



# COLLEGE DESIGN STANDARDS

Version 1.3

6/26/2018

**OFFICE OF FACILITIES  
& PUBLIC SAFETY**

9221 Corporate Boulevard  
Rockville, MD 20850

## HISTORY OF DOCUMENT REVISIONS

<b>Version</b>	<b>Date</b>	<b>Description of Version/Revisions</b>
1.0	10/12/2011	First version issued
1.1	6/20/2012	Incorporate revisions to Parts 1, 2, 3 (all pages re-issued). Add Parts 4, 5, 6
1.2	1/30/2013	Incorporate revisions to Parts 3 through 5, add Room Layout Standards Diagrams in Part 3, add two appendices (all pages re-issued – revised text is italicized)
<b>1.3</b>	<b>6/26/2018</b>	<i>All sections revised and reformatted. Part 7 – Technical Details added. Appendix J “Standard BAC Architecture Detail” added.</i>

# TABLE OF CONTENTS

Current Document Version: 1.3

	<b>PAGE</b>
<b>History of Document Revisions</b>	0.1
<b>TABLE OF CONTENTS</b>	TOC.1
<b>PART 1: DOCUMENT USER GUIDE</b>	
1.1 Introduction	1.1
1.2 Receipt and Review of College Design Standards	1.1
1.3 Current and Future Editions	1.1
1.4 Procedure for Requesting Changes	1.1
1.5 Structure for this Document	1.2
1.6 List of Reference Documents	1.2
<b>PART 2: OWNER'S GENERAL PROJECT STANDARDS</b>	
2.1 Information Furnished to the A/E	2.1
2.2 Applicable Codes and Standards	2.1
2.3 Facility Program	2.2
2.4 Renovations (Existing Conditions)	2.2
2.5 Design Overview	2.2
2.6 Procurement of Construction Services	2.3
<b>PART 3: OWNER'S PLANNING AND PROGRAMMING STANDARDS</b>	
3.1 Integration with Facilities Master Plan and Utilities Master Plan	3.1
3.2 Accessibility Design Standards	3.1
3.3 Environmental Health and Safety Standards	3.2
3.4 Fire and Life Safety Standards	3.3
3.5 Security Standards	3.4
3.6 Resource Conservation and Integrated Systems Standards	3.5
3.7 Operations and Maintenance Standards	3.5
3.8 Building Planning Standards	3.7
3.9 Room Planning Standards	3.10
3.10 Floor, Room and Door Numbering and Naming Standards	3.17
Room Layout Standards Diagrams	3.DIAG.1 TO 3.DIAG.4
<b>PART 4: OWNER'S SITE STANDARDS</b>	
4.1 General Site Development Standards	4.1
4.2 General Utilities Standards	4.5
<b>PART 5: OWNER'S BUILDING CONSTRUCTION STANDARDS</b>	
5.1 General Building Design Standards	5.1
5.2 General Energy and Sustainability Standards	5.1
5.3 General Below-Grade Enclosure Standards	5.2
5.4 General Superstructure Standards	5.3
5.5 General Building Enclosure Standards	5.3
5.6 General Interior Construction Standards	5.11
5.7 General Specialties Standards	5.13
5.8 General Equipment Standards	5.14
5.9 General Furniture and Fixtures Standards	5.14
5.10 General Fire Suppression Systems Standards	5.19
5.11 General Plumbing Systems Standards	5.19
5.12 General HVAC Systems Standards	5.19

5.13 General Integrated Automation Systems Standards	5.20
5.14 General Electrical Systems Standards	5.22
5.15 General Communication Systems Standards	5.23
5.16 General Electronic Safety and Security Systems Standards	5.26

## **PART 6: TECHNICAL STANDARDS**

6.1 Technical Notes (in CSI Category Sequence)	
6.2 Technical Standards	
075200 – Low Slope Roofing	
275100 – Distributed Audio-Visual Communication – Emergency Call Box	
281300 – Access Control	
282300 – Video Surveillance	
283111 – Addressable Fire Detection and Alarm System	

## **PART 7: TECHNICAL DETAILS**

### *Civil/Site Details:*

C.1	<i>Typical Concrete Sidewalk Paving Detail</i>
C.2	<i>Typical Concrete Sidewalk Paving – 7" Thick</i>
C.3	<i>Slab on Grade Control Joint</i>
C.4	<i>Concrete Expansion Joint</i>
C.5	<i>Typical Slab on Grade Construction Joint</i>
C.6	<i>Detectable Warning Service Pavers</i>
C.7	<i>Concrete Slab Edge at Grade</i>
C.8	<i>Concrete Slab – Grade at Both Sides</i>
C.9	<i>Paver &amp; Concrete Slab Connection</i>
C.10	<i>Paver &amp; Fire Lane Connection</i>
C.11	<i>Paver &amp; Concrete Retaining Wall</i>
C.12	<i>Concrete Pavement &amp; Trench Cover</i>
C.13	<i>Paver &amp; Trench Connection</i>
C.14	<i>Concrete Paving &amp; Concrete Wall</i>
C.15	<i>Concrete Site Stair</i>
C.16	<i>Concrete Site Stair with Cheek Wall</i>
C.17	<i>Curb with Catch Gutter</i>
C.18	<i>Curb with Spill Gutter</i>
C.19	<i>Mountable Curb with Spill Gutter</i>
C.20	<i>Depressed Curb and Gutter</i>
C.21	<i>Typical Direct Buried Ductbank Section</i>
C.22	<i>Typical Ductbank Section Below Sidewalk</i>
C.23	<i>IT Manhole Section</i>
C.24	<i>Pedestrian Light Pole Foundation</i>

## **APPENDICES**

- A. Montgomery College Facilities Master Plan Update (2016)  
<http://cms.montgomerycollege.edu/EDU/Department2.aspx?id=32897>
- B. Montgomery College Utilities Master Plan (year of issue varies per campus)  
<http://cms.montgomerycollege.edu/EDU/Department2.aspx?id=31375>
- C. Montgomery College Campus Gateway Signage (reserved)
- D. Montgomery College Landscape Master Plan (Rockville) (reserved)
- E. Montgomery College Sign System Manual (reserved)
- F. Montgomery College Office of Information Technology:
  - 1. Voice/Data/Video Cabling MDF/IDF Communications Room Standard (2011) (reserved)
  - 2. Audio Visual Standards (2009) (reserved)
  - 3. Smart Instructor Work Station Standards (reserved)
- G. MC Central Plant To Building Connections (drawing sheet M-1 "Details," revised 12/10/2012)

- H. Emergency Power Guidelines – One Line Diagram (drawing sheet E-1, “One Line Diagram,” revised 6/22/2012)
- I. *Not Used*
- J. *Standard BAC Architecture Detail (2/28/2012)*

## **PART 1: DOCUMENT USER GUIDE**

### **1.1 INTRODUCTION**

The College Design Standards (CDS) is a document that has been developed by the Montgomery College Office of Facilities & Public Safety, and is intended only for use by the College and its consultants for new construction and renovation projects for the College. This document presents Montgomery College's preferred standards for planning and design, and preferred building components and systems. The intent is to aid consultants in understanding and fulfilling the College's needs. These standards should be adapted to the specific needs of each project with due consideration given to the program, goals and financial constraints of each project.

