on the tag
 - b) Cabling shall be category 6 UTP terminated at the port of origin with a C-4 connector configured 568B.

- c) Outlets for the Nautilus Card System shall be Leviton 625B4, Screw type terminal modular wall jack, or Leviton 625B3 duplex wall jack or equivalent. Category 6 cable pairs blue and orange shall be terminated on pins 1 and 3 as follows. White/Blue and White/Orange terminate on pin 1 and Blue/White and Orange/White terminate on pin 3. Outlet face plates or housing shall contain the letter "N", the CER (communications equipment room) number, rack number (if applicable) and patch panel port number. All labeling shall be permanently affixed to the terminated outlet faceplate or housing, inside and outside.
- 6) Additional CER requirements are as follows;
- a) A minimum of four (4) four inch Schedule 80 PVC conduits shall be installed underneath the communications backboard one (1) conduit extending out in each direction (North, South, East, and West) from the outside edge of the foundation a minimum of two (2) feet.
- b) One D2 communications outlet installed forty eight (48) inches A.F.F.
- c) One twenty one (21) inch rack mountable aluminum shelf inverted and fastened to the backboard forty four (44) inches A.F.F. underneath and to left of the D2 outlet mentioned in (b) above. Location of outlet and shelf subject to availability.

Note: Patch panel and outlet labeling shall consist of a permanent label from a labeling machine. Permanent markers, pens or pencil shall not be permitted. Labeling at branch locations shall follow either the termination Schedule established at each location or default to the university's labeling scheme as defined in section 16741 1.10 D. of the University Design and Constructions Standards.

PART 2 - PRODUCTS

2.0 EQUIVALENT PRODUCTS

Equivalent product(s) may be considered for substitution for those products specified, however, the equivalent product(s) must be approved and show demonstrated and documented equivalence to the product(s) specified in performance and warranty. All like items of equipment and cabling shall be a standard product of the same manufacturer. **The request for product substitution, and supporting documentation, must be submitted, in writing, prior to submitting the bid** to the project manager. Written approval for product substitution from the project manager must be submitted with the bid.

2.1 OUTLETS

A. Outlets for Voice and Data:

Communications outlets shall consist of one, two, three or four gang utility outlet boxes and plates equipped with 8-pin modular (RJ-45) jacks, utilizing T568A wiring terminations. All outlet cabling shall terminate on termination blocks at their associated equipment rooms. Unless otherwise noted on the floor plans or within this document, all data wall outlets for 24 AWG copper cable shall be:

1. 8-position/ 8-conductor modular
2. Insulation displacement
3. Universal application/multivendor supportive accepting most phone and data plugs.
4. Faceplates shall be either ivory or white in color, as indicated on the contract drawings and labeled IAW university specifications. (Ref Sect. 1.10D2)
5. Provided with blank module inserts for all unused module locations. Jack module arrangement is shown on the drawings. Provide color-coded jacks at each outlet and patch panel with the following coloring identification:

Communications Cabling (Data & Voice) can be any color except Green

Only Nautilus = Green

B. Category 6 Outlets

All Category 6 outlets shall conform to TIA/EIA 568A Commercial Building Telecommunications Cabling Standard, Horizontal Cable Section, and shall meet or exceed the following electrical, mechanical and NEXT specifications:

Electrical Specifications:

- TIA/EIA 568A Category 6 minimum requirements
- Insulation resistance: 500 MW minimum
- Dielectric withstand voltage 1,000 VAC RMS, 60 Hz minimum, contact-to-contact and 1,500 VAC RMS, 60 Hz minimum from any contact to exposed conductive surface.
- Contact resistance: 20 mW maximum
- Current rating: 1.5 A at 68° F (20°C) per IEC Publication 512-3, Test 5b.
- Pair-to-pair NEXT (dB) @ 100 MHz:

Mechanical Performance:

- Plug Insertion Life: 750 insertions
- Contact Force: 3.5 oz. (99.2 g) minimum using FCC-Approved modular plug
- Plug Retention Force: 30-lb. (133 N) minimum between modular plug and jack
- Temperature Range: -40° to 150°F (-40° to 66°C)
- UL® Verified Category 6 Electrical Performance
- Comply with FCC Part 68
- ISO 9001 Certified Manufacturer

CABLING**Category 6 UTP, 4 pair**

1. Data cables shall be extended between the station location and its associated TC and consist of 4 pair, 24 gauge, UTP, and shall be terminated on the 8 pin modular jacks provided at each outlet. Cable jacket shall comply with Article 800 NEC for use as either a plenum or non-plenum cable as the project documentation indicates. The 4 pair UTP cable shall be UL® and Listed Type CMP (plenum) or CM (non-plenum).
2. All 4 pair Category 6 cables shall conform to TIA/EIA 568B Commercial Building Telecommunications Cabling Standard, Horizontal Cable Section. Applications standards supported should meet or exceed the electrical and mechanical specifications listed below:
 - DC resistance 28.6 Ω /1,000 ft (9.38 Ω /100 m), maximum
 - DC resistance Unbalance: 5%, maximum
 - Mutual Capacitance @ 1 kHz: 14pF/1000 ft. (4.6 nF/100m), maximum
 - Capacitance Unbalance (pair to ground): 400pF/1,000 ft. (131.2 pF/100m)
 - Characteristic Impedance: 100 Ω \pm 15 Ω from 1-100 MHz
 - Outside diameter: .21 in
 - Weight: 21.6 lb/1000 ft.
 - Worst Pair Attenuation, dB/100m [328 ft.]:

Environmental:

- Storage temperature: 68° F to 122° F (20° C to 50° C)
- Installation Temperature: 32° F to 122° F (0° C to 50° C)
- Operating Temperature: -4° F to 140° F (-20° C to 60° C)

UL® Verified for Category 6 Electrical Performance

UL® and c (UL®) Listed for Fire Safety

ISO 9001 Certified Manufacturer

Category 6, UTP, 25 pair

1. All 25 pair, Plenum and Non-plenum Category 6 cables shall be composed of 24 AWG bare solid copper conductors insulated with a suitable plastic dielectric material. The insulated conductors shall be twisted into pairs, and stranded into mini-units. The cable shall employ a honeycomb core construction, consisting of multiple three and four pair tightly stranded sub-units. A total of seven unjacketed sub-units (six around one) will be stranded to comprise the cable core. All 25 PAIR, Category 6 cables shall conform to TIA/EIA 568A Commercial Building Telecommunications Cabling Standard, Backbone Cable Section.
2. The cable shall be capable of mixing any number of the following standard compliant signals with each other in the same 25 pair cable: 1 Mb/s, 1BASE5, 4 Mb/s Active Token Ring, 10 Mb/s 10BASET, and 16 Mb/s Active Token Ring. When mixing multiple dissimilar signals, the 25 pair Category 6 cable must support distances up to 100 meters. In addition, cables shall also be capable of supporting applications such as 155 Mbps ATM and shall meet or exceed the Electrical Specifications listed below:

