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INTRODUCTION

The purpose of this guide, while not all inclusive, is to acquaint the Architect and/or the Contractor with the functions and standards of Hillsborough Community College. It is felt that a basic knowledge in these areas is essential before the Architect can successfully carry out his contract responsibilities. Copies of this guide are available in various formats: hard copy, CD (.pdf format), e-mail and the Facilities Planning & Construction website at http://www.hccfl.edu/gwsc/admin-and-finance/departments/facilities-planning-and-construction.aspx.

All bidding, contract administration and project management for renovation, remodeling and new construction projects are under the direction of Facilities Planning & Construction.

These architectural/engineering guidelines have been developed to ensure the continued quality of the built environment to provide continuity in product selection and to enhance maintainability. Design consultants and contractors are required to familiarize themselves with the document and to incorporate its provisions into their contract documents and work. In instances where these requirements conflict with design parameters or code requirements, discussions with the Owner should take place to insure all conflicts are resolved.

In general, these guidelines represent solutions to past problems which have been identified and resolved. It is not the intent of the college to restrict the creativity of the designers.

Overall Design Approach

Based upon our building development experience, we are very focused on obtaining "High Performance" building outcomes. To achieve this, we expect our consultants to thoroughly understand our design approach:

We need and expect buildings that leverage their respective mission and support the college mission in every way.

1. Sustainable
   a. Utilize local materials and trades
   b. Beneficial indoor air quality
   c. Net to gross square foot efficient floor plans

2. Utility Efficiency
   a. Mechanically
   b. Electrically
   c. Vertical transportation
   d. Plumbing
   e. Irrigation
3. Maintainable  
   a. No moisture intrusion  
   b. No outside air intrusion  
   c. Easy access to equipment  
   d. Reduced maintenance points with centralized equipment  
   e. Long life cycle material and equipment  
   f. Easy to maintain materials and equipment  

4. Student and Employee Productivity and Comfort  
   a. Secure  
   b. Comfortable  
      i. A responsive indoor climate control  
      ii. Reduced visual glare  
      iii. Controllable sound  
      iv. Aesthetically pleasant interiors  
   c. Adaptable/flexible work spaces  

5. Positive Building Imagery  
   a. Retains and attracts students and staff  
   b. Architectural asset to the college and community  

"High Performance Buildings" lower the long term public investment and ownership while increasing student learning experiences and staff effectiveness, making the building a tool for productivity. Missing this design opportunity is a loss to our students, faculty, staff and the public.
DIVISION 1 – GENERAL CONSIDERATIONS

1.00 Design Considerations

1.01 All areas of the campus should be considered learning environments.

1.02 Interior and exterior campus spaces should be designed to promote formal/informal gatherings of students, faculty and staff.

1.03 Flexibility in the arrangement and use of a building is a fundamental design requirement. Designs for new buildings and renovations should accommodate a reasonable degree of flexibility for future expansion, growth or change of programs.

1.04 Building designs should have a coherent plan that promotes way finding.

1.05 A way-finding system that provides clear and accurate directions will be provided and installed at the sites appropriate intersections. Such systems will be in the form of a lighted screen, standard signage or remote access notice board which will be updated periodically to keep the public informed. All new signs shall be designed to match existing and be flexible to facilitate updates.

1.06 Designers need to consider how new buildings will relate to adjacent structures and incorporate appropriate transition areas.

1.07 Building massing, building profiles and the selection of colors and finish materials should enhance the campus identity.

1.08 Designs should promote campus safety and security. Designers should avoid complex building perimeters which create niches where individuals can conceal themselves and places that are difficult to monitor.

1.09 The designer shall follow Leadership in Energy and Environmental Design (LEED) guidelines, a national standard for high performance and sustainability developed by the U.S. Green Building Council. The building will be, at a minimum, certified LEED Silver or equivalent as specified by the owner.

1.10 The ability to accommodate growth and change are important criteria in the design of structural, mechanical and electrical systems and selection of materials.

1.11 Designers are expected to consider long-term sustainability, durability andmaintainability when selecting equipment, materials and finishes for either new facilities or renovations. First cost is not the only consideration; life cycle costs as well as low maintenance need to be considered in equipment and material selections.
Service personnel should be able to access equipment and perform routine maintenance without disruption to campus activities. Designers shall comply with all codes and regulations for access to equipment via stairs, platforms and on rooftops. Equipment clearances must be sufficient to permit replacements over the life of the facility. Mechanical equipment rooms should have access to the exterior where possible and convenient for service-vehicle access. The designer shall take into account the needs for service vehicles when providing parking designs for new facilities. In no instance shall the Owner’s personnel have to do the following to service any piece of equipment:

1.12.1 Remove a wall/partition or other architectural component to take out or disassemble a piece of equipment. All AHU’s will be accessible on three sides excluding the discharge air side.

1.12.2 Disassemble or remove other adjacent machinery, equipment, piping, electrical conduit, etc., in order to perform normal service.

1.12.3 No conduit, electrical fittings, etc., shall be installed beneath any piece of equipment or machinery that is mounted “overhead/above ceiling”. It shall not be necessary to disconnect and remove any system components below a piece of equipment in order to remove and lower it to the floor.

1.12.4 “Climb out on” or “lay on” piping, conduit, ductwork, etc., in order to access or service a piece of overhead equipment. This includes HVAC equipment panels, disconnects or fuses.

1.12.5 “Lean out” over conduit, piping, ductwork, etc., to service/access a piece of equipment while standing on a ladder.

1.12.6 The Contractor/Sub-contractors will account for these conditions in their coordination drawings; however it needs to be easily enforceable by the Owner’s Site Representative, Project Field Engineer and the Owner by referencing the contract documents.

Designers are required to design facilities that do not rely on custom-built components and shall be of a type that can be maintained using standard stock items that can be readily and inexpensively ordered and shipped. Standard stock items must be used whenever possible. Custom-built fabrications and equipment must be clearly identified in the design documents and approved by the college. Built in cabinetry should be used selectively and only when a comparable piece of furniture would not work effectively.

Special scheduling and construction restraints to protect the safety of campus users, the continuance of the educational programs and to maintain flow of pedestrians and vehicles around construction sites may be imposed during the construction phase of the project. Designers and contractors should also be aware of the presence of students,
faculty and staff who require mobility, visual or hearing accommodations. This group of the college population shall be protected from injury and provided adequate warning and accommodations to access all temporary walkways, around stockpiles of materials, excavations, fences and barricades. Pedestrian and non-ambulatory traffic areas around the construction limits must be maintained in a clean and safe condition at all times. Accommodations for people who have disabilities shall be planned to provide appropriate detours subject to college approval and shall be included in construction documents.

1.15 Indoor air quality should be a consideration in the design of the mechanical systems and construction materials selection. The designers shall schedule time to properly balance the systems and to adequately ventilate noxious products resulting from out-gassing of the building materials prior to occupancy.

1.16 Asbestos or any asbestos containing material shall not be specified or used under any circumstances. The Architect shall be required to sign a statement asserting compliance with this requirement.

1.17 The Owner’s Room Numbering System should be used during design and construction. All of the interior signage that will be furnished and installed by the Contractor will use the Owner's Room Numbering System. This numbering system will be part of the Contract Documents and will be present in the Architect's section of the Drawings. The Electrical Design Engineer will ensure that it is clear to the Contractor/Sub-Contractors that all of the following charts, schedules, etc., shall reflect and utilize the Owner's Room Numbering System.

1.18 The contractor shall obtain the building permit from the Building Facilities Planning & Construction office located at the HCC GWS Center 39 Columbia Drive, Room 615A, Tampa, Florida 33606, Tel # (813) 253-7089. Other permit requirements shall be specified in the Construction Documents.

1.19 The design professional shall provide the following “As-Built” drawings and specifications to the Owner. All drawings and specifications shall be updated and clearly marked “AS-BUILT”.

1.19.1 Complete set of CADD files in .DWG format from all trades, all sheets labeled to match the working set of construction drawings with all external references, styles, etc., included.

1.19.2 Complete set of PDF files with all sheets labeled to match the working set of construction drawings.

1.19.3 Three (3) complete full size sets and one (1) electronic PDF version of printed drawings labeled “AS-BUILT”.

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1.19.4 Three (3) complete printed sets and one (1) electronic PDF version of the building specifications, using CSI Designation.

1.19.5 Any additional drawings, photographs, and renderings related to the project.
DIVISION 2 – CIVIL, SITEWORK AND LANDSCAPING

2.1 Earthwork and grades

2.1.1 All site clearing, de-watering, erosion control, soils transport and/or stockpile, excavation and backfilling, compaction, soil treatment, rough and finish grading, sodding, landscaping and irrigation shall be the responsibility of the General Contractor.

2.1.2 Maximum finish slopes shall not exceed 4:1.

2.1.3 Protection of indicated foliage to remain from surface or sub-surface damage shall be the responsibility of the General Contractor. A proposed site mobilization/staging plan and protection plan shall be submitted to the Designer/Owner for approval prior to start of construction.

2.1.4 Information regarding sub-surface utilities and structures will be furnished by the Owner and shall be verified by the Contractor prior to excavations. Trenching, back-filling, compaction and surface identification required for verification shall be the responsibility of the Contractor.

2.1.5 Contractor shall be responsible for the disposition of all excess soil and site work materials. College dumpsters SHALL NOT be used by the Contractor(s). Clean fill to be tabled and remained on site.

2.2 Temporary Utilities

Placement and removal of all temporary utilities shall be the responsibility of the Contractor. Water and power may be provided by the College. New building services to be arranged by the contractor with TECO. Billing is to be switched to HCC upon substantial completion.

2.3 Sub-surface Drainage and Storm Sewer Systems

2.3.1 The project Civil Engineer shall request and/or coordinate existing subsurface information as necessary to evaluate requirements for subsurface drainage system(s), special foundations, etc., in accordance with the Southwest Florida Water Management District (SWFWMD). The Engineer shall coordinate the design with other entities (EPA, ACOE, etc.) for underground utilities as required.

2.3.2 Design shall assure roof drainage and Air Conditioning condensate drains will function adequately during peak storm conditions.
2.4 Asphalt Paving, Concrete Curbing and Sidewalks

2.4.1 Roadways shall be designed in accordance with the latest specifications in affect from City, County, and the Florida Department of Transportation (the most stringent shall apply).

2.4.2 Pedestrian Walkways

2.4.2.1 Minimum standards for sidewalks are as follows: 6" thick, 3,000 psi, reinforced concrete. Primary sidewalks connecting high traffic areas shall be a minimum of 12’ in width, secondary sidewalks a minimum of 6' in width.

2.4.2.2 Sidewalks which are intended for use by security or delivery vehicles shall be designed to support those loading conditions. Sidewalks shall be level with adjacent grades.

2.4.2.3 At all locations where sidewalks meet at a perpendicular or near perpendicular angle, the intersection will be connected with large radii, tangential curves or splayed 45° sections at the points of intersection. Joints shall be arranged to avoid internal corners and slab “points”.

2.4.2.4 All sidewalk surfaces shall have a light broom, non-slip finish. Brooming shall be perpendicular to the direction of pedestrian traffic.

2.4.2.5 Provide a “group” of 4” spare conduits where the sidewalk separates two (2) green areas and at intersecting walks. These shall be shown and specified on the Electrical Site drawing. The conduits shall be placed 18” below finished grade or top of sidewalk, shall extend 1'-0" past the edge of the sidewalk (both sides); spaced 1'-0" apart and be capped on both ends. Their exact location shall be recorded on the “As-Built Drawings” and marked at the edges of the walks with lead inserts stamped with an “X”.

2.4.3 ADA curb ramps shall be provided at all road crossings and parking lots.

All sidewalk edges, including control/expansion and construction joints shall be given a tooled ¼” radius edge. Edge tool shall produce “picture frame” edge/joints. Provide for non-skid surfaces at ramps. Expansion joints shall occur every 40' (max.), be ½" wide and constructed of pre-molded expansion joint material topped with backer rod and finished with colored caulk. Control or construction joints shall be 10' o/c in both directions, ¼" wide and ¼ of the thickness of the sidewalk in depth (i.e., 1½” deep for a 6" thick sidewalk).

2.4.3.1 DOT compliant truncated dome mats are required at all curb ramps that lead into vehicular traffic. Color of the mats is to match existing majority at each Campus
2.5 Exterior Concrete Benches

Moveable cast concrete benches where specified will be provided at locations designated by the Owner. These benches shall be constructed of 3,000 psi concrete with steel reinforcement. Finish shall be smooth and free of stains, honey combing and voids. Style of bench varies per campus and will be designated by the Owner.

2.6 Parking Lots

2.6.1 Pedestrian safety shall be the primary consideration in the design of parking facilities.

2.6.2 The circulation pattern from the entry to exit should be logical, intuitive and clearly defined.

2.6.3 Vehicular traffic lanes shall be separated from intended pedestrian circulation. Walkways shall be delineated by striping, use of different paving materials or a slight rise in elevation.

2.6.4 Landscaping shall be considered in parking areas to provide shade and separation.

2.6.5 Parking Lot striping, except for parking spaces shall be applied ThermoPlastic Setfast Water-Borne Traffic Paint. Color coding shall be as follows:

- **TRAFFIC YELLOW** color shall be used to designate “FACULTY & STAFF” parking
- **WHITE** color shall be used to identify all stop bars, directional arrows, wording (i.e., STOP, NO PARKING, etc.), cross-hatching and all parking spaces designated “STUDENT” or “VISITORS”.
- **BLUE AND WHITE** color shall be used to designate all “handicapped/disabled” parking spaces. “Wheelchair Symbol” shall be white. Markings shall be in accordance with latest ADA specifications.

2.7 Potable Water Systems (water mains, control valves, and fire hydrants)

2.7.1 All materials and work shall comply with applicable Federal, State, and County codes; the Florida Dept. of Environmental Protection and NFPA 24.

2.7.2 A cast iron valve box and cover shall be provided at all below grade water shutoff valves. The valve box shall be continuous from the bonnet of the valve to finish grade. If the valve box occurs in a landscaped area, it shall be provided with a concrete collar that is 18” x 18” x 4” thick. The Contractor shall provide the Owner with properly sized T-Handle wrenches for each type and size of valve installed on the project.
Potable boxes shall be blue to differentiate them from red (fire) and lavender (reclaimed) water systems.

2.7.3 Connection to existing systems is to be depicted in the documents and annotated “coordinate and schedule with owner prior to connection”

2.8 Sanitary /Storm Sewer Collection Systems

2.8.1 Exterior “at grade” clean-outs shall be provided in sufficient quantity and at strategic locations so that all portions of these below grade systems can be easily and quickly accessed for both inspection and rodding operations by the Owner.

2.8.2 All “at grade” clean-outs shall be flush with the adjacent grade and shall have traffic rated covers. Where the clean-out occurs in a landscaped area, the clean out shall be provided with a concrete collar that is 18" x 18" x 4" thick.