These standards establish a baseline for design procedures and for construction quality. Design consultants to the College should make themselves familiar with these standards. In the course of design services, the architect/engineer is to apply the applicable codes, and these college design standards, varying from the standards only after coordination with the College. Deviations from these standards are to be discussed with the Office of Facilities & Public Safety as early as possible, and prior to their incorporation in construction documents. All variances from these standards are to be highlighted in the basis of design narratives for the schematic design and design development submittals.

This document is not intended as a representation of industry standards, nor is it intended to supersede any applicable regulations or codes. Montgomery College makes no express or implied warranties with respect to the accuracy of the information presented, or its fitness for use for any particular purpose. The use and inclusion of these standards in bid documents does not relieve the consultant or architect of the responsibility and legal liability for any bid documents created from these standards. Outside standards and documents cited or excerpted in these college design standards are not warranted to be the latest or most applicable version of said materials. Users of this document are responsible for their use of the information, and are required to comply with all applicable local codes, including City of Rockville and Montgomery County codes, and state and federal codes and regulations.

### **1.2 RECEIPT AND REVIEW OF COLLEGE DESIGN STANDARDS**

The College Design Standards document is intended to be an exhibit or reference document to the architect/engineer services contract. The receipt and review of the college design standards is acknowledged by the return of the executed architect/engineer services contract to the College.

### **1.3 CURRENT AND FUTURE EDITIONS**

The College Design Standards are intended to be a dynamic, evolving document, and is updated periodically to incorporate additional standards and revisions. Interim revisions, between the issuance of official versions of the document, are tracked with indications in the document margins. Revised pages are identified by the version number shown in the lower right corner of each page. The cover sheet and table of contents for each version are noted with the version number and the date of that version. The table on the first page of the document entitled "History of Document Revisions" is also updated to indicate the current and all past versions of the document.

### **1.4 PROCEDURE FOR REQUESTING CHANGES**

These standards were developed by and are maintained by the Office of Facilities & Public Safety, Montgomery College, located at 9221 Corporate Boulevard, Rockville, MD 20850. Please call

240-567-5371 to communicate any requests for additions and revisions, and ask that your request be brought to the attention of the Vice President of Facilities and Public Safety.

## 1.5 STRUCTURE OF THIS DOCUMENT

This document is structured to locate general standards at the front of the document, including those regarding design and documentation procedures, cross-discipline planning and design standards, and general construction components and systems standards. These general standards are contained in the following document sections:

**Part 2: Owner’s General Project Standards**

**Part 3: Owner’s Planning and Programming Standards**

**Part 4: Owner’s Site Standards**

**Part 5: Owner’s Building Construction Standards**

These general sections are followed by **Part 6: Technical Standards**, in which more specific technical criteria are compiled, sorted by materials and system types into sections named to align with the current Construction Specifications Institute (CSI) “Masterformat” section numbers and titles. The information included in these sections is intended to be included or covered in the project specifications, but is not intended to serve as project specifications. Full specifications for these building systems and/or components are to be prepared by the A/E.

## 1.6 LIST OF REFERENCE DOCUMENTS

1. *Maryland Community College Facilities Manual*, published by the Maryland Higher Education Commission, available online at <http://mhec.maryland.gov/publications/Pages/finance/MDFacilities.aspx> This document compiles relevant information for facilities development for *community colleges from state* guidelines and other documents.
2. *Procedure Manual for Professional Services*, published by the Maryland Department of General Services, available online at <http://www.dgs.maryland.gov/Documents/ofp/Manual.pdf>. This document is generally superseded by the Maryland Community College Facilities Manual. However, some elements, such as A/E document preparation and submission requirements and low-slope roof requirements apply to Montgomery College projects.
3. *Facilities Program Manual*, published jointly by the Maryland Department of Budget Management and the Maryland Department of General Services, available online at [http://www.dpsscs.state.md.us/aboutdpsscs/pdfs/Facility\\_Program\\_Manual.pdf](http://www.dpsscs.state.md.us/aboutdpsscs/pdfs/Facility_Program_Manual.pdf) This document dictates the requirements for facilities programs that are to be submitted for state funding.
4. *Whole Building Design Guide*, web-based documentation regarding integrated “whole building” design techniques and technologies published by the National Institute of Building Sciences, and available for viewing online at <http://www.wbdg.org/index.php> .
5. *Postsecondary Education Facilities Inventory and Classification Manual (FICM)*, published by the National Center for Education Statistics, of the Institute for Education Sciences and available online at <http://nces.ed.gov/pubs2006/2006160.pdf> .
6. *Montgomery College Facilities Master Plan Update 2013–2023*, approved on February 1, 2016 by the Board of Trustees. This document is available online at <http://cms.montgomerycollege.edu/EDU/Department2.aspx?id=32897>
7. *Standards for Landscape Designs (Montgomery College)* is to be found at a link on the following webpage:<http://cms.montgomerycollege.edu/facilities/centralfacilities/>

8. *Conceptual Landscape Master Plans (One College Campus Landscape Master Plan – 6/2017)*, is to be found at a link on the following webpage:  
<http://cms.montgomerycollege.edu/facilities/centralfacilities/>
9. *MC Site/Campus Specific Landscape Plan Directives*

## PART 2: OWNER’S GENERAL PROJECT STANDARDS

### 2.1. INFORMATION FURNISHED TO A/E

The architect/engineer is to collect all required information from Montgomery College, local jurisdictions, and utility owners and operators, and to contract with all required support services, e.g. surveyor, geotechnical services, etc. Available existing building plans, utility plans, and site maps will be given to the architect/engineer by the College. No assurances, however, are given that these records are complete or accurate. It is the responsibility of the architect/engineer to verify existing conditions and establish the precise location of all underground utilities and/or services in the construction area and to show the same in detail on the design drawings.

A. Upon request from the Architect/Engineer, the College will provide the most current version of the following documents:

1. *Montgomery College’s Facilities Master Plan* (viewable online at <http://cms.montgomerycollege.edu/EDU/Department2.aspx?id=32897> )
2. *Montgomery College’s Audio Visual Standards, Voice/Data/Video Cabling and MDF/IDF Communications Room Standards, Smart Instructor Workstation Standards and MCTV standards.*
3. *Montgomery College’s Utilities Master Plan* (viewable online at <http://cms.montgomerycollege.edu/EDU/Department2.aspx?id=31375> )
4. *Montgomery College’s current Utility Infrastructure and Site Drawings*
5. *Montgomery College Rockville Campus Landscape Master Plan*, prepared by Slater Associates, December, 2007. This document is not available online. Coordinate with the College to request further information.
6. The Forest Conservation Plan and supporting documents for the relevant campus will be made available to the Architect/Engineer at the commencement of the project.