Electrical Specifications:

- Nominal Mutual Capacitance: 14pF/ft (46pF/m)
- Characteristic Impedance (1-100 MHz): $100\Omega \pm 15\Omega$
- Maximum DC resistance 28.6 Ω /1,000 ft. (9.40 Ω /100m)
- Worst Pair Attenuation (dB/100m [328 ft.]):

Environmental:

- Storage temperature: 68° F to 122° F (20° C to 50° C)
- Installation Temperature: 32° F to 122° F (0° C to 50° C)
- Operating Temperature: -4° F to 140° F (-20° C to 60° C)

UL® Verified for Category 6 Electrical Performance

UL® and c (UL®) Listed for Fire Safety

ISO 9001 Certified Manufacturer

Video Cabling, Accessories, and Connectors

1. RG-6 and Rg-11 coax should have 100% shield (foil) and more than 50% braid, Belden 9116 or equivalent. (Which is 61% braid.) “F” Connectors should be crimp-type. No external power shall be required. Adapters must meet the following electrical specifications:

Electrical Specifications:

Bandwidth: 450MHz or higher

Input Impedance: 75 ohms

Output Impedance: 75 ohms

Insertion Loss: <3dB

Return Loss: <20dB

Common Mode Rejection: >40dB

Noise Figure: <12dB

Tested to FCC Rules and Regulations, Part 76

CISPR Pub. 22 for Class B

Classified by U.L. in accord with IEC Pub. 950

2. CATV/Video wall taps shall be Blonder Tongue, V-4897 or approved equal. Faceplate shall be standard electrical duplex plate, ivory or white in color.
3. CATV/Video cable splitters shall be for 2, 6, or 8 ports as indicated on drawings and shall be good to 900 MHz. Or better as manufactured by Blonder Tongue or approved equal.

D. 525 Category 6, 25 pair connector

1. The 525 Category 6, 25 pair connector will be used to terminate 25-pair Category-6 cables. The connector will be notched in the skirt to facilitate the use of keyed connectors on high-end LAN equipment preventing the possibility of connecting low-performing Category-3 cable assemblies to equipment designed to only work with Category-5 cable assemblies. Performance improvements shall be achieved without having to compromise backward compatibility with current Telco-type connectors. The 525 Category 6, 25 pair connector shall conform to TIA/EIA 568A Commercial Building Telecommunications Cabling Standard, Horizontal Cable Section. All 525 Category 6, 25 pair connectors shall be installed and tested by the manufacturer.
2. The connector will consist of three main parts - the mandrel, the housing, and the hood. Cable pair twists will be maintained up to the edge of the mandrel. The Category 6, 25 pair Cable Connector assemblies will consist of 25-pair 1061C or 2061C cable with a Category 6, 25 pair connector on one or both ends.

Mechanical Performance:

- Meets FCC Part 68 Subpart F and Industry Canada CS-03 Part 3 mating area dimensional requirements
- Contact plating in mating region: 30 μin Gold over 50 μin Nickel
- Operating temperature: -10°C to 60°C
- Insertion Life: 200 insertions Minimum
- Contact force: 100 grams minimum

Electrical Specifications:

- DC Resistance (maximum): 0.3 Ω
- Attenuation and Power Sum NEXT shall meet the requirements of TSB67 and TSB95

2.3 SURFACE RACEWAYS

Communication outlets that require surface mounting shall be mounted in non-metallic backboxes with surface raceways. Surface raceways are only allowed as indicated on contract drawings. Surface raceways may be omitted where access into existing walls is available. Backboxes shall be mounted at power receptacle height. Raceways shall be secured every 16 inches with screws and wall anchors. See drawings for detail of installation.

2.4 EMT CONDUIT

Electrical metallic tubing shall be installed as indicated on single line diagrams of the contract drawings. Metal flex conduit shall not be used without the written consent of the project manager. No section of conduit shall be longer than 100 ft. or contain more than two 90-degree bends between pull points or pull boxes. The inside radius of a bend in conduit shall be 6 times the internal diameter. When conduit is greater than 2 inches the inside radius shall be at least 10 times the internal diameter of the conduit. Any single conduit run extending from a telecommunication closet shall not serve more than three outlets. Conduit shall be sized as per EIA/TIA-569 Table 4.4-1. Pull boxes shall be sized as per EIA/TIA-569 4.42.6.4. All EMT connectors shall be compression type. All conduits shall be marked 10' on center with blue paint. Plastic bushings shall be installed at each end of the conduit terminations and in every junction box connection. Install 500-lb. pull-string in every conduit run.

2.5 EQUIPMENT RACKS

The telecommunications equipment room shall be equipped with either a wall mounted, swing gate, EIA/TIA standard, 19" hinged rack or a floor mounted EIA/TIA standard 19" rack as indicated on the contract drawings. Provide shelves and wire managers as indicated. Racks shall be manufactured by Chatsworth or approved equal.

A. Floor Mounted Single-sided Dimensions - 84 inches x 19 inches x 18 inches with 19 inch center mounting

Footprint	- 19 inches (length) x 18 inches (depth)
Hole pattern	- half-inch centered
Screw size	- 12-24 threads, half-inch length
Chatsworth Model	- 46383-503

Wall Mounted, Hinged, Single-sided Dimensions- 38.5 inches x 19 inches x 18 inches.

Hole pattern	- half-inch, centered
Screw size	- 12-24 threads, half-inch length
Chatsworth Model	- 11348-523

- B.** Where sufficient rack space is available on an existing EIA approved rack, the connections may be installed on the existing rack. The minimum rack size shall be a standard 19-inch rack with sufficient rack space to allow the Fiber Distribution Center (FDC) to be placed at the top of rack.
- C.** Racks shall be mounted on an isolation pad and utilize non-conductive washers to secure the rack to the floor. Floor mounted open racks shall be secured from the top rail to the backboard in the room with a length of cable runway to prevent movement. All racks shall be grounded to the isolated ground bar within the telecom room using a standard ground lug and #6 jacketed green cable. (See grounding requirements section of this specification).