2.8.3 Sanitary lift stations, where required, shall be connected to the emergency backup power system.

2.9 Marker Tape

All “below grade” utilities (i.e., storm, sanitary, potable water, etc.) shall be marked with 6" wide, colored detectable plastic tape bearing the name of the system. Tape shall be installed continuously for the full run of the system and shall be located 1’-0” below finished grade above the centerline of the piping. Colors shall be per standard system codes.

2.10 Irrigation System

2.10.1 The Architect shall verify the source of irrigation water. Appropriate color coding shall be used to indicate source. Irrigation lines shall be Schedule 40 “thick wall’ pipe, thin wall pipe is unacceptable.

2.10.2 Irrigation heads for campuses shall be manufactured by Hunter, Rainbird or equivalent.

2.10.3 Irrigation heads for turf areas shall be Irritrol I-Pro Series, Hunter PGP- ADJ, Rainbird Series 1800 or equivalent.

2.10.4 In no instance will an irrigation “Zone” provide water to both a “shrub/landscaped area” and a “turf area.”

2.10.5 Irrigation heads shall be “laid out” in a manner to insure that adequate “head to head” coverage of all plant materials occurs. Deflectors shall be installed at all locations where the irrigation water contacts a building.
2.10.6 All main lines shall be buried at a depth of not less than 24" below grade. All lateral lines shall be buried at a depth of not less than 18" below grade.

2.10.7 Irrigation Control System

2.10.7.1 The controllers shall be equipped with a rain shut-off device, as required by law. Where allowed, it shall be equipped with a manual by-pass switch to allow testing of the system.

2.10.7.2 Control wiring shall be run directly above sprinkler mains or in PVC conduit at walk/road crossings. A minimum of two (2) spare wires, plus a ground shall be installed with all required new wiring. All control wire splices shall occur only in valve boxes using Snap-Tite or equal connectors and sealant. Covers shall be marked “IRRIGATION” or color coded lavender when reclaimed water is used.

2.10.7.3 Quick Coupler Valves with valve boxes will be installed at strategic locations for the use of hoses by the Owner (IF system has “jockey-pump” pressure control). One (1) Quick Connect hose type fitting shall be provided with each valve installed.

2.10.7.4 All zone valves shall be manufactured by Irritrol, Hunter, Rain Bird or equivalent.

2.10.7.5 Lightning Protection for Control System (see also Division 16)

2.10.7.6 The Contractor shall furnish and install all applicable lightning protection devices for the control system and shall assure that the total system is prepared to operate in a lightning intensive environment. All manufacturer requirements shall be followed to the letter.

2.10.7.7 In addition to the ground listed above; the Contractor shall provide at the field controller location, an earth ground having a resistance to the earth of fifteen ohms or less, measured by the controller installer, who shall adequately mark the location with a concrete/brass pedestal at grade.

2.11 Landscaping

2.11.1 Statement of Intent
Landscape designs should be developed to provide landscaping that is relatively low cost and low maintenance and should emphasize simplicity, balance and ecological sensitivity. Designs should incorporate plant materials that are water wise, as well as disease, pest and drought tolerant. The use of native plant material and natural plant arrangements is strongly encouraged, whenever possible. Natural landscaping is considered an important component of the design and the designer shall make every effort to incorporate existing natural landscapes into the design and to preserve any
natural vegetation on the site. Landscape and site designs should preserve existing trees to the maximum extent possible. Proposed removal of existing trees shall be thoroughly evaluated before committing to a design strategy. The college encourages the preservation of wildlife habitat and the consideration of wildlife use in plant material selection. Landscape designs shall be based on the long term cost effectiveness and sustainability of the materials selected. The use of materials requiring excessive pruning, which drop noxious fruit or plant parts is discouraged. Landscape designs shall be cognizant of the need for a safe and secure environment for campus users. The use of inappropriate plant materials (e.g., poisonous, sharp needled, nuisance or invasive) is prohibited. Landscape and pedestrian area lighting shall be incorporated into the landscape design. In general, all designs shall promote the principles of low cost, safe, sustainable, cost efficient and low maintenance landscapes.

2.11.2 Turf Areas
Use mowed turf only in easily mow-able open spaces. Large expanses of open lawn should be minimized unless the area is a campus green. The use of ground covers, shade trees and native plants is preferred. Turf for open spaces and lawn areas within or adjacent to roadways and parking lots shall be Argentine Bahia sod. Turf for areas immediately around building perimeters, entrances and walkways shall be Argentine Bahia. Turf around building perimeters shall be planted so there is a minimum of two feet between the building face and the edge of the turf. The use of St. Augustine turf is strongly discouraged.

2.11.3 Foundation Plantings
Foundation plantings shall be selected so that at maturity, there is a minimum of two feet between the building face and the plant material space.

2.11.4 Soil requirements
Prior to designing a landscape project, the site shall be investigated by the designer and the soils tested to determine the suitability of the existing soils for the plants selected. The designer shall consider the existing soil conditions in the proposed design. Appropriate recommendations for soil amendments or modifications shall be made by the designer.

2.11.5 Quality
All landscaping shall be installed according to professionally accepted planting procedures by qualified persons using the quality and type of materials approved by the Owner’s representative. The quality of all plant material shall meet or exceed the “Florida Number One (#1)” rating as defined in Grades and Standards for Nursery Plants by the Florida Department of Agriculture and Consumer Services.
2.11.6  Warranty
The contractor shall be required to warranty the plant and landscape materials for a period of one (1) year from the date of final acceptance. The contractor is also required to provide maintenance specifications for all furnished plant and landscape materials.

2.12  Fencing and Gates

2.12.1  Temporary site fencing shall be provided for safety, traffic control and site boundaries as required by zoning, county or municipal authorities or the College.

2.12.2  Unless otherwise noted, permanent fencing shall be 6’ in height. Fabric shall be 9 gage galvanized wire, 2” mesh with 7mil black vinyl coating. Steel fence components shall be galvanized with coating to match fence. Line posts shall be spaced on 8’ centers (max). Fence shall have post caps, a top rail, bottom tension wire, pull, end and corner and gate posts (sized per gate opening); set in concrete as required. Fence at hazardous equipment enclosures shall be 6’ in height. All hardware shall be galvanized. Gates shall match fencing, hinged or rolling as required and adequately braced. All shall have matching hardware including hardware for padlocks.

2.12.3  Where equipment enclosure fencing is adjacent to building, it is desirable for fence construction to match the adjacent building construction.

2.12.4  Size enclosures to provide required clearance around equipment for servicing and removing or installing components.

2.12.5  If noise from equipment is problematic, sound attenuating material may be required.

2.13  Termite Control (Chemical)
TERMITE CONTROL: Design professional shall specify appropriate horizontal and vertical application of chemical treatment; gallons/CSF; control @ slab penetrations and perimeter, conditions of application, and terms of warranty.
DIVISION 3 - CONCRETE

3.1 Color

Colored concrete may be specified for selected surfaces (i.e., building facades, sidewalks, curbs, planters, benches, etc.). Where colored concrete is specified, it shall be integrally colored. The standard campus palette is a "warm tone concrete." Actual color of mix shall be approved by the Architect and Owner. Mock ups may be required for final approval. The Owner will provide detailed information during the design process for incorporation in the project documents.

3.2 Floor Drain

At all locations where floor drains are specified, the structural engineer shall so note this condition on the documents and shall specify the degree and the radius (in feet) of the slope which shall be constructed uniformly around the circumference of the drain. This requirement pertains to all floors, except where ceramic tile flooring is installed over a “mud bed”. The project architect, structural engineer, mechanical and plumbing engineers shall coordinate this detail throughout the pertinent decisions and categories of the contract drawings and specifications.

3.3 Construction Control Joints

Construction control joint locations for slabs on grade shall be shown on the Foundation drawings. In no case will a joint or saw cut occur in areas beneath ceramic tile. If required in terrazzo areas, they shall be located directly below Finish Control joints in the floor and shall extend in straight lines to the extremities of the finish floor. Refer to Division 7 for vapor barriers and water-stops.

3.4 Tolerances

<table>
<thead>
<tr>
<th>Slabs: Level:</th>
<th>¼&quot;/10' all directions (except @ floor drains)</th>
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<tbody>
<tr>
<td>Steps:</td>
<td>Refer to Accessibility Code Standards</td>
</tr>
<tr>
<td>Columns/Beams:</td>
<td>ACI Standards</td>
</tr>
</tbody>
</table>

3.5 Testing

Concrete testing shall include routine pours and Special testing as required (ASTM, etc.). Site work (civil) may be included. Coordinate with appropriate requirements in Division 1. The Colleges’ testing agency will be selected during bidding phase.
3.6  Precast Architectural Concrete

Panels should be uniform in color. Connections should be designed to allow for expansion and prevent cracking.

3.7  Concrete Reinforcing

Welded wire mesh (WWM) or fiber reinforcement may be used. WWM should not lay on the bottom of the slab. Rebar should have adequate cover.
DIVISION 4 - MASONRY

This division shall include all project masonry requirements, including site structures and signs, repairs as specified for existing structures; whether CMU, brick, stucco, etc.

4.1 Concrete Masonry Units

4.1.1 Where exposed Concrete Masonry Unit (CMU) occurs at interior spaces within the building (i.e., stairwells, machine rooms, custodial spaces, etc.,) the workmanship and materials shall be equal to that in occupied spaces including painted surfaces.

4.1.2 Bull nose CMU shall be provided at the corners of interior walls in high traffic areas, i.e., corridors.

4.2 Mortar

4.2.1 Mortar containing asbestos shall not be specified by designers or used by contractors or subcontractors.

4.2.2 Tooling of joint and color on new work shall match work on existing buildings on the respective Campus unless otherwise directed by the Owner.

4.3 Quality Assurance

Appropriate American Concrete Institute (ACI) and American Society for Testing Materials (ASTM) standards shall apply. Refer to Divisions 1 and 3 for testing, clean-up, scaffolding, etc.

4.4 Mock-ups

Mock-ups and/or test areas may be required before final approval of Owner.

4.5 Brick

Color and size of existing brick should be considered when specifying new brick.

4.6 Stucco

Stucco should be used on soffits above exterior doors (see 7.6).
DIVISION 5 - METALS

5.1 Finishes

5.1.1 Metal fabrications constructed of aluminum shapes and extrusions shall have an Mill finish. The typical color for all exterior metals is an Mill Finish for interior aluminum items Anodized Clear. Verify color for alterations/additions to existing buildings. In some instances a Kynar type finish may be approved for use by the Owner.

5.1.2 Ladder rungs shall have a non-slip surface specified as follows: Aluminum oxide granules set in an epoxy resin or, in lieu of a manufactured finish rung, filled with aluminum oxide grout.

5.1.3 Stair nosing: Provide abrasive filled extruded aluminum or brass safety tread nosing with embedded anchors at all concrete stair tread edges. Stair nosing anchors shall be embedded in the concrete, tops flush with adjacent surfaces, and in accordance with manufacturer’s instructions.

5.2 Steel Stair and Ladder Design

5.2.1 Stairs providing access to penthouses or roof areas from the top floor of a building shall be straight in design (no spiral stairs will be permitted). Stairs may be either conventional or “alternating tread” design with side rails. They shall comply with OSHA and ANSI requirements and shall have non-slip treads. Installation shall be in accordance with manufacturer’s instructions.

5.2.2 Ladders may be used only for Elevator pits, access to areas above high ceilings and connecting different roof elevations. Ladders may not be used for access to any space housing serviceable equipment. Ladders must conform to OSHA and building code requirements.

5.3 Equipment Supports

5.3.1 Structural steel framing connected to the building structure for the purpose of supporting toilet partitions, moveable walls, equipment of any type, including but not limited to: large TV’s, projectors and projection screens, HVAC equipment and piping, small water heaters, etc. must be designed or checked by a Structural Engineer, including anchorage details to the building structure. Such framing shall be adequately braced against vibrations, sway and torque from doors, etc.
5.3.2 All such material shall be shop primed. Installation tolerances shall be: ¼" horiz; ½" vert. Use manufacturer’s standard brackets, etc. where practical. Reinforce wall framing as required for such items as wall-mounted TV’s, transformers, projection screens, cameras and any special equipment whether required by A/E design or Owner Scheduled Equipment.

5.3.3 Rooftop equipment supports: Steel framing designed for load, wind, and uplift shall be painted with epoxy primer and paint system. Coordinate with roofing system in regard to anchoring, flashing, screening from view if required.

5.3.4 Expansion joint assemblies: Standard manufactured items, typically: anodized aluminum, clear for interior, dark bronze for exterior; Owner to verify final color.
DIVISION 6 - WOOD AND PLASTICS

6.1 Rough Carpentry

6.1.1 Provide preservative treated lumber for cants, nailers, blocking, furring, grounds, stripping and similar items in connection with roofing, flashing and waterproofing or in direct contact with concrete or masonry.

6.1.2 Provide wood blocking for walls, equipment, etc., provide wood blocking within partitions or walls at locations where items provided and installed by the Contractor or the Owner will be mounted or secured to the wall system. Contractor shall be required to record as-built location of all blocking on field documents. A partial listing of such items is as follows:

- Wall mounted door stops (where indicated)
- White boards (Rail @ 36” AFF)
- Tack boards (Rail @ 36” AFF)
- Wall mounted shelving (Special purpose only)
- Surface mounted Bulletin Boards (if indicated on plan)
- Wall mounted pencil sharpeners (60” AFF, near entrance)
- Wall Clock, battery powered (96” AFF, per plan location)
- Wall hung upper cabinetry
- Projection screens
- All wall mounted electrical equipment

6.1.3 Store lumber off the ground and under cover. Vent to prevent condensation.

6.2 Finish Carpentry

6.2.1 Listed in items 6.2.2 through 6.3.6 are Owner required features college-wide that shall be incorporated in the contract documents for all custom cabinets, finish shelving (laminate clad), counters, etc. that are not intended for science laboratory or special applications.

6.2.2 Quality and construction standard; AWI Custom, Section 400 quality. All exterior exposed surfaces shall be clad with plastic laminate: Color shall be selected by the Owner from manufacturer’s currently available stock.

6.2.3 Acceptable materials: Plywood panels; PS-1 (AWI Sections 100/200). Countertops shall be ⅜” (9 ply) plywood. Tops with sinks shall be plywood, ¾” minimum thickness, with 4” backsplash. Doors shall be ¾” plywood. Stiles shall be used between all doors. Maximum height shall be 7'-0". Shelves shall be adjustable. Backs shall be ½” plywood. Hardwood lumber for trim shall be Red Oak, AWA Custom grade. Drywall
Soffit shall be provided to ceiling. All wood in contact with the floor shall be pressure treated.

6.2.4 Workroom and utility shelving: 1" x - pine, paint grade w/tight knots, 2" x 4" support frames @ 36" maximum spacing; with 1" x 4" toe board. Corner returns shall have shelving or be closed with plywood. Shelving assemblies shall be secured to wall framing and shall be designed for 75 pounds per square foot loading. Wall brackets are typically not acceptable; verify with Owner. Shop drawings will be required for all millwork items. Any wood supports, etc., in contact with floor shall be pressure treated.