### 2.2. APPLICABLE CODES AND STANDARDS:

All projects are governed by the procedures and criteria indicated in *COMAR Title 13B Higher Education Commission, Subtitle 07 Community Colleges* (found on the internet at [http://www.dsd.state.md.us/comar/subtitle\\_chapters/13B\\_Chapters.aspx#Subtitle07](http://www.dsd.state.md.us/comar/subtitle_chapters/13B_Chapters.aspx#Subtitle07)) and the current *Maryland Community College Facilities Manual* published by the Maryland Higher Education Commission (MHEC) (viewable on the internet at <http://mhec.maryland.gov/publications/finance/mdfacilities/TOCLinks.asp>), and the State of Maryland Department of General Services’ *Design, Construction and Energy Project Management and Design Procedure Manual for Professional Services*, viewable on the internet at <http://.dgs.maryland.gov/Pages/OFP/index.aspx> )

All project design for the Rockville campus is to comply with the building codes of the City of Rockville. Project design for the Takoma Park/Silver Spring and Germantown campuses and for all projects funded by Montgomery County, shall comply with the building codes of Montgomery County. Contact the permitting department of the jurisdiction in which the project is to be constructed for a list of all adopted codes and local amendments. The site and building design is to comply with the zoning requirements of the local jurisdiction and their regulations regarding emergency vehicle access, firefighter access, and fire suppression systems. All directives resulting from Fire Marshall’s review of the documents and inspections of the building are to be incorporated into the final design and construction.

All building and site projects are to also comply with the College’s current design standards. Where there is a difference or conflict between requirements indicated in the applicable codes and standards, the most restrictive requirement shall apply.

All applicable codes and design standards are to be complied with. Any exceptions are to be highlighted on the first design drawing or design report or specification submittal in which they appear, and placed on a running, continuously maintained list of CDS items that will not be complied with.

### 2.3. FACILITY PROGRAM

Each project that is to be funded in part or in whole by the State of Maryland requires the completion and submission of a facility program. Projects that are not to receive any State of Maryland funding may also require the completion and submission of a facility program. The program document is developed and submitted during a programming phase that occurs prior to the start of project design.

The State requires that a facility program be divided into two parts. The *Part 1 Facility Construction Program* includes the justification for the project and the description and explanation of the scope of work. The *Part 2 Facility Construction Program* presents the additional details needed to procure architectural and engineering services and to guide the project design, and serves as the “program of requirements” for the project. The requirements for preparation and submission of the facility program are articulated in the Facility Program Manual for the State of Maryland (see *Section 1.6 List of Reference Documents* of this CDS document).

The facility program for each capital project is required to be submitted to the Maryland Department of Budget and Management, the Maryland Department of General Services and the Maryland Higher Education Commission for approval prior to the beginning of design phases. Once the program is approved as written by these agencies it may only be changed with revised approval from all three agencies.

### 2.4. RENOVATIONS (EXISTING CONDITIONS)

See the *Instructions to the Consultant* section of the **Part 2 Facilities Construction Program** for each specific project for information regarding documentation of existing conditions prior to demolition or selective demolition, and after demolition or selective demolition.

### 2.5. DESIGN OVERVIEW

- A. Design Principles:** all site and building design work for the College is to be executed in accordance with the following principles. Detailed requirements for each are provided in the referenced documents:
1. **Universal design/open access:** the College is an open access institution. The building and site design shall comply with the *Maryland Accessibility Code*. The College may determine that the design of a particular project is to exceed those requirements in order to provide for universal accessibility. See the *Accessibility Design Standards* section of *Part 3 Owner’s Planning and Programming Standards* of this CDS document for further details.
  2. **Resource Conservation and Integrated Systems:** environmentally sustainable design and construction, and particularly resource conservation, are very high priorities for the College. See descriptions of the standards for execution of design and energy analysis in

the *Resource Conservation and Integrated Systems Standards* section of *Part 3 Owner’s Planning and Programming Standards* of this CDS document, and in the *Instructions to the Consultant* portion of the *Part 2 Facilities Construction Program* document that is included in the Request for Proposals for each project.

3. **Environmental Health and Safety:** see the requirements indicated in the *Environmental Health and Safety Standards* section of *Part 3 Owner’s Planning and Programming Standards* of this CDS document. A/E coordination with the Campus Planner to support review and comment by the College’s Environmental Health and Safety team during design and construction phases is to be anticipated.
  4. **Safe and Secure Campus:** see the requirements indicated in the *Security Standards* section of *Part 3 Owner’s Planning and Programming Standards* of this CDS document.
  5. **Fire and Life Safety:** see the requirements indicated in the *Fire and Life Safety Standards* section of *Part 3 Owner’s Planning and Programming Standards* of this CDS document.
  6. **Exterior and Interior Architectural Expression:** for each project the architectural expression is to meet the requirements indicated in the *Part 1 and Part 2 Facility Construction/Renovation Program* documents for the specific project.
- B. A/E Service Scope and Sequence:** all programming, design, BIM model and document standards, construction administration and post-occupancy services for each project are to comply with the scope and sequence requirements that are indicated in the A/E services contract, in the *Instructions to the Consultant* portion of the *Part 2 Facilities Construction/Renovation Program* document for the project, and in the *Maryland Community College Facilities Manual* published by the Maryland Higher Education Commission (MHEC).

## PART 3: OWNER’S PLANNING AND PROGRAMMING STANDARDS

### 3.1. INTEGRATION WITH FACILITIES MASTER PLAN AND UTILITIES MASTER PLAN

All projects are to be coordinated with the goals of most current versions of the *Facilities Master Plan* and the *Utilities Master Plan* for the campus at which the project is being constructed. Strategic goals for off-campus projects for Central Administration and for Workforce Development and Continuing Education are to be confirmed in coordination with the College. The architect/engineer is to request a meeting at the time of project initiation to review the Facility Master Plan goals and criteria for the project with the College team. The existing and anticipated campus utilities and other infrastructure that may impact or be impacted by the project are also to be reviewed at that time to facilitate coordination on integration of the project systems with the existing utilities and infrastructure.

### 3.2. ACCESSIBILITY DESIGN STANDARDS

Montgomery College is an open access institution. The building and site shall comply with the Maryland Accessibility Code, and may go beyond those requirements to strive for universal accessibility. All indoor and outdoor spaces and elements of the facility and site are to be designed with the intent of accommodating all disabled individuals, including the visually and aurally disabled. Accommodations beyond the *Maryland Accessibility Code* are to be defined and confirmed in coordination with the College. Architect/Engineer coordination with the Campus Planner to support review and comment by the College’s Director of ADA Compliance is to be anticipated.