2.6 PATCH PANELS AND CORDS**A. Patch Panels**

Two types of termination block shall be used, either a punch panel or a modular jack panel. The punch panel shall be in 100 pair or 300 pair modularity, whereas the modular jack panel shall be in 24, 48 and 96 port configurations as shown on the drawings. Modular jack panel installations shall contain a retaining trough between every 100 pair termination block. Modular Jack Panels shall be wired for T568A configuration. Patch Panels shall be labeled IAW University specifications. (Ref Section 1.10D2)

- The termination blocks shall have the following characteristics:

Wire Insulation Supported:

- Size: 0.05 inches Diameter Over Dielectric maximum for top of connecting block 0.07 inches Diameter Over Dielectric maximum for bottom of connecting block
- Types: All plastic insulants (including PVC, irradiated PVC, Polyethylene, Polypropylene, PTFE Polyurethane, Nylon, and Teflon)
- Termination Type: Insulation displacements, dry, gas tight

Wire Size Supported:

- Solid: Wire Ranges 22-26 AWG, Re-termination >200
- Stranded (7 Strands): Wire Ranges 22-26 AWG, Re-termination: >200
- Wire Insertion force :(24 AWG): 13-28 lb. (59-127 Newtons)
- Wire pullout force (24 AWG): 2.2 lb. (9.7 Newtons)
- Wire retention force (24 AWG): Horizontal 8 lb., Vertical 2 lb.

Density:

- Modular Jack Panel Type Hardware: 210-pairs/sq. ft.
- Punch Panel Type Hardware: 340-pairs/sq. ft.
- Design life: 30 years

Electrical Specifications:

- Dielectric Strength: 2.0k kVrms @ 60 Hz
- Capacitance Adjacent Contacts: < 1pF
- Insulation Resistance (@ 500V dc):

Environmental:

- Temperature range: Storage -40° to +70° C, Operational -10° to +70°C
 - Humidity: 95% Maximum
2. All blocks shall be UL Listed and Austel (Australian Standards Association) approved.
 3. Category 6 Modular Jack Panels shall be used when 8-pin modular plug ended cord administration is required.
 4. Designation strips for each jack shall be provided on the patch panel. All cables shall be terminated in numerical sequence and labeled as per the campus standard numbering for outlets.

B. Category 6 Modular Patch Cords

1. Provide Category 6 Modular Patch Cords for each assigned port on the patch panel. All cords shall conform to the requirements of EIA/TIA 568A Commercial Building Telecommunications Cabling Standard, Horizontal Cabling Section. Cords shall be equipped with an 8 pin modular connector on each end and shall conform to the length(s) specified on the detailed drawing. All patch cords shall be factory terminated and tested.
2. All Category 6 cordage shall be round, and consist of 24-AWG copper, stranded conductors, tightly twisted into individual pairs and shall meet or exceed the electrical specifications listed below:

Electrical Specifications:

- DC Resistance per lead: 9.4Ω/100m (328 ft), maximum
- DC resistance unbalance: 5%, Maximum
- Mutual Capacitance: 6.6 nF/100m (328 ft), maximum
- Characteristic Impedance 100Ω ± 15% from 1 to 100 MHz
- The Category 6 patch cord shall incorporate the "cross-over lead" concept.
- The patch cord shall have built-in exclusion features to prevent accidental polarity reversals and split pairs.

UL Verified for EIA/TIA 568A Electrical Performance

UL Listed for Fire Safety

ISO 9001 Certified Manufacturer

Austel Approved

FCC Compliant

2.7 VOICE CIRCUIT TERMINATIONS

Voice telecommunications closet locations shall be equipped with approved patch panels for termination of voice station and host cable pairs. Host cable block shall consist of a minimum 100 pair block, station field blocks shall be supplied as dictated by cable counts, in standard increments. All patch panels shall be securely fastened to the equipment racks.

Provide all required D-rings or other approved cable guides as required to provide a neat installation or indicated on contract drawings. Provide ladder racking as manufactured by Chatsworth or equivalent as indicated on drawings. All cables shall be terminated in numerical sequence.

1. Entry connection blocks for Bell RJ21X interface will be amphenol connected on the RJ21X end and terminated on a 66M125.
2. Full/Half backboard shall be 16 gauge mill galvanized steel metal backboard, baked blue polyester paint over primer with either 4 or 8 89 brackets that will accommodate either 4 or 8 66M blocks.
3. Back panel assemblies shall be Reliable Electric/Utility, Model #R187B-1, two white post panels riveted with 16 DP-1, or approved equal.

2.8 UNSPECIFIED EQUIPMENT AND MATERIAL

Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete and functional PDS installation shall be provided in a level of quality consistent with other specified items.

2.9 GROUNDING SYSTEM AND CONDUCTORS

The Contractor shall provide a green insulated #6 AWG stranded copper wire cable between ground bars located at each equipment room and all installed devices. The same type of ground conductor shall be utilized for equipment, termination, rack and hub equipment grounding.

A. Bonding and Grounding

Communication bonding and grounding shall be in accordance with the NEC and NFPA. Horizontal cables shall be grounded in compliance with ANSI/NFPA 70 and local requirements and practices. Horizontal equipment includes cross connect frames, patch panels and racks, active telecommunication equipment and test apparatus and equipment. A bonding plate with lugs is provided in every telecommunications room and closet and is not part of this work.

PART 3 - EXECUTION

3.0 WORKMANSHIP

Components of the premises wiring system shall be installed in a neat, workmanlike manner. Wiring color codes shall be strictly observed and terminations shall be uniform throughout the system. Identification markings and systems shall be uniform. TIA/EIA 568A wiring codes as shown on the drawings shall standardize all UTP wiring.

3.1 PROJECT/SITE CONDITIONS

Conditions of the projects will vary with each installation. Some of the buildings within the scope of this work will be occupied during this installation. Every consideration must be given to the building occupants. The project manager may require some work to be performed when the building is unoccupied. On new construction projects the installation may not begin until substantial completion has been declared.

3.2 SCHEDULING AND SEQUENCING

The contractor shall furnish a work schedule to the project manager clearly indicating the start of the work, duration, and after hours scheduling. Work may not proceed without the approval of the project manager.

3.3 SUPPORT AND ROUTING OF CABLES

- A. Station cables and tie cables installed within ceiling spaces shall be routed through these spaces at right angles to electrical power circuits and supported only from the structure. Riser and tie cables shall be extended between closets and equipment rooms utilizing the interfloor conduit sleeves.
- B. Use of ceiling tiles, grid or hanger wires for support of premises cables shall be prohibited.
- C. The system contractor shall install a complete set of supporting rings, hoods and other supporting hardware for this system as part of the contract. All supporting hardware shall be submitted to the engineer for approval prior to installation.

3.4 FIRE AND SMOKE PARTITION PENETRATIONS

Conduit sleeves shall be provided as a means of routing cables between various TC rooms and multi floor buildings. Openings in sleeves and conduits used for the premises wiring system cables and those, which remain (empty) spare, shall be sealed with an approved fireproof, removable safing material. Sleeves, which pass vertically from floor to floor, shall be sealed in a similar manner using an approved re-enterable system. Additional penetrations through rated assemblies necessary for passage of wiring shall be made using an approved method and permanently sealed after installation of cables.