6.2.5 Lounge area and conference room counter tops shall have 4" high back-splash panels and rim mount sinks with sealer to counter top. At office workrooms, lounges, etc. as well as other spaces as directed by the Owner, the clearance between the “top of base cabinets” and the “bottom edge of wall upper cabinets” shall be no less than 18".

6.2.6 Cabinet Hardware standards shall be determined during design.

6.2.7 Door and drawer locks (where Owner specified, i.e.: Labs)
Basis for design: BEST Series with cylinders, strike plates, rosettes and keys. Keying shall be as follows:

6.2.7.1 All doors and drawers shall be provided with a lock except at a “pair” of doors with a common cabinet. In this instance, the left door leaf shall be provided with a concealed spring-loaded manual latch and the right hand door shall be provided with a lock cylinder.

6.2.7.2 Provide four (4) master keys for each bitting used and two (2) change keys for each cylinder installed.

6.2.7.3 “Visual Key Control” shall be provided for all locks and keys by stamping the assigned Key Set Symbol on the bow of each key; the unexposed surface of each cylinder.

6.2.7.4 Also provide at Substantial Completion three (3) copies of a Keying Schedule which lists each Key Set Symbol and the Hillsborough Community College Room Number that the "KSN" occurs in.

6.2.8 Where “mail slots” are called for, provide space for a cabinet furnished by the Owner with bins: 6"h x 11"w x 14"d. It shall start at countertop height with the top at 6'-0" height. A drywall soffit shall be provided to ceiling.

6.2.9 Installation: Contractor shall verify location of all cabinets, blocking, mounting heights, plumbing and electrical equipment and identify possible conflict with other trades, and
flooring installations. Specify to prime and back-paint before installation of all cabinetry. Leveling floors shall be the responsibility of the General Contractor.

Do not install until the building is enclosed, the permanent heating and cooling systems are in operation and residual moisture from plaster, concrete, masonry or terrazzo has dissipated.

6.3 Countertops

6.3.1 Laminate; standard installation in classrooms, computer laboratories, conference rooms, workrooms and lounges; basis of design is Formica.

6.3.2 Epoxy resin; standard installation in chemical, biology and science laboratories; basis of design is Chem Tops.

6.3.3 Solid Surface/Recycled Plastic; Restrooms.

6.3.4 Natural or Engineered Stone: Information desks and special applications.

6.3.5 Stainless Steel: food service preparation areas, kitchens

6.3.6 Standard counter top height is inches (34”) above finish floor (AFF).
DIVISION 7 - THERMAL & MOISTURE PROTECTION

This Division normally contains Sections relating to protection against moisture intrusion. Hillsborough Community College retains the services of a roofing consultant, when applicable.

All Sections of this Specification pertaining to roofing systems, flashing, roof penetrations, roof deck thermal control, and fascia trim shall be coordinated with the consultant through Hillsborough Community College. Items being anchored to the roof must be reviewed by the Consultant. The consultant will be responsible for all roofing inspections and warranty approvals. This specification outline deals with the Owner’s preference in exterior materials, colors, and finishes as well as the design intent of water intrusion prevention for the total building envelope.

7.1 Moisture/Damp Proofing

7.1.1 Scuppers
Where “through parapet wall” scuppers are required, they shall be constructed of 24 gauge stainless steel sheeting and shall be so designed that they prohibit capillary action of water and extend/project far enough away from the parapet wall surface that staining will not occur on the adjacent wall surface. An exception to the material specified may occur if the scuppers are to be installed at a height of 25’ or less above finished grade. In this instance the scupper assemblies shall be constructed of copper sheeting or Kynar finish, furnished and installed by the roofing contractor.

7.1.2 Parapet
Parapet coping cap material shall be mill finish (or anodized) (0.050 in.) stainless steel. No applied coating shall be acceptable or provided unless specifically approved by the Owner. All roofing metals shall be furnished and installed by the roofing contractor.

7.1.3 Bituminous Damp Proofing
Type I: Shall be trowel-applied over foundation surfaces from footing to grade.
Type II: Brush or spray applied to masonry walls for brick or pre-cast veneer.
General: All material is required to be asbestos-free.

7.1.4 Metal-oxide Waterproofing
To be used in elevator (or other equipment) pits below grade.

7.1.5 Water repellent
To be used on architectural pre-cast concrete, cast-in-place concrete exposed surfaces, brick or stone veneer.

7.1.6 Application and handling
All materials shall be used in strict accordance with manufacturer’s instructions and Architect’s clean-up instructions.

7.1.7 Vapor Barrier
Specify two layers heavy duty polyethylene material, glass-reinforced, bonded into one layer with kraft paper. Sealing tape 4” wide shall be provided below all slabs on grade. Proper laps, protection, sample submittal are required. Pay particular attention to openings in slab.

7.1.8 Material and details used for thru-wall flashing, gutters and down-spouts shall be permanent and low maintenance.

7.2 Building Insulation

7.2.1 Thermal Batt Insulation, faced and un-faced; default to current code requirements; on exterior walls, steel roof framing.

7.2.2 Insulation Boards
As specified by Roofing Consultant.

7.2.3 Sound Insulation
Un-faced Sound Attenuation Blankets; required in all walls around a conference room, classroom, laboratory, office, restroom or other special purpose rooms. Studs and insulation shall be installed to the deck above. Sound batt thickness to match width of wall cavity.

7.2.4 Safing Insulation (Fire stopping)
Safing Insulation shall be equal to USG Thermo Fiber, min. density - 4 lbs. /cu. ft.

7.2.5 Also see Gypsum board wall assemblies, Fire-rated and Sound Attenuation.

7.3 Covered Areas
Provide overhead canopies at primary building entrances. Galvanized sheet metal panel systems are recommended for soffit construction. Gutters and down-spouts may be used at covered walkways as long as run-off is directed away from walks or is discharged into underground storm drainage lines.

7.4 Sky-lights
Where day lighting of interior spaces is desired, vertical clerestory glazing is preferred in lieu of roof mounted skylights.
7.5 **Roofing**

7.5 In new roof construction, insulation shall not be used as the primary method to assure proper drainage, slope shall be designed into the structure.

7.5.1 Minimum slope on low slope roofs is ¼" in 12".

7.5.2 Equipment should not be located on the roof. If there is no other alternative and equipment must be installed on the roof, provide walkways designed for access to service the equipment.

7.5.4 All roof drains should connect to the storm drainage system. Built in gutters and downspouts shall not be used. Scuppers shall not be used for primary discharge. Downspouts at high traffic areas shall be protected with heavy duty covers up to 4' above finish grade. Provide clean-out flush with finish grade within 10' of building wall or downspout location at all underground storm drainage lines. Overflow roof drains shall not be designed to empty onto pedestrian walkways.

7.6 **Exterior Insulating Finishing Systems (EIFS)**

**EFIS shall not be allowed unless specifically approved by the owner!**
DIVISION 8 - DOORS AND WINDOWS

8.1 Metal Doors and Frames

8.1.1 Hollow metal doors shall only be used with Owner approval at interior locations. For exterior doors see 8.2.1

8.1.2 Quality assurance: ANSI/SDI 100. Fire rated assemblies shall be in accordance with NFPA 80, testing per ASTM E 152 with Listing and permanent labels by UL and temperature rise rating for exit stairs.

8.1.3 Specify delivery, storage and handling requirements.

8.1.4 Installation shall require tolerances at head, jamb and floor for proper functioning hardware: Require floor shipping spacer to remain until door is installed. Coordinate for undercutting per Division 15. Require grouted jambs at rated walls. Double studs shall be required at jambs for widths of 36" or greater. Standard door is height 7'-0".

8.1.5 Top channel of door shall be solid material with no pockets so as to avoid dirt collection.

8.2 Flush Aluminum Doors and Frames

8.2.1.1 At all exterior locations where a flush metal door is required (i.e., Mechanical/electrical spaces, stair towers, etc.) an aluminum framed, internally insulated door with fiberglass reinforced polyester panels (with a dimpled surface) shall be provided.

8.2.1.2 The color of all finished surfaces of exterior aluminum doors shall be determined by owner’s hardware requirements: Closer, lockset, stop/wind protection, weather-striping. If no canopy is planned then provide for a rain drip at door head. Exterior mechanical room doors with removable louvers shall have insect screening behind louver.

8.2.1.3 Maximum allowable height for exterior doors shall be 8'-0". Standard shall be 7'-0".

8.3 Flush Wood, Interior Doors

8.3.1 All flush wood doors shall be constructed with a staved wood core flush five ply or as required for fire listings greater than 20 minute; factory fitted and factory finished, AWI Premium Grade. Standard of quality: Marshfield, Select Rift Cut, White Oak, to be reviewed and approved with finish sample by the Owner is required.

8.3.2 All flush wood doors shall be provided with a manufacturer's full, unlimited, lifetime warranty.
8.3.3 Face and Edge Veneers

8.3.3.1 Architect shall verify wood type/cut of existing buildings at same campus as each has different veneer requirements. The edge veneer shall match the face veneer. On paired doors both leaves shall match.

8.3.3.2 Veneer shall be clear and without dark spots or streaks.

8.3.3.3 Doors shall be factory finished as selected from Architects’ submittals.

8.3.4 A glazed window (6" x 12" min.) shall be specified at all faculty office doors in the upper (latch) corner. Window shall be clear glass unless required to be fire rated.

8.3.5 Avoid an overlapping metal astragal on pairs of doors except when required by NFPA 80. If an astragal is required, provide hardware to coordinate closing sequence.

8.3.6 Specify product protection for shipping, handling and required storage conditions.

8.3.7 Classrooms are to be oriented so that the entry doors are in the back of the room to minimize disruptions.

8.4 Access Doors

8.4.1 Access panel location shall be closely coordinated with Mechanical, Electrical, and Plumbing (MEP) consultants.

8.4.2 At all wet locations (i.e., restrooms, custodial closets, etc.) access panels, if required, shall be constructed of stainless steel. Access panels for water shut-off valves shall be hinged with a latching provision. All screws shall be stainless steel.

8.4.3 At all dry locations access panels shall be constructed of sheet steel with factory applied primer finish (paint to match wall color).

8.4.4 Door locking devices shall be screwdriver operated cam locks provided in sufficient quantity to hold the door in a flush smooth plane when closed.

8.5 Exterior Aluminum Storefronts, Curtain Walls and Windows

8.5.1 Color of aluminum members shall be determined by owner. This shall be an anodized finish.

8.5.2 All exterior glazing shall be commercially manufactured glass. Types of glass shall be selected by function, location and schedule. Thermal breaks shall be provided in the framing glazing system.
8.5.3  At all locations where the bottom plate of storefronts or curtain walls occur at or close to finish grade, extreme care shall be given to the design to insure that the specified gasket or bedding compound is of the very highest quality and is warranted for the life of the installation. Sills installed less than 4” above ground floor elevation shall have a “drain pan” below the bottom member. Storefront systems shall be “internally drained” with appropriate weeps at the pan.

8.5.4  Storefront supplier shall furnish sealed design calculations for wind (per code), provide anchorage details, internal reinforcing as required and furnish non-powered overhead closers, sized per door requirement. Power door operators may be supplied separately when coordinated with Storefront Manufacturer for power and attachment. Maximum height for exterior Storefront doors shall be 8’-0”.

8.5.5  Concealed overhead and floor door closers are not acceptable.

8.6  **Interior Glazed Storefronts**

8.6.1  Interior “borrowed light” windows may be specified in certain areas in full compliance with wall and frame fire rating as well as glass safety requirements.

8.6.2  All interior glazed openings may be single glazed. Thermo-pane is not required but glazing must be sealed against moisture and dust.

8.6.3  Pass-through windows may utilize glass with “speaker” hole and/or opening at counter.

8.6.4  Architect shall provide a glazing schedule for all glass as to type, thickness, temper and color. Schedule must be approved by the Owner

8.6.5  Concealed overhead and floor door closers are not acceptable.

8.7  **Finish Hardware**

8.7.1  Only BEST type locksets shall be used unless otherwise required for special applications or by State Requirements for Educational Facilities (SREF). Mortise type locksets are not acceptable and shall not be specified.

8.7.2  Color and finish of door hardware (both exterior and interior) shall comply with HCC standard VSZ26D. In renovation and remodeling projects, color and finish shall match and be compatible with the most recent installation on the same (project) or campus. Storefront applications shall match finish of adjacent aluminum finish regardless of campus standard. Color and finish of door hardware shall be selected by the Architect and approved by the Owner.

8.7.3  All door closers shall be mounted on the interior side of all doors.
8.7.4 All door stops shall be floor mounted, half-dome type. If necessary to use a wall mounted stop, specify wood blocking at the appropriate location.

8.7.5 A wardrobe hook shall be installed on the inside of all Faculty Office doors at 60" AFF and a surface mounted (18x18) message board shall be installed on the exterior opening side of the wall at 54" AFF.

8.7.6 Specify a minimum (8" high x width required) metal kick plate of the appropriate finish color to match adjacent hardware finish at all restrooms, custodial closets, storage rooms, mechanical/equipment rooms, electrical rooms, laboratories and exit doors. 2" high mop plates shall be required at all doors abutting vinyl or terrazzo floors. Color and finish shall match hardware.

8.7.7 All locksets shall be ADA compliant with lever operating trim lever style to match campus standard (with knurling on the lever handle at all required locations).

8.7.8 All hinges shall be heavy duty ball bearing loaded type. Provide stainless steel, non-removable pin (NRP) feature at all locations where hinges are exposed at the outside or exterior side of the door.

8.7.9 All panic devices shall utilize a cylinder and key (keyed to match the exterior cylinder) to operate the “dogging feature” of the device. The use of Allen wrenches or other tools to activate the dogging feature of the hardware provided at the door will not be approved by the Owner. Von Duprin 99 Series is the College standard.

8.7.10 Sound seals shall be specified for all classrooms, laboratories and conference rooms. Seals at door bottoms shall be included unless door opens into a carpeted area.

8.7.11 All restrooms shall have pull handle outside, push plate inside and deadbolt function BEST lock with non-projecting (“L” Function) thumb turn inside.

8.8 Keying

8.8.1 Contractor shall furnish and install locksets complete and order with their properly keyed cores. Cylinders or interchangeable cores shall be set at the factory into special restricted keyway system for Hillsborough Community College with a construction master key.

8.8.2 Proximity Key Systems
Hardware applications will support the access cards and the current keyway applications. All new construction shall supply cable and raceway to facilitate Access Control, through keyless entry on selected exterior doors only. Door jambs and appropriate hinges shall be of the pre-drilled type and capable of accepting wiring for the installation of proximities card readers. HID proximity cards or equal shall be provided for entry ways and in areas where security is critical. Exterior door
applications shall support all aspects of life safety and be capable of default setting in the event of power loss or emergencies. Handicap accessibility will be achieved by installing the card reader adjacent to the push button.