- A. **Furniture for authorized classroom accommodations:** coordinate with College to determine what special furniture or equipment may need to be provided in each particular room to serve students with authorized classroom accommodations, and what impact such furniture and equipment may have on seat count, room size, furniture layout, and power and IT infrastructure.
- B. **Site Accessibility:**
  - 1. All entrances to the building must be fully accessible to people with disabilities. This requirement includes the provision of nearby parking spaces and curb cuts, compliance with maximum walkway slope standards, and the installation of handrails and signage. Innovative design will be a necessity in attaining total accessibility, especially in *any* sloped site conditions. Ramps or other special access features are to be integrated into the functional and visual design of the building and site so as not to appear as a special accommodation. The following elements are to be incorporated into the design:
    - a. Parking spaces specifically designated and dimensioned in accordance with the Montgomery County or City of Rockville building codes (incorporating the *Maryland Accessibility Code*), and College requirements, are to be located as close as possible to major access points to the building. These spaces should be level and clearly marked as reserved for the disabled. The number and location of parking spaces for the disabled shall be closely coordinated with the campus-wide parking strategy and plan, and confirmed by the College.
    - b. Walkways connecting accessible building entrances to parking for the disabled, and to other facilities within the Campus must meet design criteria for the disabled, including maximum front to back and side to side slopes. Curb cuts in accordance with current design criteria must be provided where walkways intersect roads or provide access to parking facilities. When excessive grades are encountered, ramps with level resting areas at regular intervals are to be provided.

- c. A graphic wayfinding system must be included in the site design to indicate parking spaces and to direct people with disabilities to accessible building entrances. Signage must comply with the *Maryland Accessibility Code* and with the *Montgomery College Sign System Manual* (with addenda) which is included as an appendix to this College Design Standards.

### 3.3. ENVIRONMENTAL HEALTH AND SAFETY STANDARDS

- A. Compliance with the following criteria is required. A/E coordination with the Campus Planner to support review and comment by the College’s Environmental Safety Coordinator is essential for success in meeting the criteria. For more information, see the webpage for the Environmental Safety Office. The current web address is:  
<http://www.montgomerycollege.edu/Departments/envsafe/>
  1. **Hazardous materials:** all materials and finishes shall be non-asbestos containing (0%) and non-lead bearing (<0.5%).
  2. **Material Safety Data Sheets (MSDS):** instructors and assistants for science labs, automotive, building construction and other trade shops, art studios and theatre shops` are required to review MSDS frequently, and to have convenient access to them, as are custodial staff and Office of Facilities staff. Design provisions are to be made for convenient display/storage locations for MSDS sheets at labs, chemical storage rooms, trade instruction shops, art studios, theatre shops, custodial closets, custodial storage rooms, and other rooms in which hazardous chemicals are to be used.
  3. **Emergency Posters:** Classroom Emergency Posters and Emergency Evacuation Area Maps are to be placed in locations indicated by the College. Frames matching sign type H11 in the *Montgomery College Sign System Manual* are to be included in the construction contract. The posters and maps will be provided by the College (Director of Emergency Planning). Coordinate with the College regarding quantity and locations.
  4. **2-Way Radio Communications:** 2-Way radios are a critical element of the emergency communication systems. Coordinate design of the site and building to avoid any “dead” spots that do not support effective use of the radios.
  5. **Ergonomic Design:** workstations and other work areas are to be designed in compliance with ergonomic standards to support healthy performance of work duties and other activities.
  6. **Slip, Trip and Fall Prevention:** avoid building and site designs that will cause users to be exposed to the potential for slip, trip or fall while in the course of normal activities. Avoid creating building conditions that will cause the anticipated replacement of building elements (such as lamps) or repair of building elements (such as roofing) to require working in unsafe conditions or require that expensive and extreme measures be taken to provide safe conditions for the work. Provide safe access to all equipment on roofs.
  7. **Emergency Showers:** (reserved)
  8. **Laboratory Ventilation:** (reserved)
  9. **Art Studio Safety:** many potentially hazardous processes are performed in art studios. A work environment assessment of each studio or shop is to be performed in coordination with faculty to determine and document any processes that might be performed in each room at the time of building opening and in the future. From that information determinations are to be made as to what hazards each process might include or generate (dust, fumes, acids, silica,...), what mitigation processes are needed, which of those mitigations are to be included in the project, what provisions are needed to

accommodate future evolutions/changes in the processes, and what limitations are to be placed on the use of each space. These analyses and the outcomes are to be coordinated with the College team to confirm final program, limitations on space use, and required ventilation and other safety measures.

10. **Theater Shop Safety:** the construction of theater sets involves many potentially hazardous processes. A work environment assessment of each shop is to be performed in coordination with faculty to determine and document any processes that might be performed in the room at the time of construction and in the future. From that information determinations are to be made as to what hazards each process might include or generate, what mitigation processes are needed, which of those mitigations are to be included in the project, what provisions are needed to accommodate future evolutions/changes in the processes, and what limitations are to be placed on the use of each space. These analyses and the outcomes are to be coordinated with the College team to confirm final program, limitations on space use, and required ventilation and other safety measures.
11. **High voltage Electrical Panel Locations:** all high voltage electrical panels (50 Volts or more) are to be located in separate Electrical Rooms that are secure from access by individuals who do not have the training required for proximity to these panels.
12. **Site and Building Access for Deliveries, Removals:** provide for safe driveway access to buildings for vehicles delivering fuel for generators, lab gases and supplies, art supplies, and other supplies to the building, and vehicles removing trash, recycling, hazardous wastes and other materials from the building. Provide adequate loading infrastructure for safe and ergonomically healthy loading and unloading. Provide for adequate vehicle turnaround radius at or very near each driveway.

### 3.4. FIRE AND LIFE SAFETY STANDARDS

- A. Fire and life safety are among the highest priority design considerations. The architect/engineer is directed to investigate all potential fire and life safety problem areas and coordinate with the College in the determination of solutions. A partial list of requirements is below:
  1. The project design is to be fully compliant with the codes and standards listed in the *Applicable Codes and Standards* portion of this document above.
  2. The architect/engineer scope includes coordination with the local jurisdiction regarding emergency vehicle access, fire-fighter access, Knox Box selection and location, annunciator panel design and location and graphic designation for fire equipment.
  3. All fire equipment is to be clearly visible and graphically designated.
  4. All emergency equipment, including the Automated External Defibrillator (AED), phone, and fire extinguishers are to be co-located in the public corridor near the elevators, or in other conspicuous locations.
  5. Emergency access and egress routes are to be clearly identified and physically apparent to the building occupants.
  6. Provide Areas of Refuge Assistance with 2-way communication at each floor of each required egress stair, except at on-grade landings with immediate ADA compliant access to the exterior of the building and to a public way at least 50 feet from the building. The design of the Areas of Refuge Assistance is to comply with the current adopted *International Building Code*.
  7. All fire and life safety alarm systems designs must be approved by the Fire Marshal prior to installation.