3.5 INSTRUCTION OF OWNER

The contractor shall schedule a time to provide not less than two (2) hours of familiarization instruction to the Telecommunications and Data Departments support personnel. Training shall include a “walk-through” of the system for location and labeling orientation, a discussion of overall system concepts and configuration, specific instruction on system reconfiguration using patch cords in the telecom rooms and closets, a review of the as-built drawings, a review of the system testing and acceptance documentation and guidelines for basic troubleshooting of the structured cabling system. A person who is thoroughly familiar with the installation shall present the instruction in an organized and professional manner.

3.6 TESTING OF WIRING ACCURACY

A. Category 6 Testing

Each jack in each outlet shall be tested for Category 6, TSB 67 and TSB 95 compliance, using an appropriate testing instrument, to verify both the integrity of all conductors and correctness of the termination sequence. Testing shall be performed between modular jacks at the outlets and the modular jacks at the TC station field.

B. Documentation

Documentation of cable testing shall be required and the engineer shall be present during all tests. The SCS contractor shall provide a table of test results in a 3-ring binder submitted with the as-built drawings. The table shall include the following measurements for all voice/data station cables, backbone cables, and pairs:

Measurement	Basic Link Limit	Source
Wiremap	Continuity on all 8 wires, no shorts, breaks, crossovers, miswires	TSB67
Length	< 94 m (90 m plus 2 m test cords at each end)	TSB67
Attenuation	21.6 dB @ 100 MHz: (formula based)	TSB67
NEXT	29.3 dB @ 100 MHz: (formula based)	TSB67
Return Loss	1<f<20 MHz: 15 dB 20<f<100 MHz: 15-7 log (f/20)	TSB95
ELFEXT	> 17 – 20 log (f/100)	TSB95
PSELFEXT	> 14.4 – 20 log (f/100)	TSB95
Delay	< 510 ns at 10 MHz	TSB95
Delay Skew	< 45 ns	TSB95

1. The table shall indicate all defective pairs and test results of all pairs listed above. Cables not complying with EIA/TIA 568A Category 6 tests for 100 Mb/s rating or not passing TSB 67 and TSB 95 test guidelines shall be identified to the Project Manager for corrective action which may include replacement at no additional expense to the Owner.

3.7 MATERIAL DELIVERY, STORAGE AND CLEANUP

A. Delivery

No responsibility shall be assumed by the University's Central Receiving Department as to how or when materials are delivered, as this is the responsibility of the awarded contractor. The contractor shall make all arrangements to unload and transport delivered materials and equipment to the jobsite. Equipment and materials shall be received at the site in new condition and shall be maintained in new condition throughout the installation process.

B. Storage

The University does not have the resources to dedicate a storage area for each contractor. It is recommended that the selected contractor provide a lockable material trailer to be parked in an area designated by the project manager.

C. Cleanup

The contractor shall be responsible for the disposal of unused materials subject to the requirements for hazardous materials disposal act. This shall include the disposal of all wire spools.

3.8 AS-BUILT DRAWINGS

As-built drawings shall be provided which indicate accurately all approved changes, pair assignments, labeling, actual device mounting locations, and all pertinent graphical information necessary to facilitate system administration, maintenance, and future moves. Contract drawings will be furnished to the contractor on 3.5-inch diskettes or electronically transmitted media using AutoCAD Release 14 and shall be returned, revised to reflect as-

built conditions using the same format. The as-built drawings shall be returned no less than five (5) working days from the substantial completion of the project.

3.9 INSPECTION

The Project Manager and the installation supervisor shall perform on-going inspections during construction. All work shall be performed in a high quality manner and the overall appearance shall be clean, neat and orderly.

-END OF SECTION-

EXHIBIT 15

THE UNIVERSITY OF WEST FLORIDA

ECLASSROOM STANDARDS AND GUIDELINES

New Construction, Renovation, and Upgrades to Existing Classrooms

Revised August 2013

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1. INTRODUCTION

This document has been developed to establish standards and design guidelines for eClassroom facilities at the University of West Florida. The considerations included in this document are provided as guidelines; they are neither static nor all-inclusive. These guidelines will need to be adjusted and adapted to specific applications and modified to fit specific projects early in the planning process. These guidelines will also be considered when retrofitting or upgrading existing classroom spaces.

This document is subject to review and modification when appropriate. Changes should be made regularly to address significant changes in available classroom technology and trends within the educational environment. At a minimum, this document will be reviewed annually to ensure it reflects current and up-to-date standards for eClassrooms.

2. INFORMATION TECHNOLOGY SERVICES (ITS) SUPPORT RESPONSIBILITIES

ITS supports the following University generally scheduled Classroom types:

- Standard eClassrooms;
- Videoconferencing-capable eClassrooms.

ITS will only support collegiate classrooms (classrooms scheduled by a college and not the registrar) under the terms of a special service level agreement established between the college and ITS.

ITS has one support staff person for the Emerald Coast, located at the REEF; Technology-enabled classrooms are supported by local technology staff. Support of the Videoconferencing-capable eClassrooms is accomplished by Classroom Technology team of ITS Operations. Paid student facilitators for Videoconferencing classes are provided by the various departments conducting those classes, with funding provided by Academic Affairs. Funding for facilitators is only provided for those Videoconferencing classes taught in classroom facilities. Conference rooms and other areas are not included.

Services provided for eClassrooms:

Planning and Consulting Services

Planning and consulting services involve participating in projects to build new eClassroom facilities; renovate and equip existing non-technology classroom facilities with classroom technology; or enact major upgrades to existing classrooms. The role of ITS in these services is to serve as the specialists on information technology and IT infrastructure issues. It is imperative that ITS be involved in all phases of these projects. Proper planning for technology at the onset of a project will avoid costly mistakes and oversights later on.

Installation and Upgrade Services

When a classroom technology project moves from the planning to the execution stage, ITS handles the provisioning of IT infrastructure services and the ordering and installation of classroom technology equipment going into the classroom facility, working within the parameters of the budget defined for the project and adhering to established standards for eClassrooms.

Maintenance and Repair Services

For existing eClassroom facilities within the scope of services, ITS maintains the equipment and infrastructure in the eClassroom and performs repairs and replacements as necessary. Preventative maintenance is also performed on equipment in all eClassrooms to minimize equipment failures and malfunctions.

Instructor Support Services

ITS provides a variety of services to instructors using eClassrooms, including training in the use of equipment in the eClassroom and problem-response services, provided via the ITS Help Desk.

Videoconferencing-capable eClassrooms_Support for these classrooms is provided by the Classroom Technology team of ITS Operations. Classroom Technology provides training to facilitators and instructors on the use of classroom equipment only. Pedagogical and instructional support are available from the Academic Technology Center or the ITS Faculty Technology Support Specialist.