8.8.3 Furnish the following keys:
To be determined by owner.

8.8.4 Supplier of builder's hardware specified in the schedule shall furnish locksets complete with required cylinders set to restricted special keyway. All blanks, cut keys and cylinders shall be made available to the Owner's Designated Hardware Representative through regular authorized factory distributors.

8.8.5 All locksets and cylinders furnished under this contract shall be CONSTRUCTION KEYED or contractor supplied temporary IC cores. Furnish twelve (12) construction keys (new construction and major renovation/remodeling projects).

8.9 Key Delivery and Key System Hardware Inspection

8.9.1 In no instance will the contractor supplier convey, transmit or deliver any of any keys to anyone other than the Owner's Designated Hardware Representative.

8.9.2 Each door and key cylinder shall be physically tested for proper operation by the installer and superintendent. A list of all deficiencies found will be recorded and shall be made a part of the Substantial Completion Punch List for the project.
DIVISION 9 - WALLS & FINISHES

9.1 Interior Wall, Partition Construction

9.1.1 All walls and partitions shall extend to the structure above and shall be designed for total height with bracing as required and fire-stopping at ceilings per code. Anchorage shall be designed at structure above to achieve sound stop without transmitting building loads through anchors. Double studs shall be required at door jambs. Walls at mechanical and electrical rooms shall have curb or other permanent water barrier at perimeter walls. Conduits, piping and equipment shall be mounted on back boards or Unistrut brackets.

9.1.2 All partition types shall be identified on the Floor Plans; detailed on (or adjacent to) the Life Safety Plans with UL and Fire Ratings as well as descriptions. Walls shall have 16” off-set gypsum board joints. Show and define smoke compartments, smoke walls, fire-rated walls, stair and exit information; and all materials with ratings, thickness, etc., on Life Safety Plan. Fire rated walls shall be marked above the ceiling at no more than 10’ intervals.

9.1.3 All walls shall be filled with acoustical insulation from finish floor to the structure above. At all perimeter edges of a wall (top, bottom, ends and at intersections of walls) acoustical sealant caulk shall be installed. Floor track shall be bedded in two (2) beads of acoustic sealant at all corridors and equipment rooms.

9.2 Walls and Miscellaneous Finishes

9.2.1 Paint; the Owner will only accept paint products manufactured by the Sherwin Williams Co., or equal. **White paint shall not be allowed on stair hand or guard rails unless specifically approved by the owner!** The standard colors are:

<table>
<thead>
<tr>
<th>CAMPUS</th>
<th>BUILDING</th>
<th>PAINT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandon Campus</td>
<td>All</td>
<td>Gray Enamel, Devoe Paint from ICI Delux paints, Devguard 4308 Alkyd Enamel</td>
</tr>
<tr>
<td>GWSC</td>
<td>Administration</td>
<td>SW6091 Reliable White</td>
</tr>
<tr>
<td></td>
<td>Corporate Training</td>
<td>SE7006 Extra White</td>
</tr>
<tr>
<td>Dale Mabry Campus</td>
<td>DGYM-Gym</td>
<td>Light Tone, Marshmallow #80YR83/017; Dark tone, Toasty Grey, #30YY51/098</td>
</tr>
<tr>
<td></td>
<td>DLRRC-Library</td>
<td>Marshmallow #80YR83/017</td>
</tr>
<tr>
<td></td>
<td>DSSC-Social Science</td>
<td>Painters' White #90YR645/040</td>
</tr>
</tbody>
</table>
DHUM-Humanities  Light tone, painters' white #90YR64/040
DSCS-Science   Toasty Grey, #30YY51/098

Southshore  
Campus  

SMPF-Multipurpose  
Salem Grey B70W00213; Water based epoxy gloss-Putnam

YPAB-Performing  
Campus  
Arts  
SW6106-2210-0100 White; SW6335-2403-0500 Fired Brick
YPST-Public Service  
SW2260-0100 White
YBOR  
SW2210-0100 White
YFAC-Faculty  
SW2210-0100 White
YCDC-Child Care  
SW4216-0400 Green
YLRC-Library  
22600400-Black
YVAB-Visual Arts  
22600400-Black

Plant City  
Campus  
Match existing or as determined by the Owner

Ybor City  
Campus  
Training  
Center  
Match existing or as determined by the Owner

Brandon  
Advantage  
Center  
Match existing or as determined by the Owner

Other colors may be introduced where appropriate and approved by the Owner. These selections must be of the same paint quality.

9.2.2  Vinyl Wall Covering  
Special applications:  **ONLY**  when identified and selected by the Owner.

9.2.2.1  Baseboard  
Baseboard color shall match owner approved door frame color.  **White base shall not be allowed unless specifically approved by the owner.**

9.2.3  Ceramic Tile

33
9.2.3.1 Ceramic wall tile shall be specified for all toilet room walls, full height and drinking fountain alcoves to ceiling, full alcove.

9.2.3.2 Tile shall be provided with a full selection of all trim shapes required for proper installation (i.e., inside and outside corners, cove base, inside and outside cove base corners). All special shapes will match the color of adjacent tile.

9.2.3.3 Tile shall be cushion edge, thin-set with inside/outside corner and cove base as manufactured by American Olean, DIAL Tile or approved equal.

9.2.3.4 Contractor shall provide the following “attic stock” to the Owner at Substantial Completion: One (1) sealed carton of wall tile and twelve (12) pieces of each of the following; inside corners, outside corners, and caps. These shall be boxed with contents labeled. See Section on ceramic floor tile.

9.3 Floor Finishes

9.3.1 Specify synthetic terrazzo, pre-cast cove base and stair treads with inset abrasive strips. The terrazzo shall be finished, the entire surface grouted and re-finished.

9.3.1.1 Architect and Owner will determine pattern and design of control joints and zinc divider strips during the design phase of the contract documents.

9.3.1.2 Architect and Owner will select patterns and colors of terrazzo.

9.3.1.3 Joints **must** occur directly over slab joints below.

9.3.1.4 Terrazzo stairs shall have integral non-skid embeds designed for such use.

9.3.1.5 Carpet Tile anti-statics shall be specified for offices, conference rooms, waiting areas, classrooms, computer labs and lab related classrooms.

9.3.2.2 Provide Five percent (5%) of each color for attic stock.

9.3.2.3 Basis of Design: Mohawk Square Recycled Content 24” X 24” tile. No adhesive backing to be used for installation. Standard style Alladin;

Other styles will be considered per project, pending approval of Owner. Use 6” rubber base at locations of carpet.

9.3.2.4 Cove Base and accessories shall be as specified above for new construction. Match existing for renovation project.
9.3.3 Ceramic Tile
9.3.3.1 Shall be provided in all toilet rooms to coordinate with ceramic wall tile and cove base.

9.3.3.2 Refer to Division 3 for floor preparation and slopes at drains.

9.3.3.3 Floor grout shall be epoxy.

**9.3.3.4 White grout shall not be allowed unless specifically approved by the owner**

9.3.4 Vinyl Composition Tile (VCT)
Basis of Design: Armstrong

9.3.5 Linoleum
Basis of Design: Armstrong

9.3.6 Concrete

9.3.6.1 Painted concrete with a vinyl base shall be provided in custodial, communications and in stairs and landings in stair towers. Paint should be chemical, impact and abrasion resistance.

9.3.6.2 Unpainted sealed concrete shall be allowed for exterior stairs, landings and covered entrances.

9.3.6.3 Dyed concrete may be used where appropriate.

9.3.7 Specific program requirements may necessitate special floor finish applications such as; resinous floor systems or epoxy coating.

9.4 Acoustical Ceilings

9.4.1 At all Main Entrances, Main Corridors, Lobbies, Rotundas, and all Public areas ceiling tile shall be specified as follows:

<table>
<thead>
<tr>
<th>Size</th>
<th>2' x 2' x ¾&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge</td>
<td>Tegular</td>
</tr>
<tr>
<td>Pattern</td>
<td>Directional Fissured with Random Perforations</td>
</tr>
<tr>
<td>Model No.</td>
<td>AC 200</td>
</tr>
<tr>
<td>Manufacture</td>
<td>Armstrong, Basis of Design</td>
</tr>
</tbody>
</table>

9.4.2 At all occupied spaces (i.e., offices, corridors, classrooms and laboratories, classroom and laboratory service rooms, etc.) ceiling tile shall be specified as follows:
<table>
<thead>
<tr>
<th>Size</th>
<th>2' x 2' x ⅝&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge</td>
<td>Tegular</td>
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<tr>
<td>Model No.</td>
<td>AC 200</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Armstrong, Basis of Design</td>
</tr>
</tbody>
</table>

9.4.3 With few exceptions, ceiling surface in restrooms is drywall with access panels for servicing equipment. In restrooms (and at all areas subject to high humidity conditions) where acoustical ceilings are needed the following listed ceiling tile shall be specified:

<table>
<thead>
<tr>
<th>Size</th>
<th>2' x 2' x ⅝&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge</td>
<td>Square</td>
</tr>
<tr>
<td>Pattern</td>
<td>Random Large and Small Perforations</td>
</tr>
<tr>
<td>Special Face Finish</td>
<td>Ceramic</td>
</tr>
<tr>
<td>Model No.</td>
<td>AC 100</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Armstrong, Basis of Design</td>
</tr>
</tbody>
</table>

Additional manufacturers and styles may be possible with Owner approval.

9.4.4 When it is necessary to field cut "Tegular edged” tile, the field cut will also be a Tegular edge so that the tile is supported on the grid member edge and will not sag. Field cut edges shall face a wall.
DIVISION 10 - SPECIALTIES

10.1 Visual Display Boards

All Visual Display Boards will be installed level with concealed mechanical fasteners at the corners. The use of mastics/adhesives will not be permitted. Marker boards shall be installed at 36" AFF, tack boards as noted.

10.1.1 Marker boards shall be joined by use of a steel concealed spline which will assure perfect alignment and hairline joints. Marker boards shall be installed with mechanical fasteners only. Glue shall not be used to allow the marker board to be removed without damaging the board or the wall surface. Marker boards shall be constructed of 24 gauge steel sheet with a virtuous porcelain enamel writing surface. A 50 year warranty shall be provided. The core material shall be 7/16" thick with a .015" aluminum backer sheet. A marker rail with cast aluminum caps, a 1" wide map rail with cork insert and map hooks and aluminum trim at all edges shall be included. Marker boards shall be equal to Claridge WLCS Series.

10.1.2 Tack boards shall be constructed of ¼" thick natural cork, ¼" hardboard with .015" aluminum backer sheet. Edges will be finished with mitered aluminum trim.

10.2 Phenolic Toilet Partitions

10.2.1 The toilet compartments in group toilets shall be constructed from High Density Polyethylene (HDPE) or Poly-Mar HD or Poly-Granit HD virgin resin materials in colors that extend throughout the surface. The panels, doors and pilasters shall have combined recycled and/or virgin material (HDPE). Panels shall be 1" thick and all edges machined to a radius of .250" and all exposed surfaces to be free of saw marks. Product shall be resistant to rust, mildew, graffiti, dent and crack resistant as well as chemical and corrosion resistant with water vapor impermeability.

10.2.2 Manufacturer to supply a written warranty covering all plastic components and plastic hardware against breakage, free from manufacturing defects in workmanship or material, corrosion and delamination for a period of 15 years.

10.3 Clocks

10.3.1 Clocks shall be battery operated with 1 year life heavy duty battery. Trim shall be black and face shall be white.

10.3.2 Install clocks in all classrooms, laboratories, and all other spaces occupied by students (to include the main lobby or rotunda of a building). Clocks may also be installed in other spaces as directed by the Owner during the design process.
10.3.3 Mounting Heights and Locations

In classrooms, mount clock on the center line of the side wall at 8'-0" AFF so that it is visible to both the instructor and the students. At all other locations, the mounting height shall be 8'-0" AFF and at the location designated by the Owner.

10.4 Access Flooring

Access floors, when requested by the owner, shall be All Steel 1000 as manufactured by Tate Access Floors or equal. The access floor shall be constructed of 2’ square panels capable of supporting a concentrated load of 1000 pounds. Panel lifting devices, spare panels and perforated floor panels for air distribution shall be included.

10.5 Exterior Signage

10.5.1 The existing exterior signage system for each campus will be in accordance with College sign standards.

10.5.2 Use white premium grade vinyl die-cut letters, numbers and symbols (non-reflective and reflective depending upon location and function) VC specifications to be provided during design stage.

10.5.3 Include electrical lighting when specified by owner.

10.5.4 New exterior signage shall be designed based on information provided by the Owner and the Owners archives and shall be formatted and included in the Contract Documents for the project.

10.5.5 All exterior sign locations shall be coordinated with the landscaping and site utility plans for any obstructions. All exterior post and paneled signs shall have a minimum clearance of 24" from finish grade to bottom of panels.

10.6 Interior Signage

10.6.1 Standards

10.6.1.1 The letters, numbers or graphic symbols are “graphic blasted” or machine engraved into the surface of this signage material and located per A.D.A requirements.

10.6.1.2 The signage shall be mounted at the designated locations by the use of two-sided foam tape. In high humidity, damp or exterior locations or on porous/uneven surfaces, mount signage with construction adhesive.

10.6.1.3 Color: to match existing; new construction to be determined during design.

10.6.2 During the Design Phase and when the Architect has finalized the floor plan and
assigned construction document room numbers to all spaces, he will deliver a complete set of “electronic” floor plan sheets to the Owner. From these sheets the Owner will establish the Owners Room Numbers and will develop:

10.6.2.1 The Signage Schedule for all interior signs (to include sign type, mounting location, mounting height, copy, etc.).

10.6.2.2 All details for each type of sign (i.e., size, graphics, shape, letter/number style, color of signs to include color of engraved area, etc.).

10.6.2.3 All information regarding material, manufacturer, etc.

10.6.3 All of this will be returned to the Architect for formatting and inclusion in the Contract Documents for the project. The Architect’s Signage Sheet shall show Owner’s No. for all spaces.

10.6.3.1 Provide interior, recessed, changeable, lockable, magnetic backed menu/directory boards. They shall be located two (2) on each floor at primary traffic locations. Similar to Quartet 2964M aluminum 48” x 36” magnetic directories with aluminum frames.

10.7 Folding Panel Partitions

10.7.1 System shall be equal to: Hayworth System moveable wall having a minimum STC rating of 43.

10.7.2 The area above the ceiling system and directly above the folding partition wall (and for the full length of the wall) will be closed from top of ceiling system to the bottom of the structure above with a supporting wall or system with acoustical insulation that has at least as good a sound transmission rating as the partition assembly.

10.7.3 Provide the Owner with two (2) operating wrenches for each individual room partition system that is installed.

10.7.4 Provide the following accessories at the direction of the Owner; Integral chalkboards, marker boards, chalk and eraser trays and tackboards.