8. All fire and life safety alarm systems shall be Native BACnet direct digital control. See *any Division 28* technical sections in the *Technical Standards* portion of this document.
9. All materials used in the building are to be selected with regard to flammability of the contents and the types of emissions produced by combustion.

### 3.5. SECURITY STANDARDS

- A. The facility should be open, inviting, flexible and accessible, yet safe and secure, with special attention given to minimizing the possibility of assault, vandalism, theft and other crime. The following list represents some of the design recommendations that should be employed, for the purposes of discouraging theft and other crimes of opportunity in campus buildings. Coordinate with the College team for review and comment by the Safety and Security Office.
1. Incorporate electronic safety and security systems, including an emergency notification system (ENS), a fire alarm system, access control system, and emergency telephone system to meet the criteria indicated in section 5.16 *General Electronic Safety and Security Systems Standards*, and any Division 28 technical standards sections of this *College Design Standards* document. Coordinate locations and quantity of devices with the College.
  2. Locate circulation, activity spaces and physical features in such a way that they maximize use and visibility and foster positive social interaction among legitimate users of private and public space. Place windows overlooking pathways, parking lots and entrances. Use vehicle pathways as a surveillance asset. Create landscape designs that promote surveillance.
  3. Provide adequate lighting for visibility and safety, avoiding glare and shadows. Place overhead exterior lighting along pathways and other pedestrian areas at proper heights for lighting the faces of the people in the space or on the path. Do not use in-ground or bollard fixture types. Lighting occupancy sensors and controls where specified shall be provided with auxiliary contacts and connected to the building’s Energy Management Control System (EMCS) with alarm points into the Campus Safety and Security Office.
  4. Provide transparent vestibules at all public entrances.
  5. Design with short corridors wherever possible to define locally supervised areas and discourage intrusion.
  6. Individual suites within the facility are to be separately securable without interfering with required egress routes from the building.
  7. All entrances, entrance lobbies and exits, including emergency-only exits, are to be equipped with surveillance cameras.
  8. Use structures, built-ins and furnishings to direct visitors to reception areas.
  9. Avoid design features that provide access to roofs or upper levels.
  10. Place toilet rooms in locations that are convenient to high traffic areas. Toilet room entrance access, except at *Single Occupancy Restrooms*, shall be “airport-style” without entry doors.
  11. Locate stairwell and elevator access and egress in open, public spaces.
  12. Fire doors at stair towers are to include vision panels.
  13. Coordinate door hardware selection and keying, access control technology and video surveillance technology, to optimize security and convenient access for building occupants.
  14. All emergency exits and exterior doors that are designated as “EXIT ONLY” should be installed without hardware on the exterior, and with an automatic door closer as well as with an alarmed panic device with local and remote annunciating capability.

15. Service and rear entry doors are to be constructed of heavy-duty materials with heavy-duty hardware to be as break-in resistant as possible.
16. All doors should have hinge pins that are not exposed to public areas.
17. Locks shall be provided on all doors and are to have removable core cylinders to match the existing College system. All cylinders shall be keyed, sub-mastered and master keyed as directed by the College.
18. Extend all interior partitioning to the structure above at public corridors, at the perimeter of individual suites, at conference rooms, at offices designed for counseling services, at offices designed for personnel of the Director level and higher, at toilet rooms and at mechanical, electrical, plumbing and IT/telecom rooms. Non-fire-separation-rated partitions at other locations are to terminate at the height of the bottom of the ceiling.
19. Design with windows that are easily secured in closed position.
20. Design for ease of maintenance to promote a “well cared for” appearance and encourage “ownership” by occupants and users.

### 3.6. RESOURCE CONSERVATION AND INTEGRATED SYSTEMS STANDARDS:

- A. Environmentally sustainable design and construction, and particularly resource conservation, are high priorities for the College. The project design shall comply with the environmentally sustainable design requirements of Montgomery County. New buildings and renovations on the Rockville Campus must also comply with the environmentally sustainable design requirements of the City of Rockville’s City. Projects funded by the State of Maryland must comply with the *International Green Construction Code*. Per the Montgomery County mandates, the project design shall comply with the current LEED Green Building Rating System requirements and be processed for LEED Silver Certification Building Rating. The College may elect to apply more restrictive or aggressive design standards than those indicated in the LEED credits, and may choose to submit for a Platinum or Gold Certification rather than a Silver Certification.

In order to optimize project success in building functionality, resource conservation, sustainability and durability, it is critical that site and building components and systems be well integrated. A collaborative, integrated team approach is required from the program verification phase through all energy analysis and design phases, project construction, and the initial year of occupancy. Further definition of the sustainable design scope, including a description of the Commissioning scope and commissioned systems, is to be found in the *Instructions to the Consultant* portion of the *Part 2 Facilities Construction/Renovation Program* document that is included in the Request for Proposal (RFP) for each project.

### 3.7. OPERATIONS AND MAINTENANCE STANDARDS

- A. The following criteria are to be implemented to support long term durability and life expectancy for buildings at the College:
  1. Life-cycle-cost and equipment maintenance: long term maintenance costs must be a consideration in the selection of all materials and design of all systems. Life-cycle studies have shown that the cost of maintaining a building over its normal life exceeds the cost of constructing that facility. Every effort is to be made to minimize maintenance problems and costs. All building systems, including but not limited to Mechanical, Electrical, and Plumbing systems, shall be selected and designed based on a life-cycle cost analysis (LCCA) as described in the *Instructions to the Consultant* portion of the *Part 2*

**Facilities Construction/Renovation Program** document that is included in the Request for Proposal (RFP) for each project.