3. ECLASSROOM DESIGN GUIDELINES

3.1 General Concepts

These key points should be kept in mind when designing and implementing eClassrooms:

- Technology in eClassrooms is intended to serve a broad range of academic users with general purpose systems.
- Installed technology should not interfere with non-technology uses of the room.
- Classroom technology systems should be fully operable by any instructor (who has completed training in their use) without the assistance of the Classroom Technology staff.
- Technology design should be closely coordinated with design of lighting and mechanical systems; all installations must adhere to current building codes.
- Installations should provide easy access to equipment for maintenance and flexibility to change equipment over time.
- Controls for operation of the technology equipment should be centrally located as much as possible to allow for intuitive and straightforward operation by the instructor.
- eClassrooms should be standardized to the greatest extent possible, with considerations being made for existing viable equipment, with the goal of having the equipment in each eClassroom operate in the same manner.
- Manufacturers of equipment should be standardized to the greatest extent possible. This document does not address the specific vendors and models to be used, but rather the requirements for each component.
- A regular schedule and available funding for installation of new eClassrooms and refreshing the technology in existing eClassrooms is essential to maximize the use and viability of all eClassrooms for the future.

3.2 Classroom Shape and Orientation

- Industry publications and literature suggest there are preferred shapes for classrooms:
 - Instructors tend to prefer a rectangular or square shaped room;
 - The height of the ceiling should be no less than 12 feet;
 - An ideal room dimension ratio is 1 (depth) to 1 (width);
 - Columns, alcoves, soffits, and other structural projections into and recesses out of the room should be avoided;

- If a rectangular shape is used, classrooms should be designed with a landscape, rather than a portrait, orientation. Instructors tend to request a “wide and shallow” rather than a “long and skinny” orientation in order to keep the instructor closer to the students and provide a larger presentation area.

3.2.1 Presentation Space

- The main presentation wall should be at the front of the room, on the opposite side of the entrance area, to minimize interruptions and traffic for the instructor.
- Classrooms and lecture halls will also continue to be used for traditional instruction. The front center of the room (presentation wall) needs to accommodate whiteboards, projection screen(s), and walking space for the instructor.
- Beveling of the front presentation wall can be considered.

3.2.2 Doors

- Vision panels should be installed in or near doors to allow observation to see whether the classroom is in use. Panels should be narrow to reduce spillage of light from outside the classroom.
- Guidelines for doorways:
 - Doors should be located in the back of the classroom in order to minimize disruption from late arrivals;
 - Doors shall be 2” thick, sound-rated, solid-core to prevent noise from entering the room.

3.2.3 Ceilings

- A minimum 12-foot finished ceiling height shall be utilized for all classrooms. (For large classrooms, such as lecture halls, the size of the screen must be determined before the height of the ceiling at the presentation wall can be determined.)
- Soffits should be avoided; they can cause unwanted acoustical reflections.
- Solid ceilings must have access hatches installed to facilitate access to the ceiling cavity.

3.2.4 Acoustics

- All classroom facilities must have appropriate acoustical treatment and materials so as to absorb all echoes and reverberation that would impact on audio intelligibility. An individual with the qualifications of a certified acoustical engineer who has experience with designing similar facilities should be included as part of the design team.
- Acoustical treatment should address the twin concerns of hearing the presenter more easily and containing the room sound so it does not bother nearby classrooms and offices. Appropriate “voice friendly” acoustical treatment permits instructors to teach without sound reinforcement, except in the largest classrooms (100-plus students). To hear the presenter more clearly, attempt to lower sound reverberation in the room to .7 seconds. Carpeting, acoustical ceiling treatment, sound absorption panels on the back wall and sound absorbing fabric below chair rails help minimize unwanted noise in the classroom.

3.2.5 Lighting

- Placement of light fixtures must be planned so as not to co-exist in the same location as ceiling-mounted projection equipment.
- Lighting control is critical. Adequate light is needed for student note-taking. Sufficient light is needed at the podium and on the whiteboards. All light fixtures must be located and controlled to minimize washing out the image on the projection screen.
- Because all classrooms, meeting rooms, and auditoria will utilize some type of projection or display device, all facilities require appropriate lighting and lighting control systems so as not to interfere with projected images. All lighting must be controlled:
 - To eliminate or minimize light spillage on the projection screen;
 - During projection, switched lighting systems should be designed so that the rear 2/3 of the room has sufficient light for note-taking while the front 1/3 is without light that might spill onto the screen.
- To achieve these requirements, switched lighting systems should be zoned in rows positioned parallel to the screen (i.e. side-to-side across the width of the room) rather than perpendicular to the screen (i.e. from the front-to-back of the room). Multiple controls shall allow, at minimum, which lights are switched-off near the screen, with other lights remaining on away from the screen.
- All lighting switches and controls must be located adjacent to the podium as well as each doorway. The switching of the lighting system shall be designed to enable low-voltage interfacing with an external audiovisual control system.
- Light from outside the room needs to be controlled. Vision panels in doors should be narrow to reduce spillage of light from the hallway.
- All classrooms must have a minimum of two lighting zones: one zone for the instructor at the podium, and another zone for the student area. Ideally, the student zone should have the capability of multiple light levels. Each zone shall be independently controllable via its own separate switch.
- Large classrooms, such as lecture halls, must have a minimum of three zones: the two zones above plus a zone for the presentation/whiteboard area. This zone should be dimmable, with incandescent lighting preferred.
- In addition to general room lighting, other systems may be required, including a ceiling-mounted track light system above and in front of each teaching station.
- In studio classrooms and computer labs, lighting must be designed to minimize glare on computer screens. Indirect lighting fixtures are ideal for computer environments. If indirect lighting is not used, fluorescent light fixtures should include 3", 1.5", or .5" cell parabolic diffusers to minimize glare on computer screens.
- In auditoria, master control units shall be provided. These master control units must include multiple zones and presets plus be provided with an RS-232 AV interface for connection to a control system. The AV Interface must provide appropriate bi-directional RS-232 feedback status back to the control system.

3.2.5.1 Lighting Interface and Control

- Although the traditional method of light control has been to provide 3-way wall switches in the appropriate locations, it was also the tradition, due to the limitation of projection technology, to significantly darken the room during projection. A darkened

room limits interaction and student attention. Modern classrooms can take advantage of several advances in lighting technology, combined with higher lumen output from projectors, to adapt lighting to multiple purposes (i.e. discussion, exams, multimedia projection):

- Low-voltage control switches can provide wired, wireless, or RS-232 control of zoned lighting systems, both incandescent and fluorescent fixtures.
- Fluorescent dimming – electronic fluorescent dimming ballasts provide flexible, reliable, and cost-effective control of standard drop-in ceiling fixtures.
- Lighting control systems allow instructors to create personal light settings or recall preset scenes. Such systems can easily be interfaced with manufacturer or third-party control systems. Such systems can also be integrated into a campus-wide energy management system.