10.7.5 Owner will select panel face/color during Design Phase.

10.8 Fire Protection Specialties

10.8.1 In all occupied or finished spaces, fire extinguisher cabinets shall be fully recessed. Cabinet front and frame shall be a clear anodized aluminum finish, mounted at ADA height. Extinguisher type, size and spacing shall be designed to meet or exceed requirements of NFPA 101 and NFPA 10. Maintain wall fire rating behind cabinet.
10.8.2 In all engineering spaces, custodial spaces and storage rooms, fire extinguishers may be surface mounted using the manufacturer’s approved bracket.

10.9 **Toilet Room Accessories**

10.9.1 **Toilet Tissue Dispenser:** San Jamar Model R4000TBK Unisource #1026554 (Supplied by Owner)

10.9.2 **Soap Dispenser:** GOGJ Model #5155-06 AST0364 Black (Supplied by Owner)

10.9.3 **Toilet Seat Cover Dispenser:** Impact Model #1122 Unisource #10449653 (Supplied by Owner)

10.9.4 **Paper Towel Dispenser:** Sam Jamar Model #T1290TBK Unisource #10085050 (Supplied by Owner)

10.9.5 Unit to be secured to wall above lavatory with two screws. Exact location shall be specified by Owner at the time of installation.

10.9.6 Coordinate the location of this dispenser so that no conflict occurs at either the wall mounted mirror above the lavatory or the cold water faucet assembly mounted on the deck of the lavatory.

10.10 **Mop Holders**

10.10.1 **Mop Holders** shall be Bobrick, Model No. B-223, Stainless Steel, 48” long x 5’ or equivalent; provide one (1) at each custodial sink. Mount at 60” AFF.

10.11 **Corner Guards**

10.11.1 Provide vinyl “corner guard protection” at all “outside wall corners” in public areas of the building (i.e., hallways, corridors, exposed free standing columns, etc…)

10.11.2 Corner guards will be installed directly above the wall base material and extend up the wall to 52” AFF.

10.11.3 Color of corner guard shall match the wall color to which it is installed.

10.11.4 Mounting adhesive shall only be when supplied or recommended by the manufacturer.
10.11.5 Contractor shall warranty installation of corner guards for a period of one year including adhesive and any required repairs to wall surface due to replacement or necessary repair to the product.
DIVISION 11 - EQUIPMENT

11.1  Theft Protection System (where required by Owner)

11.1.1 Theft Detection System: (For special equipment, books, projectors, etc.)

11.1.2 Owner will furnish detailed requirements at specific locations, wherever this system is required.

11.1.3 System shall utilize a micro magnetic type system to prevent unauthorized removal of books, periodicals and A/V materials.

11.1.4 Electrical power for this system shall be provided from the building's Emergency Power Electrical System.

11.1.5 Provide the following accessories with the system:

11.1.5.1 Desktop Desensitizer

11.1.5.2 Electric Sensitizer

11.1.5.3 Hand Stamp

11.1.5.4 Four (4") Double Sided Strips/1,000 ea.

11.1.6 The power/electronics control cabinet for each installation location will be mounted above the ceiling system and the audible horn component will be flush mounted on the ceiling tile directly above the monitoring panels.

11.2  Projection screens, power operated; front projection. (If requested by Owner)

11.2.1 Power operated screens, when required, shall be recessed mounted in the ceiling with mechanically operated flush door. Screen shall be sized according to the Owner requirements suitable for the size and seating capacity of the space. Operating switches shall be as directed by the Owner. Switch at the screen location shall be key-operated. Motor shall be end-mounted. Projector may be either overhead or in the room space as function requires.

11.3  Laboratory Equipment:

11.3.1 Science Laboratory equipment shall be equal to that manufactured by Fisher Scientific
11.3.2 Computer Laboratories: Special equipment requirements (control rooms, special flooring systems and lighting controls) information will be supplied by the Owner.
DIVISION 12 - FURNISHINGS

12.1 Window Blinds (When Specified by Owner)

12.1.1 Blinds shall be 1" wide, vinyl slats with a plastic wand tilting mechanism as manufactured by Bali or equivalent.

12.1.2 Standard locations should be colored coordinated with the color palate for the building.

12.1.3 Provide surface mounted vertical guide channels at all locations where a blind is installed adjacent to a door to prevent blind from being damaged by the opening and closing action of the door.

12.2 Window Shades

12.2.1 Window shades shall include clutch, tube, chain, fascia and fabric to produce manual roller shades. Basis of design: Mechosytems, Inc.

12.3 Marker, Bulletin and Tack Boards

12.3.1 White marker boards shall be provided on the front wall and on one sidewall of the classroom/laboratory clearly visible from all student stations.
   a. Classroom, 800 sf or larger 4’ x 16’ in front wall and 4’ x 12’ on side wall
   b. Classroom smaller than 800 sf 4’ x 12’ in front wall 4’ x 8’ on side wall

12.3.2 Two (2) bulletin/tack boards mounted inside the room (minimum of 48” x 48”), one of which shall be mounted adjacent to the opening side of the entrance door.

12.3.3 One (1) 24” x 24’ tack board mounted on the wall outside of the room adjacent to the opening side of the entrance door.
DIVISION 13 – SPECIAL CONSTRUCTION

To be published as needed
DIVISION 14 - HYDRAULIC ELEVATORS

14.1 Basis of Design

Otis Elevator

14.2 Cab

Cab door shall be center opening type (two leafs) with a minimum clear opening of 4'-0" wide. Minimum clear inside dimensions of the cab shall be: 6'-8" w. x 5'-5" d. x 8'-0" clear ht.

14.2.3 Finishes

14.2.3.1 Flooring shall be flexible enough so as not to crack under normal conditions

14.2.3.2 Rear wall and side walls shall be covered with HP Plastic Laminate. Owner will select from Elevator Manufacturer’s standard colors.

14.2.3.3 Front wall and Return Control Panel shall be Standard Brushed Stainless Steel.

14.2.3.4 Car doors/hoist way doors shall be Standard Brushed Stainless Steel.

14.2.4 Special Features:
   Braille and handicapped features
   Safety edge and photo-eyes
   Recessed telephone cabinet with associated telephone conduit/wiring
   Firefighter’s emergency service
   Pit ladder [OSHA Code; by General Contractor]
   Sill support angles; as required by Mfg.
   Independent service
   One complete set (all walls) of elevator cargo pads (full length) and associated pad hooks. Deliver to Owner in orig. carton(s)
   2" (wide face) stainless steel, No. 4 finish handrails on the side walls

14.3 Keys/Security Devices

14.3.1 Owner requires four (4) hoist way door unlocking devices/keys for each elevator car.

14.3.2 Owner requires four (4) keys for each lock cylinder installed within the car and at the lobby wall mounted call button stations.

14.3.3 Owner requires four (4) reset keys for elevator equipment.
14.4 Hoist way

Rated walls per Code; including Shaft “ceiling”. Pit is to be waterproofed; See Division 7

14.5 Warranty/Service

The Contractor shall furnish to the Owner a one year warranty and a one year Service Contract (same day response) from date of Substantial Project completion, including travel expenses.
DIVISION 15 - MECHANICAL

15.1 Owner's Standard Construction Features / Requirements and Details

The following listed items are features which the Owner requires to be incorporated in the project contract documents. It is not to be assumed that the Contractor will incorporate these items as part of his field work. The Plumbing Design Engineer and the Mechanical Design Engineer will ensure that these items are specifically called out in either the General Mechanical Requirements; Technical Specification Section of the written specifications or on the Drawings (or both).

15.1.1 Numbering

The Design Engineers shall insure that it is clear to the Contractor/Sub-Contractors that all of the following charts, schedules, etc., reflect and utilize the Owner's Room.

Numbering System;
All “Valve Charts” (both domestic/potable water and chilled water systems)
All software programs and graphics for control of equipment (i.e., Energy Management Program, occupancy status, etc.)
Air Handler Unit Filter Charts
Lubrication Charts

15.1.2 Clearances

All Equipment shall have adequate and safe access/working clearances around it; whether it is floor mounted or installed overhead/above ceiling. In no instance will the Owner's personnel have to do any of the following to service any piece of equipment (this shall include access to fusible links located at fire damper assemblies).

15.1.2.1 Remove a wall/partition, door or other architectural component to remove or disassemble a piece of equipment (i.e., removal of a motor or wheel from an air handler unit; removal of a pump, etc.). The designer shall consider the installation/replacement of large and/or heavy components as it affects the size and location of Mechanical rooms/spaces. Space and access panels must be allocated for the removal/replacement of Air Handler Unit (AHU) coils. This also applies to any required disassembly of adjacent equipment to facilitate repairs of the primary component beyond normal maintenance tasks.

15.1.2.2 Disassemble or remove electrical conduits and piping to other pieces of equipment etc. in order to service, disassemble or remove the initial piece of equipment.
15.1.2.3 “Climb out on” or “lay on” piping, conduit, ductwork, etc., in order to access filters, or service a piece of overhead equipment.

15.1.2.4 Remove light fixtures, etc., verify damper settings or make other air distribution adjustments.

15.2 Design of Equipment Rooms

15.2.1 Architect and Engineer shall insure that the design of Mechanical, Electrical and Machine Rooms are sized to have adequate room to provide the manufacturers and code specified working clearances for the equipment. Provide sufficient details, sections, etc., to develop a workable duct lay-out w/hangers and access doors, etc. Temperature gauges are of little value if they cannot be read from floor level. Allow adequate space for duct transitions, bends, splitters and recommended straight duct runs to avoid air turbulence, radical pressure changes and system noise. Air Handling Units shall have adequate working clearance for servicing on three sides excluding the discharge air side.

15.2.2 All floor mounted equipment and machinery shall be installed on concrete housekeeping pads at least 4” high. At curbs or sumps, provide for adequate collection of condensate to drains without flooding the equipment room floor. Provide 10” min. between unit bottom and floor. Condensate may NOT discharge into the storm drain system without a 2” air gap and adequate back-flow water protection.

15.2.3 Water shut-off valves for toilet room/locker room areas must be located in the wall, or above the ceiling on the same floor: Well identified and easily reachable in an emergency situation. Isolation or branch shut-off valves should be located in a mechanical room or above corridor ceilings. They must be identified with color-coded markers on the ceiling grid. DO NOT allow these valves to be located over a classroom or office.

15.2.4 All valves shall be identified with round brass stamped/engraved tags and secured to the valve with brass ball type chains. Numbering system shall be prefixed with a letter “P” for all potable water valves. Chilled water system valves shall bear only the valve identifying number.

15.2.5 Provide separate framed and glazed “valve charts” for the Potable Water System and for the Chilled Water System. The valve charts shall list the “Valve I.D.”, “Valve Function” and “Location of Valve” (Owner's Room Number). The “Chilled Water System” valve chart shall be mounted in the main air handler room/pump room. The “Potable Water System” valve chart shall be mounted in the main first floor custodial room.
15.2.6 Provide 6” dia., glass faced, bourdon tube type pressure gages at the suction and discharge of all pumps on the inlet and outlet piping of all cooling coils, etc.

15.2.7 Thermometers: Provide digital variable angle thermometers WEIS DVU35 or equivalent. Stem lengths and thermometer wells/sockets shall be of proper length for use/location.

15.3 Thermostats

All thermostats shall have digital displays with override capability. Mount at 60” AFF.

15.4 Cast-in-place concrete housekeeping pads

Outdoor equipment shall be sized such that they provide a continuous 36” wide clear walkway/working surface around the entire perimeter of the equipment. Such equipment must be enclosed in a fenced enclosure (See Division 2.12 for fencing information.) Indoor equipment pads shall be at least 4” from walls and 12” from floor drains/sumps to minimize standing water from leaks, etc.

15.5 Operations and Maintenance Manuals

At or before Substantial Completion, deliver to the Owner three (3) bound copies of the Operations and Maintenance Manual for this project. Prior to turning these manuals over to the Owner, they will have been reviewed and approved by the architect and/or engineer. Each copy shall be bound in a 3-ring type rigid cover notebook. The following information shall be typed and inserted in a clear plastic pocket on the spine of the notebook:

Name of the Manual
Name of the Project
No. of Volumes for this Division (i.e., 1 of 2, etc.)

WARRANTIES: Each manual shall have a title page that includes the above information as well as the following additional information: Name, address, telephone number of the Contractor and Sub-contractor and date of expiration of the warranty. All warranties are to be dated from the date of Substantial Completion. Additionally, the manuals shall have a “Table of Contents” page and each section shall be easily identified by a tabbed (typed) divider sheet. Include electronic copy in PDF format.

15.6 Instructional Sessions

Before Final Completion, the sub-contractor shall provide formal, scheduled Instructional Sessions for all systems and equipment furnished and installed under this
division. Training sessions shall be recorded. The sub-contractor shall develop a schedule which identifies dates/times and the system to be addressed. This schedule will be forwarded via the Project Architect to the Owner for the Owner's review and approval. The Owner requires at least a two (2) weeks’ notice for scheduling such training sessions. If this occurs close to holidays or major college activities, a longer lead time may be required. The Owner shall have the right to request that the Contractor provide a "Manufacturer's Representative" to be present and assist at selected Instructional Sessions. A minimum of four (4) hours of instruction shall be provided for each system or major piece of equipment plus instructional aids/recordings as available from the manufacturer.

15.6.1 Provide classroom training for the Building Automation System (BAS) in the listed quantities. Provide a three (3) day basic operator training for four (4) employees. Provide a four (4) day intermediate training for four (4) employees. Provide four (4) day advance training for four employees.

15.7 **Interruptions to Owner’s utilities or services**

15.7.1 Scheduling utilities outage: Any intentional utilities outage must be scheduled with the Campus Facilities Manager at least seven (7) days in advance. Certain interruptions may require a longer notice. This applies to all utilities and all campuses.

15.7.2 Vehicular traffic: Any planned interruptions of normal traffic flow or loss of parking spaces must be scheduled with the College’s Public Safety Office at least forty-eight (48) hours in advance to allow for re-directing of traffic or loss of accommodations.

15.7.3 Accidental interruptions of services: Should any utility service be lost due to any Contractor action the campus facilities office shall be notified immediately, informed of the situation and an estimate of time of service restoration.

15.8 **College design standards**

The following items that may exceed certain “industry standards” represent the minimum design standards acceptable to Hillsborough Community College in the various mechanical systems. The Engineer shall incorporate these items in the various Sections of mechanical and electrical systems documents.

15.9 **Sanitary and Vent Systems**

15.9.1 At all locations where floor drains occur, the floor surface shall slope towards the drain at 1/10" per foot. This shall be addressed and coordinated with the Design Architect and the Design Structural Engineer to insure that it is coordinated throughout the documents. See Division 3.2 for structural coordination.
15.9.2 All floor drains shall have 4" nominal “P” traps, w/primers. Trap primers shall be installed inside of walls and 18” - 24” AFF (trap primers will not be installed “overhead/above ceiling”). Hinged door access panels with screwdriver operated door locking cams shall be provided in a size large enough to allow easy service or replacement of the valve. Also refer to Division 8, Item No. 8.4 for additional information regarding access panel finish, material, etc.