2. Analysis shall be provided to evaluate the option of a Mechanical penthouse versus rooftop air handling units.
3. Any systems which vary from Montgomery College standards may be proposed for College approval if supported by life cycle cost analysis.
4. Close coordination with the College is required to obtain input regarding the locating of facilities, design and layout of building systems, selection of equipment and finish materials, and other design elements that directly affect annual maintenance costs. All built-in architectural elements and materials shall be industry-proven, dependable, durable and low-maintenance systems and products. The target life expectancy for the structure and enclosure for all buildings is to be a minimum of sixty years. The selection for all building systems, materials and products are to target the longest lifespan demonstrated to be feasible for the relevant function and material/product type. The A/E is to identify any proposed materials and products that typically do not achieve a higher than average life expectancy (per industry standards for that material/product type) and coordinate with the College before incorporating their use into the building design. The College will review the systems design and equipment and material selections prior to approval to proceed. Some specific requirements for the facility are:
  - a. Equipment that requires highly technical skills and procedures or specialized equipment/tools for its repair is to be avoided. Any such equipment that is proposed is to be brought to the attention of the College team prior to incorporation in the Construction Documents.
  - b. All corridors, stairwells, and public areas must have highly durable finishes.
  - c. Adequate accessibility to all equipment must be provided to allow for convenient maintenance, repair, removal, and replacement with minimal effort. Coordinate with the College during all phases to confirm required clearances.
  - d. Durability and ease of maintenance requirements are to be primary considerations in the selection of all floor coverings.
5. Computerized Maintenance Management Systems (CMMS): (reserved)
6. Labeling and Identification: (reserved)
7. Format for Maintenance Management Manuals and Operating Instructions: (reserved)
8. Assemblies to be commissioned: The following building assemblies are to be commissioned and this list of commissioned assemblies shall be included in the scope of commissioning (Cx) activities for all College projects. The list in its entirety shall be used to develop commissioning contract documents and be used as the basis for all commissioning plans.
  - a. Division 01 Section: **Facility Substructure Commissioning** – for commissioning process activities for foundations and basement systems and assemblies
  - b. Division 01 Section: **Facility Shell Commissioning** – for commissioning process activities for superstructure, exterior enclosure and roofing systems and assemblies
  - c. Division 01 Section: **Interiors Commissioning** – for commissioning process activities for interior construction, stairways and interior finishes systems and assemblies.
  - d. Division 11 Section: **Commissioning of Equipment** – for commissioning process activities for program equipment, equipment infrastructure, assemblies, and components.

- e. Division 14 Section: **Commissioning of Conveying Equipment** – for commissioning process activities for dumbwaiters, elevators, escalators and moving walks, lifts, turntables and scaffolding systems, assemblies, equipment and components.
- f. Division 21 Section: **Commissioning of Fire Suppression** – for commissioning process activities for fire suppression systems, assemblies, equipment and components.
- g. Division 22 Section: **Commissioning of Plumbing** – for commissioning process activities for plumbing systems assemblies, equipment and components.
- h. Division 23 Section: **Commissioning of HVAC&R** – for commissioning process activities for heating, ventilating, air-conditioning and refrigeration systems, assemblies, equipment and components.
- i. Division 25 Section: **Commissioning of Integrated Automation** – for commissioning process activities for commission integrated automation systems, assemblies, equipment and components.
- j. Division 26 Section: **Commissioning of Electrical** – for commissioning process activities for electrical systems, assemblies, equipment and components.
- k. Division 27 Section: **Commissioning of Communications** – for commissioning process activities for communication systems, assemblies, equipment and components.
- l. Division 28 Section: **Commissioning of Electronic Safety and Security** – for commissioning process activities for electronic safety and security systems, assemblies, equipment, and components.
- m. Division 33 Section: **Commissioning of Utilities** – for commissioning process activities for water, well, sanitary, sewerage, storm drainage, fuel distribution, hydronic and steam energy, electrical and communications utilities, systems, assemblies, equipment and components.

### 3.8. BUILDING PLANNING STANDARDS:

#### A. Programming and Planning Reference Standards:

1. For information regarding general requirements for Community Colleges, refer to the *Maryland Community College Facilities Manual*, published by the Maryland Higher Education Commission (MHEC).
2. For information regarding the scope and documentation requirements for a Facilities Master Plan and the procedures for submittal and review, refer to *Section 2 Facilities Master Plan* of the *Maryland College Facilities Manual*, and *COMAR, Title 13B, Chapter 4 Construction Procedures, Regulation 02 Facilities Master Plan*.
3. For specific requirements regarding the determination of space allocations, please refer to *COMAR Title 13B, Maryland Higher Education Commission, Subtitle 07 Community Colleges, Chapter 05 Space Allocation Guidelines, section 02 Capital Guidelines*.
4. For guidance regarding the scope and documentation that is required in a *Part 1 Facility Program* and a *Part 2 Facility Program*, and the procedures for submittal and review, refer to the *Maryland Facility Program Manual*, published jointly by the Maryland Department of Budget and Management and the Maryland Department of General Services.
5. For additional information regarding programming procedures and criteria, refer to the most current version of the *Postsecondary Education Facilities Inventory and Classification Manual (FICM)*, published by the National Center for Education Statistics, of the Institute for Education Sciences.

6. For planning information regarding gender inclusive restrooms and locker rooms, lactation facilities and serenity spaces, refer to the Montgomery College Special Spaces Study (May 2016, Stantec).
- B. **Building Areas, Volumes & Efficiency Measurement:** all areas, volumes and efficiencies are to be measured in accordance with *Chapter 3, Appendix D and Attachment 4 of the Postsecondary Education Facilities Inventory and Classification Manual (November, 2015)* (see *Programming and Planning Reference Standards* above).
- C. **Entrance Vestibules:** entrances should be appropriately designed for accessibility, for use by individuals with disabilities and for service deliveries and other general traffic. Weather protection for outside entry areas shall be designed for and provided by overhangs, canopies, or recessed doorways. An adequately sized vestibule shall be provided at each major entrance. Doors that are egress only and do not have hardware on the exterior do not require vestibules. Vestibules are typically not heated or ventilated, so the air barrier system needs to be continuous through/around the vestibules along the interior surfaces in order to provide a barrier between the vestibule and the conditioned interior of the building.
- D. **Circulation Patterns:** circulation routes within the structure must provide for ease of use and be appropriately sized. Careful attention is to be given to the distinctive circulation patterns of staff, students, and visitors. In addition, the relative sizes of the horizontal circulation elements (lobbies and corridors) are to be based on calculated loads and egress capacities appropriate to those areas directly served. These spaces shall also be sized to accommodate the broader movement of persons through the areas to other parts of the building, complying with NFPA requirements. Horizontal circulation elements shall be designed with due consideration to the ratio of net assignable square feet to gross square feet.
- E. **Entrance Lobbies:** these spaces should be designed to provide clear indications of arrival within the building and of where to find further directions to locations within the building. Security, with regard to persons entering and exiting the building, should be maintained by camera surveillance of all entrance spaces, and of all exits.
- F. **Corridors:** provide sidelights or other vertical or horizontal “borrowed light” glazed panels wherever possible in partitions between corridors and rooms along the building exterior in order to optimize the use of daylight in corridors. Coordinate the size and location of borrowed light panels with the sustainable design efforts and procedures for the project.
- G. **Stairs:** adequate stairways shall be provided to meet all egress requirements. Additional enclosed or open stairs may be required for convenient access between related spaces. Stairs are to be located near primary building entrances, with visual access from the entrances. Size the doors at stairwells to provide for adequate egress width to meet code requirements and safely accommodate the maximum anticipated traffic. Provide vision-panels in stairway doors, or sidelights beside stairway doors to provide sight lines to and from stairwells for safe circulation.
- H. **Storage:** additional storage spaces, above and beyond those listed in the building program shall be added where it is feasible to do so without exceeding the design NASF for the building. Coordinate closely with the College to determine what additional rooms might be needed for storage of equipment and other materials.
- I. **Trash and Recycling:** provide functional and aesthetically appropriate trash and recycling receptacles built into corridors, vending rooms, and dining facilities. Provide adequate rooms near to the loading dock and service entrance for trash and recycling materials collected from the building to be temporarily stored until they are removed from the building. Size these rooms to accommodate the College standard receptacles.