3.2.5.2 Window Coverings

- Reducing and controlling daylight coming into classrooms is always identified as major concern for classroom design.
- Sunlight shining into the room can wash out projection images; window coverings are imperative. Blinds, room darkening shades and/or drapes need to cover all windows to control light and assure that glare from windows does not interfere with computer screens, TV screen or projection screen(s).
- All window treatments shall be capable of controlling and eliminating all outside light.
- Ideally, each window should have two window coverings, one totally opaque and another that is transparent, to provide a range of light control.
- Motorized window shading systems must be capable of control by room control systems and/or easily controlled from switches located near the podium.

3.2.5.3 Safety Lighting

- As a safety feature, it is desirable to have a fixture or two at the rear of the room, unswitched, which remains on at all times, so that the room is never totally dark. Such unswitched fixtures must be positioned as required by code, but without spilling light onto the screen or interfering with projected images.

3.2.6 HVAC

- Placement of HVAC vents must be planned so as not to co-exist in the same location as ceiling-mounted projection equipment and document cameras. Vents must be located away from projection screens, so as not to create air circulation currents that might move the screen.
- HVAC ductwork must be planned so as not to be placed in the same location as ceiling-mounted projection equipment.

3.2.7 Electrical

- Audiovisual and multimedia systems require clean, high quality electrical power to operate correctly and reliably. Dedicated electric circuits are required for the ceiling-mounted projector and computer electrical outlets.
- A true isolation transformer is recommended, specifically designed for technical system power.

- All audio, video and control electrical circuits should be fed from "clean" legs of the transformer free of high inductive loads. There shall be no elevator motors, compressor motors, blower motors, etc. on the side of the power transformer that feeds the media equipment.
- Audiovisual and multimedia equipment require standard 110VAC electrical outlets in specific locations:
 - All eClassrooms must have a floor-mounted duplex outlet in an appropriate location under the instructor podium. A power conditioner/voltage regulator should be included to provide clean and consistent power to electronic components in the podium. A network-connected power distribution unit (PDU) should also be included to enable remote restarts as needed and to ensure clean shutdown and startup of the system in the event of a power disruption.
 - All eClassrooms must have a ceiling-mounted quad outlet near the location of the ceiling-mounted projector. An inline power conditioner is to be provided to insure that the projector receives clean and consistent power. The conditioner should have a minimum of 2 outlets and be hard-wired to take the place of a standard electrical outlet at the projector location. This will also increase the life of the projector lamp.
 - A duplex electrical outlet should be located on the instructor podium to provide power for laptop computers.

3.2.8 Network Connectivity

- All eClassrooms require connectivity to outside resources. Network connections enable accessibility to and real-time interaction with resources such as distant computers, databases, banks of stored information, via local networks and the Internet.
- Network connections in all eClassrooms will be run using the current UWF standard for all networking.
- Classroom facilities are to be designed with appropriate wired network connections available:
 - Availability of wireless network connectivity (ArgoAir) provided by the university, is not to be viewed as a substitute for the installation of wired network connections in eClassrooms.
 - 4 data (Ethernet) ports must be provided in the ceiling, near the ceiling-mounted projector, to accommodate network-capable projection devices and the room control system;
 - 1 voice and 3 data ports must be provided for connection to the instructor podium, to accommodate connections for a telephone, network switch for access to the university network (for the resident computer, connection for an instructor laptop, and network access for the ADA-compliant port, located in the podium), and network switch for connecting the control system and network-enabled power management devices to the network for on-campus remote access and management
- Each eClassroom should have the capability of connecting with the ITS Help Desk, via telephone, voice-over-IP, or other technology, to facilitate providing assistance in a timely manner to those instructors needing it while using the eClassroom. For increased security, the control system in an eClassroom should connect to the campus VLAN

designated for Classroom Technology. This VLAN is private and prevents access to the control system from outside the UWF network.

3.2.8.1 Conduit, Cabling, and Floor Boxes

- All eClassrooms will be designed to accommodate a teaching console (instructor podium) to function as base station for instructors or presenters lecturing and/or using instructional technology. This podium will house equipment and therefore must be provided with connectivity and electrical power. The podium will be located to the side of the screen, without obstructing the view of the screen.
- Multi-purpose conduit and connections must be provided under each podium. Each in-floor location must include at minimum:
 - A duplex 110-VAC electrical outlet;
 - Communication wiring for network connectivity (4 ports);
 - Empty continuous conduit running from the podium to the wall, then up inside the wall to an over-the-ceiling stub-out for connections to speakers and the ceiling-mounted projector;
- Such conduit and connections can be provided cost-effectively as stub-ups, or be recessed at the floor level within commercially manufactured floor boxes.
- Separate continuous non-metallic conduit must be provided during construction including: one 1.5-inch empty conduit from the podium location to a stub-out above the ceiling. This conduit is to be installed during construction with a pull-tape accessible from both ends. This empty conduit will accommodate various audio, video, signal, and control cables to be installed after construction by the designated audiovisual contractor;
- All conduit direction changes must be completed with gradual “sweeps”, not 90-degree bends.
- The use of Panduit and wall plate connections can be considered in pre-existing classrooms where it would be impractical or cost-prohibitive to install floorboxes.

4. FURNISHINGS AND TEACHING EQUIPMENT

4.1 Instructor Teaching Station (Podium)

- The teaching workstation is an essential component in each room. This workstation or "teaching station" is a specially designed presentation console (podium) that serves as the central control point for all of the system's operational functions. It houses the system control interface, has room to accommodate a computer system or thin client, and offers multiple connecting points for the output of both computer and composite video devices.
- The following equipment is to be housed (and installed in such a way to deter theft) in/on the instructor podium:
 - Blu-ray player;
 - Digital document camera;
 - Room control system, to include amplification for program audio;
 - Resident PC;
 - Touch panel control interface;

- SMART Podium for on-screen annotation of content of the Resident PC
- Additionally, the following optional equipment may be included in the podium:
 - Wireless microphone system.
- The instructor podium should have a work space on the top to accommodate the instructor laptop as well as notes, books, or other necessary instructional materials needed by the instructor.
- The podium is to be placed on the right or left front edge of the room, facing the students. Location must not interfere with doorways or traffic, or, most importantly, viewing the screen or whiteboards. Instructors will find it is desirable to face students when using a computer in a classroom. They don't want a massive desk/console barrier between them and their students. An instructor podium should be 36-40" high.
- The podium will require floor boxes with appropriate electrical and telecommunication connections, as well as cable paths and conduit to other locations.
- Switching and control for the eClassroom is to be mounted on or near the podium.
- Instructor-accessible connections (such as laptop connections, including power, VGA, HDMI, audio, and network) are to be positioned in a convenient, easily accessible location on the podium so as to minimize wiring clutter.
- User-accessible components, such as the Blu-ray player, are to be positioned in a location that minimizes the amount of bending down or kneeling required by the instructor to operate these components.
- For new construction projects, conduit for all A/V connections which terminate at the podium must be run in the floor at time of construction, prior to slabs being poured, to eliminate wall plates being added after the fact.
- For existing projects, wiring runs for all A/V connections which terminate at the podium must be run in such a way as to minimize wiring clutter in the room. Carpet tunnels or similar solutions are to be used.