15.9.3 Provide sufficient “clean outs” so that the full length of the system can be accessed for rodding. Floor clean outs occurring at carpeted or finished floors shall be provided with cast brass crosshatched covers. Wall clean outs shall be accessible by hinged door access panels. Joints in vertical piping shall be at least 6" above floor. Approved caulked fire stop sleeves shall be used at all rated walls/slabs.

15.10 Storm and Roof Drainage System

15.10.1 All horizontal storm drain piping shall be properly pitched and supported and shall have insulation/wrap for sound control. At all locations where "wall clean outs" occur provide hinged door access panels.

15.10.2 Condensate should drain to the sanitary system with a 2" air gap at the drain.

15.11 Water Distribution System

15.11.1 Provide an Interior Master Shutoff Valve for the building. This valve shall be located no higher than 6'-0" AFF and at the point of entry into the building. It shall be labeled with an engraved plastic sign either wall mounted adjacent to the valve or suspended from the valve with brass ball/bead chain.

15.11.2 Individual “shutoff valves” shall be provided in sufficient quantity and at strategic locations so that it will never be necessary to shut off the water supply to the building or a complete floor level due to a leak at any branch water feed or a fixture. Shutoff valves may be located overhead/above ceiling except at public toilet rooms. Shutoff valves shall also be provided in branch line feeds above corridor ceilings to each exterior hose bibb or wall hydrant.

15.11.3 Only cold water shall be supplied to restroom lavatories.

15.11.4 Provide one (1) hose bibb in each restroom, located beneath the lavatories and approximately 18" AFF. Piping for this valve shall be concealed in the wall. Handle shall be removed for custodial use only.
15.11.5 Provide one (1) exterior wall hydrant every eighty (80) lineal feet at outside walls of the building. Hydrant shall be recessed with cover.

15.11.6 Provide one (1) hose bibb in each AHU room at 18" AFF.

15.11.7 All "hose bibs and wall hydrants" shall be operated by removable keys/T-valve handles. Provide two (2) "keys" for each valve.

15.12 **Plumbing Fixtures and Accessories:**

15.12.1 Fixtures, except for handicapped sink units shall be as manufactured by Kohler, Zurn.

15.12.2 Stainless steel sinks shall be determined during design.

15.12.3 All urinals and water closets shall be wall hung. All fixtures shall be minimum flow.

15.12.4 Water coolers shall be wall-hung.

15.12.5 Showerheads shall be manual or electronic Sloan Act-O-Matic or equivalent that incorporates a self-cleaning design and a powerful spray for user satisfaction while complying with local governing water conservation regulations.

15.12.6 Special Fixtures
   Each project may have requirements for certain “special applications or fixtures.” The Owner will furnish the requirements (and mfr. # if known) to the Engineer who will complete the selection and design for the Owner’s review and approval.

15.12.7 All fixtures shall be provided with wall stop valves (concealed or w/o handles).

15.13 ** Preferred Fixtures**

15.13.1 The following Fixtures are College preferences although equivalent models from other manufacturers will be acceptable.

15.13.2 Water Closet (Handicapped W.C. equal but at ADA mtg. height):
   - **Bowl:** American Standard No. 2257.001-White
   - **Seat:** Olsonite No. 95-White
   - **Flush Valve:** Hydrotek Battery Powered Dual Flush Model HB-128DF (Bat)

15.13.3 Urinal (Handicapped Urinal equal but at ADA mtg. ht.):
   - **Urinal:** American Standard No. 6590.125-White
   - **Flush Valve:** Hydrotek Model HB8-B1.125 (Bat)
15.13.4 Lavatory:
Bowl: American Standard No. 0475.047 White
Faucet: Hydroteck Model HB-5000E (Battery)

15.13.5 Lavatory-Handicapped:
Unit will be provided under DIVISION 10 and installed under this division. Provide and install all necessary fittings, valves, etc. Note supply only cold water to this unit, blank off hot water inlet to faucet. Mount per ADA requirements to accommodate a wheelchair.

15.13.6 Custodial Sink
Mop basin with continuous stainless steel cap or commercial grade stainless steel. Service Faucet: Chicago No. 897 or equivalent w/rigid vacuum breaker spout, ¾” hose thread outlet, pail hook and wall brace, adjustable integral stop supply arms, rough chrome plated finish, 35” long heavy duty black rubber flexible hose w/wall bracket. Protect walls w/S.S. splash aprons, 18” high.

15.13.7 Sink (Stainless Steel Bar Type at Lounges, Conf. Rooms, Labs, etc.)
Sink: Elkay Lustertone series or equivalent (size to be specified by Owner per project/need requirements. Provide with one (1) hole in deck unless HW is required. Faucet: Chicago No. 50 or equivalent w/GN2A rigid/swing Gooseneck, E3 Aerator, #369 Handles w/Chrome Plated Finish.
Basket Strainer: Stainless Steel, Elkay No. LK-35 or equivalent.

15.13.8 Water Cooler
Acceptable manufacturers: Elkay Model # EVFSA4F, Halsey Taylor model # HAC8FS or equivalent. Sunroc water coolers shall not be specified.

15.13.9 Lawn Yard Hydrant shall be Woodford Model No. Y70 or equivalent.

15.13.10 Hose Bibb shall be Chicago No. 387-E27-RCP, ¾” flanged female inlet, ¾” hose thread outlet, lock shield cap with removable 293-6 tee handle, polished chrome finish or equivalent

15.13.10 Wall Hydrant shall be Zurn No. Z-1310 Ecolotrol recessed or equivalent.

15.14 Water Heating Equipment

15.14.1 Sizes and quantities of electric hot water heaters will be determined by the project/building hot water needs and requirements.

15.14.2 If a building's need is confined to custodial closets then each closet will be provided with a tank-less water heater.
15.14.3 Where sinks are installed in office environments under counter, electric, “Instant Hot” water heaters may be installed when specified by the owner. They shall be 115v, dedicated circuit.

15.15 Chilled Water System

15.15.1 Chiller/Package system shall consist of air cooled liquid chillers (Screw Type) with vertical discharge cooling fans, evaporator, condenser, interconnecting piping, controls package, full operating refrigerant and lubrication systems and required accessories; all mounted on a supporting steel frame. Unit shall have compressor un-loading from 100-0% of capacity and all ranges in between. Hot gas by-pass may be required to achieve minimal loading. Water cooled packaged units should be considered where appropriate. Air cooled chillers should have coated condensing coils. All chillers shall have variable frequency drives. Acceptable manufacturers are:

Air Cooled Chillers: Trane
Water Cooled Chillers: Trane

15.15.2 Provide thermometer wells, thermometers, gauge tapped connections with shut-off cocks and gages on both the “inlet” and “outlet” chilled water piping at chiller unit. If the chiller unit utilizes a condensing water system provide this same configuration of thermometers and gages at/or directly adjacent to the condensing barrel at the chiller unit.

15.15.3 Provide motorized “inlet” isolation valves at the chilled water piping connections at a chiller unit. These valves shall be controlled by the Energy Management System (EMS) for the unit/building. Additionally, the “discharge valve” position would be automatically controlled during operation of the unit (by the EMS) and would act as a balancing valve for chilled water flow through the unit.

15.15.4 Multiple Chiller Package Units shall be piped in parallel and valved for redundancy or “lead/lag” selection. All underground CHWP shall be jacketed, pre-insulated and engineered with assembly drawings, numbered components complete with thrust blocks, expansion loops, gaskets, etc. The Engineer shall inspect pipe, etc., for cleanliness, rust, marker tape and installation. Chiller yards shall be designed for proper ventilation, service accessibility, sound control and shall include normal/emergency power equipment as required. Special attention shall be given to lightning protection.
15.16 **Chilled Water Pumps and Installation**

15.16.1 Pumps which must be located outdoors or in an area subject to wet conditions shall be of the fully enclosed, rough service type and elevated on a concrete base. Pump and motor assemblies shall be protected from weather with an external metal rain guard constructed with galvanized materials.

15.16.2 Pump motors controlled by a variable frequency drive shall be premium efficiency “inverter duty type” designed for such operation.

15.16.3 When it is necessary to encase a pump in insulation, the insulation will be designed and installed in such a manner that it can be neatly removed and reinstalled without damage. It will not be installed in a manner that requires cutting/sawing operations to remove the insulation and that subsequently requires the use of new insulation, paste, etc. to reinstall. Mechanical fasteners, clips, etc. shall be used for securing the various pieces of the insulation casing, and the joints sealed to prevent condensation.

15.17 **Chilled Water Chemical Treatment**

15.17.1 Chemical treatment for the Chilled Water System (CWS) is required, and shall be based on water analysis prior to system installation. It shall include chemicals for start-up, testing, contractor operation of the system through construction completion and for a period of one year after final acceptance of project by the Owner. Installation shall include test cabinet, equipment and test procedure manual as required for all systems.

15.17.2 Provide for sidestream “sock” filter in primary CHW system and adequate traps and filter/strainers in secondary CHW system. Require adequate shop drawings to assure system has accessible components for operation and maintenance. Provide sidestream filter/strainer for open loop.

15.17.3 Chemical Treatment for the condenser water system shall be based on the 0 bleed system supplied by C. G. Solutions and will include water softener with reclaim system, Blue Trak system, brominator, condenser filter and web based monitoring.

15.17.4 “Green treatment process” should be considered where appropriate.

15.18 **Packaged Air Handlers**

15.18.1 Unit cases, floor pans and doors shall be of double wall construction; minimum 16 gauge galvanized steel with 2” thick, 1½” density insulation, whether of unit construction or individual panels for field assembly. Units shall be provided with galvanized base rail w/lifting lugs and supported on isolation spring mounts. Large units shall be provided with a “walk-plate” to allow entry for filter replacement, coil
cleaning or other servicing of equipment. Door hinges shall be stainless steel and have gaskets. All metals used inside of case shall be stainless steel, copper, or galvanized.

Acceptable Manufacturers:

AHU: Trane Performance Climate Changer
Terminal Unit: Trane

15.18.2 Fans shall be curved as specified by the Engineer and rated at 15% more than the specified RPM. The motor shall be “inverter duty type” designed for operation with a variable speed drive and be mounted on an adjustable base to allow for belt tensioning and alignment. Coordinate spring mounts.

15.19.3 The filter section shall be designed with access for changing on both sides of the case. This section shall have a filter differential pressure gauge mounted on the outside such that it is easily read. Standard is Dwyer Magnahelic 2000 Series or equivalent.

Pre-filters: Extended surface (pleated) panel type. Acceptable source: Nalco, American Air Filters, Cambridge, Farr. Require Contractor to change pre-filters at any time static pressure exceeds .75"w.g. or .50" if final filters are not installed.

Final filters: The filter section shall be designed with filter racks for 2" high efficiency filters. The filters shall be rated at 14 MERV or greater. Acceptable source will be given by the Owner and will be determined by who is the current filter provider/vendor.

15.18.4 At Substantial Completion, the Contractor shall provide and install one (1) complete set of filters for all air handling units, terminal units, etc., which utilizes filters and any additional spare filters as may be specified. Provide the Owner with documentation of filter purchases. Require Contractor to supply one complete set of spare filters at Final Acceptance in original cartons.

15.18.5 Provide and install at each Main Air Handler Unit: A framed/glazed FILTER CHART which gives the following information:
Name & Number of the AHU
Manufacturer/Model No. of Filter
Type of filter (thickness and filtering medium material)
The total number of each size of filter required to perform a complete filter change at unit.

15.18.6 Ductwork: Shall be designed per system requirements and pressure ratings with adequate clearances, turning vanes, access openings, fire/smoke dampers, etc., with the Contractor requirement for coordination drawings and component access. Require testing of all ductwork by a third-party Contractor. Require all ductwork interior visible through grilles and registers to be painted flat black. All ducts shall be sealed throughout construction and temporary filter placed on face of returns to prevent
contaminants from entering the system prior to start-up. Ductwork and fan speed should be designed to minimize noise from air flow. All openings shall be sealed at end of each day during construction.

15.19 System Controls Theory

Review design and specifications with the Owner at 50% completion and at any prior to code reviews.

15.19.1 Controls requirements: Electronic microprocessor type employing Direct Digital Control (DDC) for all control sequences of total building HVAC system(s) unless specifically stated otherwise in the Control Sequence. Acceptable System: Trane Tracer Summit. Hillsborough Community College will determine based on project specifics, campus and location.

15.19.2 Code considerations for controls logic, air quality and total system design:
Types of occupancy, percentage and grouping of each type by floor
Fresh air requirements for classrooms, non re-circulated air from science laboratories, toilet rooms and utility spaces positive building pressure

15.19.3 Owner constraints on air quality:
CO² sensors
55% maximum humidity
Occupancy sensors
Daily/weekly schedules

15.19.4 Other Owner considerations: Operating costs and maintenance frequency and costs.

15.19.5 The Main/Central Control Panel (when provided) shall have the following minimum requirements:
Dual processor system;
As this technology is constantly changing, verify requirement with owner prior to purchase.

15.19.6 All DDC controllers shall be connected to a global information handler and to an Operator’s panel via a communication bus allowing all controllers and the Operator’s Panel access to all information contained within the system and shall be programmed with all points using BACKNET/MSTP, BACKNET/ARCNET, BACKNET/IP PROTOCOL.

15.19.7 In addition to the local Work Stations, controllers shall be capable of interfacing with local Campus Ethernet or Internet via standard ASCII 56K modem. Password access
shall also be required. Provisions shall be provided to allow additional controllers to be added for future system modifications or additions.

15.19.8 Floor plan/maps shall show heating and cooling zones throughout the building in a range of colors which provide a visual display of zone temperatures relative to their respective set points. The colors shall be updated dynamically as zones’ comfort condition changes. All spaces shall have Owner room number identification. In addition the graphics shall have “pop-up” graphic menus (minimum) as follows:

<table>
<thead>
<tr>
<th>Quit</th>
<th>Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarms</td>
<td>Set points</td>
</tr>
<tr>
<td>Messages</td>
<td>Module Status</td>
</tr>
<tr>
<td>Schedules</td>
<td>Programming Parameters</td>
</tr>
<tr>
<td>Schedule Graphs</td>
<td>Utilities</td>
</tr>
<tr>
<td>Schedule Groups</td>
<td>Chiller Readouts</td>
</tr>
</tbody>
</table>

15.19.9 Building zones shall be according to exterior/compass orientation, interior functions:
Classrooms, academic/computer laboratories, administrative offices
Faculty offices (this requires careful considerations as they are not always grouped together and must not be combined w/ classrooms)
Assembly areas (over 50 seats)
Circulation, lobbies, corridors (excluding stairs)
Building support spaces and toilets which require exhaust

15.19.10 Science Laboratories require total zone separations with isolated 100% pre-conditioned make-up air and exhaust air discharge above the roof. This system is to be operated twenty-four (24) hours, seven (7) days/week with volume and temperature controlled by occupancy and CO² sensors. Audible and visual alarms shall be provided in all spaces and shall report to the College’s Public Safety Office.