- J. **Ceiling Heights:** the minimum ceiling height in occupiable spaces shall be 9 feet above the finished floor surface. Ceiling heights should be set as high as is feasible within the building height restrictions and balanced with providing adequate interstitial space for floor structure and mechanical, plumbing, electrical and IT systems. Some rooms, such as classrooms, may require higher ceilings in order to accommodate equipment, or for other reasons. Coordinate with the College to confirm the ceiling height requirements for each room.
- K. **Conveyance:** elevators will be required in the building for the vertical circulation of building occupants and freight. Elevators are to be located near the primary building entrances, but on the far side of stairways, to facilitate the use of stairways by faculty, staff, students and visitors rather than the elevators. A freight elevator should be located in the building with direct access to the at-grade loading and receiving area and should provide access to all levels of the building, including to the roof (where feasible). Elevators shall comply with State of Maryland requirements. Coordination with the College is required to ensure compliance with the current College standards for elevator types, manufacturers and specifications.
- L. **Custodial Closets:** a minimum of one custodial closet is to be provided at each floor, sized to accommodate the necessary equipment and supplies for that floor. An additional closet is to be provided on one floor for storage of floor buffing and shampooing equipment.
- M. **General Restroom Requirements:**
1. Adequate Restroom facilities for the quantity and use patterns of occupants are needed, which may require fixtures beyond code mandated counts. The wide range of occupancy in College buildings often results in a high variation between peak and typical loads. Calculations shall be performed to determine peak and typical day to day occupant loads to provide adequate fixtures for all program functions. Restroom facilities shall be located to best support day to day and peak occupancy loads.
  2. Restrooms are to be named based on the gender of the user group (Women’s Room, Men’s Room), and restrooms with a single water closet and lavatory are to be named “Single Occupancy Restroom,” are to be ADA compliant and are intended for use by all individuals. The wheelchair logo in each sign is to include an ‘L’ or ‘R’, or both, to indicate left-hand or right-hand transfer access to the ADA toilet(s).
  3. For space use classification purposes, Restrooms/Toilet Rooms are classified in the Postsecondary Education Facilities Inventory Classification manual as Building Services Area type HEGIS X03 “Public Rest Room”.
  4. All Restroom facilities are to comply with Maryland Accessibility Code requirements, OSHA and National Sanitation Foundation requirements/recommendations.
  5. All Restroom facilities are to comply with the guidelines for Gender-Inclusive Restrooms that are provided in the **Montgomery College Special Spaces Study**.
  6. The minimum clear width for typical toilet stalls is to be 35 inches, measured from face of partition or wall to face of partition or wall. Standard toilet stall partitions are to be located at 36 inches on center. Clear dimensions within wheelchair accessible stalls are to comply with the Maryland Accessibility Code. *Provide an approximately equal quantity of toilets situated for left-hand transfer and right-hand transfer in single occupant toilet rooms and across restrooms throughout the building.*
  7. Provide a lavatory sink within the wheelchair accessible toilet stall in all multi-stall restrooms to allow for hand washing within the stall.
  8. No doors are to be provided at entrances into Restrooms. Privacy is to be provided by the layout of entrance screen walls (in “airport” style).
  9. Floors at Restrooms are to be finished in terrazzo.

- N. **Single Occupancy Restroom Requirements:** in addition to the Restrooms required to house the quantity of plumbing fixtures that are required by the applicable building codes, provide one or more single occupancy restrooms designated as a “*Single Occupancy Restroom.*” *These rooms are to be equipped with doors with hardware to lock the door from inside. When the lock is engaged, signage outside the door is to display the word “Occupied”. When lock is disengaged, signage outside the door is to display the word “Available.” Include a water closet, lavatory, mirror, baby changing station, paper seat cover dispenser, toilet tissue dispenser, soap dispenser, towel dispenser, etc. The signage for these rooms is to include only the international/universal ADA symbol – no text is needed.*
- O. **Gender-inclusive Locker Facilities Requirements:** *coordinate with the College regarding the possible need for locker rooms in the project, to confirm strategy for providing for gender-inclusive locker facilities.*
- P. **Lactation Room Requirements:**
1. *Coordinate with the College regarding the possible need for a Lactation Room in the project. All lactation rooms are to comply with the guidelines for lactation rooms that are provided in the Montgomery College Special Spaces Study (2016, Stantec).*
- Q. **Serenity Space Requirements:**
1. *Coordinate with the College to confirm the need for one or more serenity spaces in the building. All required serenity spaces are to comply with the guidelines for serenity spaces that are included in the Montgomery College Special Spaces Study (2016, Stantec).*

### 3.9. ROOM PLANNING STANDARDS

- A. **Room Types, Quantities, Sizes and Adjacencies:** the room types, and the quantity, population and size of each type of room, and the preferred adjacencies among rooms are to be determined in coordination with the College. The criteria for these determinations is established in the Request for Proposal for A/E Services for the project, the A/E services contract, and the documents indicated in **3.7.A Programming and Planning Reference Standards** above. Preliminary criteria for typical room types are indicated below.
- B. **Furniture and Equipment:** the standard list of furniture for each typical room type is indicated with the room type description below. These lists are to serve only as preliminary standards. The final dimensions, layout and furniture and equipment list for each room is to be developed in coordination with the College team and the occupants. See the **General Furniture and Fixtures Standards** in **Part 5: Owner Building Construction Standards** (reserved) of this document for more detailed information about standard furniture.
- C. **Planning Standards for General Purpose Classrooms:**
1. Room Size/Net Assignable Square Footage: coordinate with the College to confirm the optimum classroom population size(s) for each project and the current College standards for classroom size, shape and layout. See the diagrams for room layout standards at the end of this **Part 3 Owner’s Planning and Programming Standards** document. When considering how many student stations will fit in a new or existing room, other issues must be considered such as accessible student stations, obstructions (column or pillar, a nook in a corner, shelves or overhanging cabinets, etc.) and orientation to classroom doors. Calculate the initial NASF for planning each classroom size using the following criteria:
    - a. Allow 100 NASF for primary circulation aisle
    - b. Allow 100 NASF for Smart Instructor Workstation (SIWS) and circulation around it
    - c. Allow 20 NASF per student station (includes secondary/internal circulation space)
 As an example, the initial planning size for a 30 station classroom would be 100 (primary aisle), + 100 (SIWS) +(30 x 20) = 800 NASF.