4.2 Projection Screens

- All eClassrooms require appropriate projection screens.
- A widescreen format projection screen, with an aspect ratio of 16 units wide by 9 or 10 units high (16:9 or 16:10) is necessary as widescreen content and equipment have become more mainstream. When ceiling height permits, screens should be wall-mounted above the ceiling (versus recessed ceiling-mounted) to minimize installation costs. Wall-mounted screens will also permit easy screen exchange in the future if wider proportions become standard.
- It is important to coordinate the distance the screen is mounted away from the wall to avoid touching the whiteboard or its eraser tray.
- Screen size and positioning must be appropriate to the room. Fit the screen to the size of the audience and the distance from the furthest seat.
 - The width of the screen (and the image width) should be no less than one-sixth the distance from the screen to the last row of seats;
 - The front row of seats should be not any closer than the image width;

- The screen must be mounted high enough for the students in the back of the classroom to see the bottom of the screen; typically, this means that the bottom of the screen should be at least 4 feet above the floor.
- The top of the screen should be no greater than 35° from horizontal from any seating position (*screen size requirements and clearance from floor may compromise angle for the first 1 or 2 rows*).
- Screens are to be mounted away from windows, doors, light switches and other controls.
- The ideal screen size is determined using a formula where the height of a video-format screen for any room is one-sixth (1/6) as high as the distance from the screen to the last row of seating. (e.g. in a classroom where the last row of seats is 30 feet from the screen, the screen would need to be 5 feet high.) The appropriate screen size, coupled with proper screen placement, dictates minimum ceiling height.
- Projected images should not be viewed at angles greater than 45 degrees off the projection axis, or outside of a 90 degree viewing cone. Care should also be taken to assure that there are no obstructions (i.e. columns, podium, furniture, etc.) between any seat and the screen.
- Screens should be mounted such that the entire image is visible from all seats in the room. Multiple screens (or displays) for simultaneous display in a classroom provide more flexibility than one screen.
- Screens are typically front projection with high-gain, reflective surface.
- Electric screens are required in all eClassrooms. They allow instructor control using the integrated control system and are not subject to the possible damage of manual screens, caused by pulling them down and releasing them improperly.
- Electric screens are to be wired in order to be controllable by a room control system.
- At minimum, a typical classroom is supplied with a widescreen-format screen (i.e. one with a width-to-height ratio of 16:9 or 16:10).
- In existing installations, older screens (4:3 aspect ratio) may be retained and repurposed for display of widescreen content by adjusting the limit switch so that the amount of screen surface exposed will accommodate a widescreen aspect ratio.

4.3 Ceiling-Mounted Projectors

- All eClassrooms require ceiling-mounted projection systems.
- Projectors should provide the best possible image quality for a variety of image sources. (*Motion video should be free of blurring and artifacts. Text should be readable throughout the room.*)
- LCD/DLP projectors are to be permanently mounted in the ceiling.
- Security devices are to be installed on all projectors to deter theft.
- Calculate 2.2 times the width of the screen to approximate the distance between the screen and the lens of the video projector (special order short-throw and long-throw lens can also be used).
- Native Projector resolution must be a minimum of 720p.
- Projectors must have the ability to natively display (without scaling or stretching) a widescreen format image.

- Projector brightness is measured in ANSI lumens. Output from projectors must be bright enough to see without having to dim the lighting in the room to a great extent.
- Projector contrast ratio should be no less than 600:1.
- Projectors must have appropriate video inputs to fully utilize the features of the control system they are connected to. HDMI is the current standard for connection of components in the system. Analog VGA connections are desirable to allow for connection of legacy devices.
- Network connectivity (Ethernet connection) must be available at the mounting point of each projector to ensure room control system connectivity to the network.
- All projectors installed must be capable of being controlled (typically via RS-232) by a room control system.

4.4 Document Camera

- Document cameras allow a presenter to display a 3D object, a photograph, a sheet of paper or any simple text document on a large screen. A document camera allows all students to have a “front-row seat”.
- Document cameras to be installed in eClassrooms will be digital, using a DVI or HDMI interface. The image quality of a digital document camera is far superior to that of an analog unit.
- The document camera will be capable of being controlled by a room control system.
- The document camera will provide native widescreen (16:9 or 16:10) output.

4.5 Blu-ray Player

- Blu-ray players will be permanently secured in the podium.
- The Blu-ray player will be capable of being controlled by a room control system.
- Most Blu-ray players offer network connectivity. Since the university does not have institutional accounts with streaming content providers, the network feature is not to be enabled. The resident PC and the laptop provide options for the display of streaming content.

4.6 Computers

- An eClassroom includes a resident PC, connected to the university’s network and the ARGONET domain, installed in the podium. This PC is not physically accessible to the instructor, which means that there is no access to the optical drive. Since users must log in to the PC with their ARGONET credentials, their network drives are available for use. In addition, a multi-port hub is provided for connecting USB devices, such as flash drives, which can be used for file storage.
- An eClassroom will include appropriate connections for a laptop computer. These connections include HDMI, VGA, audio, and Ethernet.
- The SMART Podium serves as the primary display monitor for the resident PC and also as the preview monitor for all sources in the system.

4.7 Room Control System

- A control system simplifies the use of an eClassroom and eliminates using multiple remote controls for each component. System control is made available to the instructor

via touch panel technology which simplifies the operation of the entire system by offering an intuitive, visually-based, control panel for the presenter. The touch panel is designed to greatly reduce the complexity of system control which allows the user to concentrate the presentation instead of being distracted by a series of complex equipment control functions.

- LCD touch-panels are to be secured to the podium. The touch panel is used as the room control interface. Room control systems should have the capability of controlling all aspects of an eClassroom, including lighting level, screen(s), video and audio inputs, and component power. The systems should also allow for remote monitoring and management of an eClassroom.
- Labeling and layout of room control systems must be intuitive and consistent across all eClassrooms.
- Simplicity is the key; the number of remote controls/buttons required to operate the system is to be kept at a minimum. Remote controls tend to be lost during the course of a semester and should only be used as secondary control devices in the event that the primary control system fails.
- The room control system can also be used by the instructor to alert Classroom Technology support personnel if they encounter any problems using the equipment in the room.
- The room control system can also be used for scheduling use of certain equipment, remote monitoring and control, preventative maintenance scheduling and recordkeeping, and inventory control.