15.19.11 Computer server rooms, phone rooms and other areas having sensitive communication equipment that produce heat shall be provided a separate air conditioning system e.g., split system so as to maintain that equipment if failure of the building chiller should occur. These units shall be connected to the BAS and be installed with high temperature alarms.

15.19.12 Groups of classrooms shall have individual control of heat/cooling without “averaging”. This must be carefully coordinated with the AHU, fresh/return air requirements and CO² sensors (which is an individual condition).

15.19.13 CO² Sensors: These devices need to have special consideration as to “side effects” on the system. Their primary function shall be to reduce the requirement for outside (fresh)
air when un-occupied for a programmed time. This can result in problems with humidity and air balance and would have to respond to the needs of each classroom.

15.19.14 Dampers and Operators: Outside, return, relief and exhaust dampers shall be of low leakage proportion/air type with spring return and failure-closed position. Electronic operators shall be positive gear driven. Outside air shall be preconditioned while maintaining a slight positive building pressure.

15.19.14 All relays, controls, etc., shall be mounted in accessible dust-tight control panels.

15.19.16 Software shall be designed to be user-friendly, modular with complete data-based entry with all programs and alarms/messages; color graphics package w/ floor plans and VC Room numbers. Refer to Division One for owner training requirements, field documentation/as-builts and Contractor submittals. The BAS shall interface with the common area lighting panels, main switch gear, variable frequency drives, chillers and generator.

15.19.17 Individual comfort levels shall be considered when sizing zones. No more than three (3) individual offices should be on same zone.

15.19.18 User Control over System Configuration: Data base creation and modification. All changes shall be done utilizing standard procedures and be capable of being done while the system is on-line and operational. The system shall allow changes to be made through the portable operator terminal and from the central site including new graphics. To aid the user instructive prompting software shall be provided.

15.18.19 System Power failure; Automatic Re-start:
Power failures shall cause the system to go into an orderly shut-down with no loss of program memory. Upon resumption of power system shall automatically re-start and print out the time and date of power failure (and restoration). The re-start program shall automatically re-start affected field equipment. The operator shall be able to define an automatic power up time delay for each piece of equipment under system control.

15.20  Heating, Ventilation, Air Conditioning (HVAC) System Commissioning

15.20.1 This work shall be performed by the design team in accordance with the contract documents. Qualifications shall include ASHRAE Guideline 1-1989 (current issue) and shall be an experienced Florida licensed Professional Engineer acceptable to the Owner’s Design Engineer. This will require full submittal of procedures and documentation requirements at start of construction including coordination with other systems (Fire Alarms, etc.). This process must be included in the Project Specifications and shall require coordination with the Owner’s training. It shall include start-up, check out and sign-off for every piece of major equipment. The procedures are not
performed in a timely manner as System Commissioning cannot occur until all components are complete and a Start-up and Commissioning Plan has been approved by the Engineer. Test and Balancing (T & B) cannot be performed until Systems commissioning is complete.

15.20.2 The HVAC Engineer shall review with the Owner all requirements for this work during the Design Process and include in the Contract Documents all systems affected. Include requirement for full filter replacement at Final Acceptance prior to occupancy by Owner as verified by Commissioning Agent and Owner’s Engineer.

15.21 **Test and Balance (T&B)**

15.21.1 T & B shall include all functions and therefore all components must be checked at the alternate season, in both occupied and un-occupied conditions, in order to check all conditions as well as proper functioning of the controls, and internal atmospheric conditions. Refer to Division 1 for Record Drawings and Warranty.

15.21.2 The “T & B Agency” shall be a contracted agent of the Owner. The Architect/Engineer shall secure quotations for this service from at least three (3) qualified firms and shall recommend approval to the Owner who will contract and pay for this task. The T & B firm may need to start during the Commissioning process as they become familiar with the system components. The Architect and Project Engineer shall administer and review the work as performed by the approved T & B agent.

15.21.3 Review with the Owner all requirements for this work during the Design Process and include in the Contract Documents.

15.21.4 A “Certified T & B Report” shall be performed on both the water and air systems of the project. T & B will be coordinated with the BAS control provider. All air side T & B will be completed with the AHU fan operating at 100% and all VAV’s in the zone fully open. The final Certified Report w/three (3) copies will be delivered to the Project Engineer (Architect's Consultant) for review and returned to the Contractor for corrections as required until approved by the Engineer. This must occur prior to Substantial Completion of the project being granted. The T & B must include all functions and conditions therefore all components and performance must be checked in the alternate season in both occupied and unoccupied modes. Refer to Division I for “Record Drawings, Warranty, and Documentation”.

15.22 **Indoor Air Quality Testing**

15.22.1 This work shall be performed by a qualified sub-contractor as approved by the Architect/Engineer.
15.22.2 Review with the Owner all requirements for this work during the Design Process and include in the Contract Documents. The results of air quality testing must be submitted in writing to the Owner as a condition of Substantial Completion.

15.23 Fire Suppression Systems

15.23.1 When required by code or by the Owner the Contractor shall furnish an approved and complete automatic wet pipe sprinkler system to serve all areas of the building as shown in the drawings and specifications. The Engineer shall require full compliance with NFPA 13 as amended by local ordinances and connection to the municipal water system with appropriate back-flow water protection. This system shall be integrated with the Fire Alarm and Mechanical Systems for fans, dampers, elevator, exits and annunciators. A Fire Test Station and auxiliary drains shall be provided to minimize water damage due to head replacements, etc. Arm-over connections to heads are preferred. Sprinkler heads shall be located in accordance with NFPA 13 to provide complete room coverage. Heads shall be located on long ceiling tile center-lines. If indicated by local authorities or tests that there is insufficient municipal water pressure available to operate such a system at the highest portion of the building then the Engineer shall design an NFPA 20 approved Fire Pump System together with an approved emergency power source. An approved Fire Department connection shall be available not less than 40' from the new structure. All systems and materials shall be in accordance with applicable NFPA Codes.

15.23.2 The Engineer shall coordinate the design with all systems and interactions with the various Architectural features and limitations such as allowable head locations in lay-in tiles or panels. If exterior heads are required by code at exits they shall be wall mounted with chrome finish. This system shall be included on the required “Systems Coordination Drawings “by the Contractor as well as the Reflected Ceiling Plans and Owner instructions.
DIVISION 16 - ELECTRICAL

The following listed items are features which the Owner requires to be incorporated in the contract documents for a project. It is not to be assumed that the Contractor will incorporate these items as part of his field work. The Electrical Design Engineer must ensure that these items are specifically called out in either the General Electrical Requirements; Technical Specification Section of the written specifications or in the Drawings (preferably both).

16.1 Contract Documents

16.1.1 The following information shall be provided in the contract documents:
- Electrical Panel Legends
- Schematic Programs for the Fire Alarm System
- Schematic wiring diagrams for all sensor control’s, fan and relay controls, science labs safety/emergency circuits and alarms.

16.1.2 Electrical Identification

16.1.2.1 Electrical Panel Legends shall be typed, hand printed legends will not be accepted. Entries shall be accurate, abbreviated and specific, i.e., Rather than “doors” an entry would read: Auto. Drs.-Rm. 145 (which would indicate the Automatic Doors at Room 145).

16.1.2.2 Breakers/Panel no. shall be marked on each receptacle plate.
All internal labeling shall be typed.

16.1.2.3 Exterior panel board I.D., name, etc., shall be engraved plastic laminate.

16.2 Equipment Pads

16.2.1 All floor mounted equipment will be installed on 4” (min.) high cast-in-place concrete housekeeping pads. All raceways, conduits, etc., shall terminate at or above this level.

16.2.2 Cast-in-place concrete housekeeping pads that are installed at all outdoor equipment shall be sized such that they provide a continuous 3’ wide clear walkway/working surface around the entire perimeter of the equipment and shall be a minimum of 8” above surrounding grade.

16.3 Electrical/Communication Rooms

Electrical and Communication rooms shall be adequately sized. Building code and NEC manufacturer’s working clearances for the specified equipment shall be provided.
All equipment/communication rooms shall have hard ceilings. Equipment room lighting should be on an emergency circuit. Communication rooms should have back-up cooling on emergency power with alarm to building automation system.

16.4 Conduit

16.4.1 All below grade conduit, duct-banks shall be marked with 4” wide yellow plastic tape, installed no less than 12" above conduit with the name of the utility printed in large block letters in a contrasting color at not more than 10’ intervals. No direct burial of wire will be permitted except for irrigation control wires or grounding wire per N.E.C.

16.4.2 Conduit shall not be run horizontally inside of walls or partitions and shall be run parallel or at right angles to the major building axes. All conduits penetrating walls shall be at 90° degrees to the wall.

16.4.3 All conduit shall be concealed except in mechanical or utility spaces and where noted exposed. All exposed conduit shall be painted and Panel/Circuit legibly noted on all J-boxes.

16.4.4 Minimum size of power conduit shall be ¾” unless otherwise noted on drawings.

16.4.5 Minimum size of communication/data conduits shall be 1” (to a single box). Minimum size of data feeder to under floor duct banks shall be 2”. Exposed conduit shall be run parallel or at right angles to the building's lines.

16.4.6 Conduit run concealed above ceiling shall be routed parallel or perpendicular (at right angles to building construction) and shall be grouped.

16.4.7 Provide spare conduits from the top of each flush mounted panel board tub to area above ceiling for future use. Provide one (1) spare conduit (¾”) for every three (3) spare circuit breakers or spaces or part thereof. If panel board is on a partition then the spare conduits shall be provided equally to both rooms. Provide pull strings in all empty conduits securely tied at ends.

16.4.8 Provide groups of spare/capped conduits to five (5) feet outside the building’s exterior wall lines, or 12” beyond adjacent walks) as follows:

16.4.9 Conduits will be buried at a depth no less than 30" below finished grade.

16.4.10 Groups of conduits will be provided at every cardinal compass elevation of the building not to exceed 150’ along a continuous wall of a building.
16.4.11 Each group of conduit shall consist of the following: Each with an engraved phenolic tag attached to the capped end identifying the originating panel. All conduits shall have pull strings securely attached at both ends:
- One (1) - 1" conduit homerunned to the nearest high voltage panel (277/480 v.)
- One (1) - 1" conduit homerunned to the nearest low voltage panel (120/208 v.)
- One (1) - 2" conduit homerunned to the nearest communications backboard
Conduits in the group shall be spaced no greater than 16' apart nor less than 2".

16.4.12 The location of each group of spare conduit shall be marked on the outside of the building using a solid brass sign made of ⅛" thick material which shall be secured to the building with stainless mechanical fasteners.

This sign shall be 6" w. x 3" h. and shall have engraved in its surface the following: SPARE CONDUITS BELOW. The lettering shall be all upper case letters, ½" h. and block style with letter stroke width of no less than 3/32". The sign shall be mounted to the building directly above the centerline of the group of conduit and its bottom edge shall be 12" above finished grade.

16.4.13 Branch Circuit conduits shall be parallel to building lines, secured to structure and sealed at all wall penetrations. Light fixtures shall not be “daisy chained”. Flexible conduit shall be ½" min. dia. x 3' max. for motors, etc.; ⅜" min. dia. x 6' max. length for lights. All Junction boxes shall be identified with panel and breaker number.

16.4.14 Systems conduits shall be no less than 1" dia. unless otherwise noted on drawings. Multiple runs of 4" schedule 20 PVC (w/pull strings) shall create a “loop” from the Main Systems Room thru all Systems rooms/frame closets and return to the MSR.

16.5 Recessed Floor Boxes

Recessed floor boxes for power/data connections shall be Series 880 or Omni Box Series as manufactured by the Walker Corporation or equivalent. Boxes shall be single or multiple gangs as required by occupancy with stainless trim.

16.6 Junction Boxes and Wiring Troughs

16.6.1 All J-boxes shall have panel/circuit identified on the cover. Empty boxes for future use shall have system/panel I.D. marked on inside of box.

16.6.2 Fire Alarm boxes shall be painted red and manually/mechanically marked as such.

16.6.3 Due to cable constraints, systems “pull boxes” above ceilings for multiple cables, shall be wiring troughs measuring no less than 4"d. x 6"w x required length. They shall be
installed with the cover facing down and shall have no obstructions between the ceiling and the trough.

16.7 Terminal Cabinets

16.7.1 Shall be flush/recess mounted except in machinery or utility spaces or as noted.

16.7.2 Where cabinets are flush or recess mounted, provide six (6) spare 1" conduits out of the top of the cabinet and stub out of the wall 24" above ceiling. Three (3) of the conduits will be stubbed out of one side of the wall and the remaining three out of the other side of the wall. Conduits shall be stubbed out 6" from the wall and capped.

17.7.3 Terminal cabinets shall be keyed alike and keyed to match the building's electrical panel boards.

16.8 Wiring Devices Standards

16.8.1 Switch and Receptacle Colors shall be Ivory except as follows:
- Receptacles served by emergency power shall be Red
- Switches served by emergency power shall be illuminated when off
- Switches and receptacles served by an Uninterruptible Power System (UPS) or surge protected panel shall be Gray

16.8.2 Wall plates shall be .040" thick satin finish, 302 grade, stainless steel with beveled edge, plain. Plastic or vinyl plates may be substituted when approved by the owner.

16.8.3 Devices shall be “ganged” where permitted by code.

16.8.4 Provide a weatherproof GFI protected duplex receptacle every one-hundred fifty (150) lineal feet of exterior wall and near all entrances at a new building.

16.8.5 Provide GFI protected duplex receptacles at every air handler room, custodial closet and roof area with equipment. Min. qty: one (1) w/max. spacing of: 15'.

16.8.6 The electrical “on/off” control for automatic doors shall be operated by a rocker switch as opposed to a toggle switch.

16.8.7 In addition to above GFI requirements, GFI protected duplex outlets shall be installed where required by codes.

16.8 Panel Boards
16.9.1 All panel boards will be recessed or flush mounted unless installed in machinery or utility spaces.

16.9.2 Provide one (1) spare \( \frac{3}{4} \)" conduit from flush mounted panelboards to above ceiling for every three (3) spare breakers or spaces or portion thereof. Spare conduits shall stub out of the wall 24" above ceiling for 6' and capped. Quantity shall be divided between both sides of wall; (see 16.4.8).

16.9.3 Panel board legends accurately identifying the devices the breaker protects shall be typed using the Owners Room Numbering System; (see 1.16)

16.9.4 All panel boards shall be keyed alike.

16.9.5 All panel boards shall have a minimum of 9 spare breaker slots.

16.9.6 Provide a minimum of two (2) ea. - 20a/1p spare breakers in each panelboard.

16.10 Over-current Protective Devices

Provide a Schedule of Fuses which lists all equipment which uses fuses and the quantity, size of fuses required for each piece of equipment. This schedule shall be framed and glazed and mounted at the spare fuse cabinet. Also provide this schedule in each of the Operation & Maintenance (O&M) Manuals provided to the Owner.

16.11 Fixtures, Lamps and Switching Interior Spaces (LED to be evaluated)

16.11.1 Fluorescent lamps

   2 foot T5 or T8

   Classrooms and Laboratories:
   Supporting spaces, Offices and Toilet Rooms:
   Rotundas and Lobbies: Compact Fluorescent:
   Acceptable Manufacturer: Sylvania, G.E. or, Phillips

16.11.2 Fixtures:

Standard fixtures are fluorescent 2' x 2' lay-in fixture w/parabolic three (3) or four (40lamps, T-8 w/electronic ballast and a low iridescence semi-secular louver.

Classroom storage rooms, laboratory storage rooms, office workrooms, file rooms and storage rooms should have 2' x 2' lay-in fluorescent fixture w/two (2) lamp and prismatic lens.

Main and secondary corridors should have 2' x 2' lay-in fluorescent fixture w/parabolic lens, three (3) or four (4) lamps.
.4 Restrooms should have 2' x 2' lay-in fluorescent fixture, two (2)-lamp w/parabolic lens.

.5 Custodial storage rooms should have 1' x 4' chain suspended “industrial type” fluorescent fixture with white enamel reflector (10% uplight design), two (2) lamps with lamp guards mounted at 8' minimum AFF. Also provide one (1) lamp (min.) Emergency power/illuminated switch.

16.11.3 Switching

.1 Provide dual level switching at offices with occupancy sensor.

.2 Classrooms, Laboratories: Dual level switching; front row switching; two (2) (min.) fixtures on emergency relay and separate switch. All conventional fluorescent light fixtures shall be on adjustable occupancy sensor with two (2) fixtures per room fed from the emergency power branch via control relays for local switching and/or “night light” control.

.3 All fixtures occurring in public areas (i.e., lobbies, main and secondary corridors, restrooms, etc.,) shall be controlled by the BAS.

.4 Lighting panels shall be Ethernet based and shall not need a phone line. The panels shall also speak native BACNET and will seamlessly integrate with the BAS. Lantronix or other protocol translator type devices are unacceptable.

.5 Acceptable manufacturer shall be Crestron or approved equal

.6 Fluorescent fixtures in classrooms, laboratories and all teaching spaces shall be three (3)-way switched. The other set of light switches shall be mounted adjacent to the chalkboard/marker board located at the front of the teaching space.

.7 Install dual technology occupancy sensors in all classroom, laboratories and offices.

.8 All occupancy sensors will be connected to the system.

16.12 Fixtures, Lamps and Switching Exterior Spaces

16.12.1 Fixtures/Lamps

Provide 400w Metal Halide, wall mounted, adjustable, bronze housing security floodlights mounted to the parapet wall at strategic locations. These should be similar to or match existing fixtures on same campus. Review locations with Owner during the design process.
Walkway lighting: 175w (max.) Metal Halide, 12’ pole/standard mounted in the grass area adjacent to the sidewalk. These should be similar to or match existing fixtures on same Campus. Review final selection with the Owner.

Parking Lot lighting when provided by owner; normally provided by TECO: 400w Metal Halide, single, double or quad “shoebox” on 30’ pole (125 mph. design). Poles shall be similar to or match existing on same Campus. All pole lights to have fuses and grounding located in the base of the pole. The poles should be mounted on precast concrete bases extending 3’ above pavement as a traffic guard.

16.13 Switching

Selected fixtures on “Night-Lite” circuit. On/Off Photocell only for safety. Feed from EM panel. On/Off controlled by BAS with photocell backup. Review final control sequences with owner during design.

16.14 Emergency Egress Lighting System/Fixtures (Sole Source)

Internal exit signs shall be of the photo luminescent type that meets NFPA and UL 924 requirements. These signs will be approved by the owner prior to installation.

16.13 Standby Power Generator Systems

16.15.1 Emergency electrical power shall be provided and maintained to each facility on all campuses. The standard requirement for emergency power at all sites is a gas (LP or natural) generator providing 277/480v, 3ph, 4 wire service.

16.15.2 Diesel engine power will not be considered. Diesel fuel will not be allowed as a fuel.

16.15.3 Mufflers and exhaust pipes will be provided with condensate drains.

16.15.4 Provide battery charging system.

16.15.5 Provide engine “run time meter”.

16.15.6 The concrete pad for outdoor installation shall extend a minimum 3’ on all sides of the generator.

16.15.7 Motor/Generator shall be enclosed/air cooled for outdoor installation, including batteries and charger.
16.15.8 Generator Control Panel w/full controls, status indication lights, alarms, system meters w/ adj. controls, local and remote. Run/Off/Auto control. All required features of NFPA 110. Provide MODBUS or BACNET connection so BAS can interface with unit.

16.15.9 Acceptable Manufacturers: CUMMINS, KOHLER, GENERAC

16.15.10 Warranty/Service: Extended warranty as available from Manufacturer or Dealer. One (1) year service contract w/installation; proposal to Owner for evaluation and approval.

16.16 Primary Service

16.16.1 Primary power is furnished to each campus by TECO Power Company. The Design Team shall contact the utilities company to determine basic requirements and fees to provide or expand existing primary service to the project. A blanket utility easement is generally already in place with TECO.

16.16.2 All primary service shall be via concrete duct-bank and approved buried PVC pipe to the transformer(s) supplied by TECO.

16.16.3 Primary metering is generally provided by the Utility Co. at each transformer. Provide MODBUS or BACNET connection so BAS can interface with unit.

16.16.4 Underground secondary service shall be kept as short as practical. The Engineer shall make provisions in this duct system for anticipated growth and coordination with other utilities on site. The Owner will pay for all required surveys.

16.16.5 Main service entrance gear and dry type transformers, whether floor or wall mounted, are part of the general contract.

16.16.6 The CM/Contractor shall pay for installation, repair and removal of all required temporary power service, temporary exterior lighting as required until the date of Substantial Completion of the Project. Any such equipment and distribution shall be by the Contractor including removal and be maintained by same in accordance with all applicable codes.

16.17 Surge Suppression/Phase Monitoring Equipment (24v through 480v and Communication)

16.17.1 Provide Surge Suppression at the following locations:

.1 Each building service entrance switchboard and at other panel-boards as determined by use/function.
.2 At all wiring pairs and cable sheath, if used entering or leaving the building: Fire Alarm, Control wiring including emergency power, intercom system, HVAC control system, antennas and irrigation controls. All such equipment shall be UL listed and labeled for respective applications.

.3 On the fire alarm system wiring at each conductor pair and cable sheath entering or leaving a building’s respective terminal cabinet.

.4 In other locations where equipment sensitivity to surges and transients requires additional protection beyond that inherent to the design of the equipment.

16.17.2 Provide “Surge Suppression/Phase Monitoring” equipment at the following locations for electronics or communication equipment:

.1 At the point of connection of each piece of equipment item and its power supply conductors (direct wired equipment).

.2 At all power distribution panels serving computer station receptacles.

.3 Chiller control panel(s).

.4 Variable Frequency Motor Control units at exterior applications.

.5 RF antenna connections.

.6 At all pairs of wire entering or leaving a building.

16.17.3 Surge suppression/arrestor protections is required as follows: Surge suppression or transient voltage surge suppression (TVSS) shall be provided at each building service entrance switchboard and other panel boards as determined by use/function. A quality surge arrestor shall be installed at each end use as well as at the source panel to all utility and communications circuits where they enter the building.

16.17.4 Warranties and service: All surge protection devices shall have five (5) year (min.) warranties and shall be repaired or replaced/at no expense to the Owner during such period. Any equipment that is damaged by such failure during the warranty period shall be repaired or replaced by the Mfgr. and/or Contractor. It is understood that lightning damage may preclude certain items or circumstances. (Refer to Lightning Protection System.)

16.17.5 Telephone/data service building interface will be protected by the respective Utility suppliers.
16.17.6 Inspections: The Owner’s Engineer shall inspect the installation of all equipment listed above including photographs, if necessary, to assure compliance with the design documents, industry standards/good practices since it is recognized that workmanship and field conditions may affect the success or failure of this equipment.

16.18 **Lightning Protection**

16.18.1 The Engineer shall specify/show the installation of a complete lightning protection system which shall be designed and installed in accordance with all requirements of NFPA 780 (at a minimum). This shall include the building(s), chiller yard, irrigation pumping equipment (if used), exterior lighting poles and signage/building illumination. Bond to existing building systems as required and require as-built drawings showing locations of buried grounding cables and access covers at ground rods for periodic measurements as needed. These covers shall be marked so as not to be confused with the irrigation system, or water valve boxes.

16.18.2 Label: The Contractor shall be required to furnish a UL MASTER LABEL for the system.

16.18.3 Coordinate design of down-lead roof penetrations with roofing consultant using non-corrosive materials.

16.18.4 Grounding rods shall not be placed closer than two feet from foundations.

16.18.5 Require that down leads be routed away from building electrical system and that connection to water service piping as required by code be marked.

16.18.6 Bond fencing at equipment yards to ground rods.

16.19 **Fire Alarm System**

16.19.1 New buildings shall be compatible, and report to, existing Campus-wide system and annunciating panel. It must be fully addressable. There shall be at least one (1) FAAP located near the main building entrance. If possible, it should be visible from outside the entrance. Coordinate with Elevator and HVAC controls. This shall be non-propriety item.

16.19.2 All conduit, boxes, devices shall be adequately marked or color-coded. Audible/visual alarms are preferred in White; pull stations in Red.
16.19.3 Require Contractor to coordinate connection and programming to existing Campus system with all required documentation for O&M manuals. Provide the Owner with a copy of the system program on CD.

.1 Provide lightning/surge suppression protection at FA panels/power sources.

.2 All devices and panels will be recessed/flush mounted except in engineering spaces. All cabinets, panels, and devices shall be keyed alike (except elevator).

.3 The assigning of device I.D. numbers will be coordinated with the Owner and Owner's System Consultant.

.4 Design and installation shall comply with all current applicable NFPA Codes.

.5 The Contractor shall provide full documentation, training and demonstration of the system as required in Division 1. Owner will with-hold final payment until full testing and acceptance of the system by the project engineer is complete and the Owner has received documentation of three (3) year warranty and twelve (12) month service contract.

16.20 Grounding

16.20.1 This Section is intended to insure that all grounding requirements of the Building are compatible and meet the Owner’s needs for the various systems, now or in the future, will provide a safe environment and protect the Owner’s equipment from possible damage.

16.20.2 All conduits shall have a bare equipment ground wire continuous from all equipment connections and bonded at all boxes and run to the feed panel and subsequently to the Building Equipment Ground.

16.20.3 All equipment rooms, communication rooms and closets, antenna connections, and computer/data rooms shall have a bare copper common buss/wire connection sized per the drawings which shall be run to the incoming building ground. It shall terminate in each room with one or more 2” x 8”x ¼” copper local Ground Buss with threaded holes and stand-offs for multiple equipment ground connections.

16.20.4 All connections shall be bolted or exothermic welded unless otherwise specified.

16.20.5 All grounding rod installations, connections, etc., shall be tested for ground resistance and the Owner shall be provided with a log of such readings, with the O&M submittal.
16.20.6 Bond building ground with adjacent equipment yard grounds within 50' of main building.

16.21 Telephone/Computer (Data)/Intercom/ Television Systems (See HCC Network Wiring Standards)

16.21.1 Backboards

.1 Backboards will be constructed of ¾" A/C grade plywood painted with fire retardant paint (bridal white - see paint specifications). Backboards shall be mounted with their long dimension 8' run vertically and their horizontal lineal footage will be determined by the size of the system being installed. They shall be mounted on top of ¾" furring strips and the bottom edge of the plywood sheet will be held 4" AFF.

.2 Where backboard material is run continuous on a wall or around a whole room for several different systems the following shall apply.

.3 Where one systems backboard ends and another systems backboard commences a full length (painted) 1" x 2" vertical furring strip shall be installed to de-mark this separation of systems.

.4 The name of the system shall be stenciled at the “top – center” of each systems section of backboard material in a contrasting paint color.

16.21.2 Individual System Requirements; an on-staff representative of the Owner will provide detailed systems requirements to the design engineer/architect. Meetings will be coordinated by the College’s Facilities Planning & Construction Office.

.1 Provide a double-duplex surface mounted (dedicated 20a. circuit) at 18" AFF every four (4) lineal feet at the bottom of all backboard systems. Note: In some instances the need for these outlets to be on the emergency electrical power system will be specified and required by the Owner.

.2 Provide #6 insulated copper ground wire from each telephone/communication backboard to service entrance ground. Ground wire may be looped from backboards. Ground wire shall be installed in conduit. Provide ground terminal strip at each backboard. Leave 6' minimum slack of ground wire at each backboard.

.3 All conduits will be labeled at each end with the opposing end's room number and intended use.

.4 All empty conduits shall be provided with a continuous nylon pull string.
.5 All conduit bends shall be long radius bends. In no instance shall the inside radius of a bend be less than six (6) times the "internal diameter of the conduit".

.6 At all locations where flush/recess mounted wall boxes occur and no device is to be installed (future/spare outlet) furnish and install a blank stainless steel cover.

16.21.3 Electrical Requirements for Communications Rooms

.1 All Intermediate Distribution Frame (IDF) and Main Distribution Frame (MDF) rooms shall have a dedicated 30 amp circuit with a twist lock (NEMA LS-30P) receptacle. This should be located no more than 48” from the base of the patch panel rack for network equipment.

.2 All IDF and MDF rooms shall have at least a double outlet box with a dedicated 20 amp circuit and NEMA L5-15P receptacles. This should be located no more than 4 feet from the base of the patch panel rack for network equipment.

16.21.4 Electrical Requirements for Smart Classrooms

.1 Provide a ceiling mounted outlet for an LCD projector 12’ from teaching wall and centered. Ceiling pan will be provided by others.

.2 Provide power for projection screen with low voltage interface relay and Dalite 40973 low voltage control switch or approved equal. (When specified)

.3 A document camera will be installed over the instructor’s desk by others.

.4 On the side wall by the teaching station, provide a single gang box with a 1” conduit stubbed out above the ceiling for network cables. Provide a quad outlet for power; provide a double gang box with two (2) 1” conduits stubbed out above the ceiling for A/V cables. These should be located 12” above the floor and 7’6” from the teaching wall.

.5 Audio Visual equipment will be stored in the teaching station (see previous paragraph). If a cabinet is used the same number of outlets will be needed at the teaching station and behind the cabinet.

.6 Provide switches on the teaching wall for lights and projection screen if required. If there is a cabinet these should be located near it but not behind it. The telephone outlet requires 11” clearance from other outlets to accommodate the width of the phone.

.7 Provide infrastructure for electronic locks on all exterior doors and select spaces as determined during design. The college will arrange for installation of devices.
Emergency Telephone mounted on the wall adjacent to the instructor’s station in all classrooms, laboratories, auditoriums, conference rooms and meeting rooms.