4.8 Microphone, Audio, and Amplification Systems

- Installation of microphone systems is based on size of room, acoustics, and the need for recording or external transmission of audio. (new construction only)
- Program audio amplification is required in an eClassroom. Power, size and number of speakers depend largely on the size and acoustics of the space.
- The microphone system, if present, will be separate from the audio system used for program audio. The microphone system should be able to be used without having to use the room control system.
- Mono or stereo front-mounted speakers for program audio should be matched to the output of the amplifier.

Americans With Disabilities Act (ADA)

- The ADA, enacted in 1990, prohibits discrimination against persons with physical and mental disabilities. Title II of the ADA states that public institutions can choose to follow either UFAS (Uniform Federal Accessibility Standards) or the ADAAG (Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities) standards. The goal for classroom designers is to keep in mind that appropriately designed facilities to facilitate persons with mobility, hearing, vision, and mental disabilities is not just important, it is mandated by Law.
- Mobility and Hearing Impairments
 - Upon two weeks advance notice, Classroom Technology will work with Human Resources and the Student Disability Resource Center to make reasonable accommodations for individuals with mobility or hearing impairments;
 -

- Each instructor podium in an eClassroom features a connection faceplate, meeting ADA accessibility requirements, to enable the connection of a laptop computer for presentation and room control.

5. OTHER CONSIDERATIONS

5.1 Staff Support (Classroom Technology)

- A cadre of professionals is necessary to support eClassrooms. The equipment has to be designed, installed, cleaned, checked, maintained and, when necessary, replaced. The staff must have technical expertise, but more importantly they must have a customer-service orientation.

5.2 Continuous Improvement

- Staff must make sure that systems work appropriately, and the installed technologies are dependable. The design and support team must constantly strive to improve the reliability of technologies from the instructors' perspective. Even when complex electronic installations are working reasonably well, there are always improvements that can be implemented in the future.

5.3 Preventative Maintenance

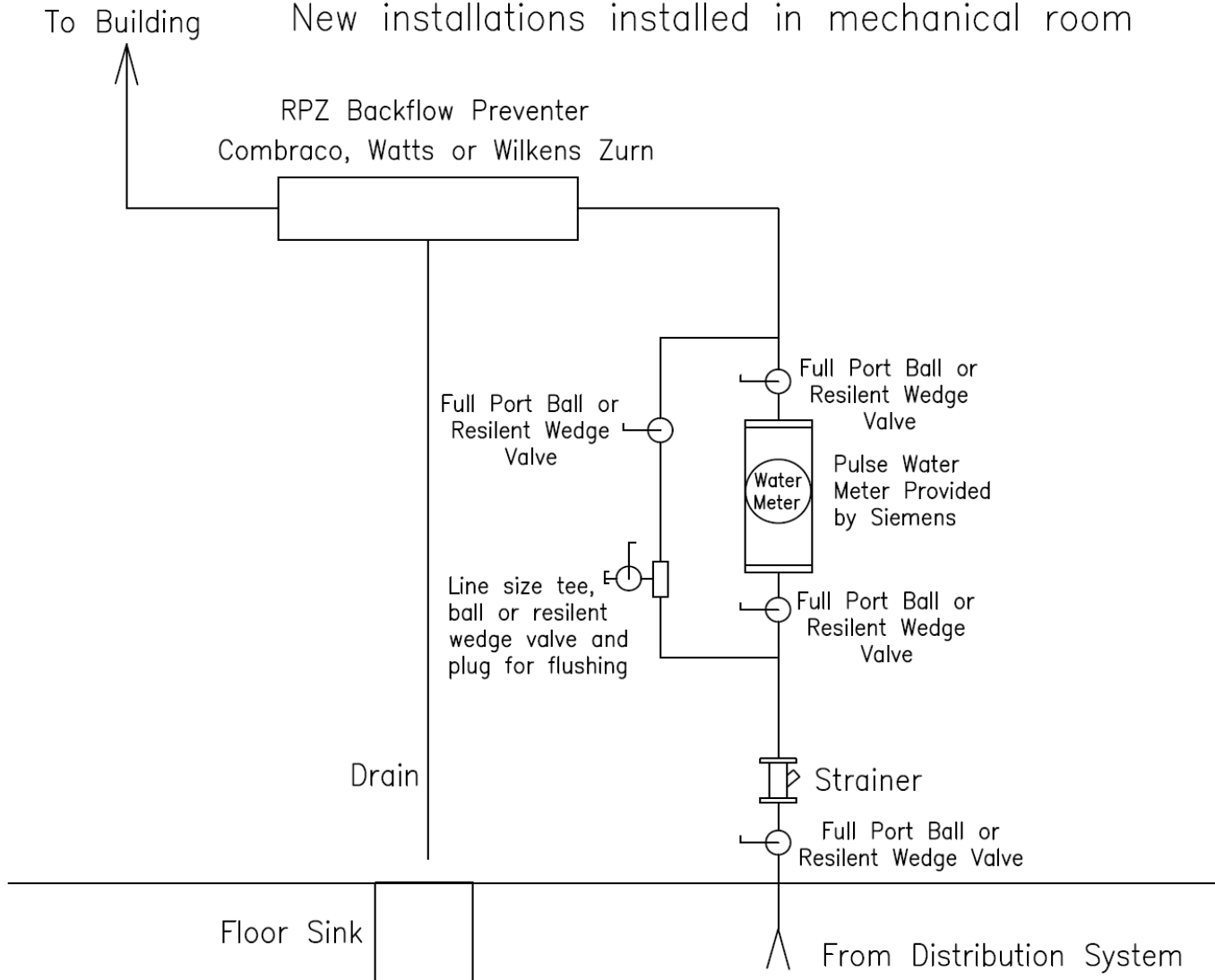
- All hardware should be regularly inspected, tested and cleaned. A weekly check ensures that all equipment will appear professional and meet the operational requirements of the instructor. Classroom Technology staff maintains maintenance logs on all work performed on classroom equipment.

5.4 Planned Upgrades and Replacements

- Following an initial capital investment, funding is needed for replacement lamps and periodically for equipment renewal and replacement. Continuing equipment replacement will cut the labor-intensive costs of repair and maintenance, permit the staff to devote more time to instructors than to hardware.
- Assuming funding is available, eClassrooms will have a five year technology replacement cycle.

Exhibit 16 Potable Water Building Entrance

Type K copper pipe.
Provide unions and flanges for disassembly.
Insulate piping and fittings.
New installations installed in mechanical room



UWF TYPICAL WATER METER DETAIL

11/15/13RN