2. Room width and depth: acceptable sightlines and student station distances to images projected on projection screens, “white” boards and other display surfaces vary greatly depending upon the performance parameters of the projection technology that will be installed in the room. For that reason, the determination of classroom width and depth must include analysis of the projection technology’s limits for projection area, viewing angles and distances, all door and window locations, and column locations, among other factors. Coordinate with the College during programming and design to optimize classroom size and shape and the successful use of projection technology.
3. Ceiling height: the minimum ceiling height is to be 9’-0” or the height required to accommodate the proposed projection system for the room, whichever is higher. Coordinate ceiling height with performance parameters of the projection system that is to be installed.
4. Furniture/equipment Standards: the preliminary list of furniture and equipment for this room type is as indicated below. Coordinate final table selections with the final computer equipment selection for student stations:
  - a. Chairs: 1 per instructor and student station
  - b. Table (24” x 60”): 1 per 2 student stations
  - c. ADA Table (24” x 42”): 1 per first 25 student stations, and a 2<sup>nd</sup> per next 25 stations
  - d. Instructor table (24” x 60”): 1 each
  - e. Smart Instructor Workstation (SIWS):
    - 1 lectern/equipment cabinet/rack (27” x 58”)
    - Computer
    - SMART Podium monitor
    - DVD/VHS video player
    - Audio amplifier
    - Document camera
    - Component switching device
    - Input/output panel
    - Remote/pointer
    - Telephone (mounted at wall near SIWS)
  - f. Projector: 1 each
  - g. Projector screen: 1 each (confirm based on projector selection)
  - h. Flat panel screen (LCD or plasma): 1 each (confirm based on need)
  - i. Marker surface: 2 or more (confirm based on projector selection)
  - j. Bulletin board: 1 each
  - k. Window shades : As needed to cover windows
  - l. Waste basket: 1 each
  - m. Recycling bins: 1 each
5. Special Finishes: chair rail around room
6. Marker Surface and Layout: coordinate marker surface sizes and locations with the anticipated location of projected images in the room, based on projector technology location and height. Coordinate marker surface material/product selection with the College. In rooms in which the marker surfaces will be used as a projection surface, locate all joints between panels outside of the anticipated projected image area. In rooms that will include a drop down projection screen, locate the marker surfaces so as to provide adequate marker surface for instructor use when the screen is in the down position.

7. Aisle Widths and Lengths: the central aisle used for access to rows of tables is to be a minimum of 4 feet clear in width. Aisles between rows of tables, for access to individual seats, are to be a minimum of 3 feet clear in width. Comply with current IBC requirements regarding aisle length and width (if it exceeds the widths stated above) for use in Occupancy Group B.
8. Windows: classrooms that are adjacent to exterior walls of the building are to have at least one operable window at an exterior wall.
9. Window shades: coordinate selection of window shades for each Classroom with College requirements for daylight dimming, shading or blackout for that room.
10. Doors: the preferred location(s) for classroom door(s) will vary depending on multiple factors, including location of Smart Instructor Work Station, and room proportions. Coordinate with the College to select door quantities and locations for each classroom.
11. Classroom Layout Standards: see the Classroom Layout Standards Diagram below at the end of *Part 3: Owner’s Planning and Programming Standards*.

**D. Planning Standards for Computer Equipped Class Laboratories:**

1. Room Size/Net Assignable Square Footage: coordinate with the College to confirm the optimum class laboratory population size(s) for each project. For computer-equipped class laboratory layout standards, see the *Computer Equipped Class Laboratory Layout Standards* diagram in the *Room Layout Standards Diagrams* section at the end of this CDS Part 3 document. When considering how many student stations will fit in a new or existing room, other issues must be considered such as accessible student stations, obstructions (column or pillar, a nook in a corner, shelves or overhanging cabinets, etc.) and orientation to room’s doors. Calculate the initial NASF for each computer equipped class laboratory size using the following criteria:
  - a. Allow 100 NASF for primary circulation aisle
  - b. Allow 100 NASF for Smart Instructor Workstation and circulation around it
  - c. Allow 30 NASF per student station (includes secondary/internal circulation space)
 As an example, the initial planning size for a 30 station class laboratory would be 100 (primary aisle), + 100 (SIWS) +(30 x 30) = 1,100 NASF.
2. Room width and depth: acceptable sightlines and student station distances to images projected on projection screens, *marker* boards and other display surfaces vary greatly depending upon the performance parameters of the projection technology that will be installed in the room. For that reason, the determination of computer-equipped class laboratory width and depth must include analysis of the projection technology’s limits for projection area, viewing angles and distances, all door and window locations, and column locations, among other factors. Coordinate with the College during programming and design to optimize class laboratory room size and shape and the successful use of projection technology.
3. Ceiling height: the minimum ceiling height is to be 9’-0” or the height required to accommodate the proposed projection system for the room, whichever is higher. Coordinate ceiling height with performance parameters of the projection system that is to be installed.
4. Furniture/equipment Standards: the preliminary list of furniture and equipment for this room type is as follows:
 

a. Chairs:	1 per instructor and student station
b. Table (30” x 60”):	1 per 2 student stations
c. ADA Table (30” x 42”):	1 per 1st 25 student stations, a 2 <sup>nd</sup> per next 25
d. Instructor Table (30” x 60”):	1 each

- e. Smart Instructor Workstation: (abbreviated as SIWS)
    - 1 lectern/equipment cabinet/rack (27" x 58")
    - Computer
    - SMART Podium monitor
    - DVD/VHS video player
    - Audio amplifier
    - Document camera
    - Component switching device
    - Input/output panel
    - Remote/pointer
    - Telephone (mounted at wall near SIWS)
  - f. Marker board: 2 or more (confirm based on projector selection)
  - g. Bulletin board: 1 each
  - h. Window shades: As needed to cover windows
  - i. Waste basket: 1 each
  - j. Recycling bins: 1 each
5. Special Finishes: chair rail around room
6. Marker Surface and Layout: coordinate marker surface sizes and locations with the anticipated location of projected images in the room, based on projector technology location and height. Coordinate marker surface material/product selection with the College. In rooms in which the marker surfaces will be used as a projection surface, locate all joints between panels outside of the anticipated projected image area. In rooms that will include a drop down projection screen, locate the marker surfaces so as to provide adequate marker surface for instructor use when the screen is in the down position.
7. Aisle Widths and Lengths: the central aisle used for access to rows of tables is to be a minimum of 4 feet clear in width. Aisles between rows of tables, for access to individual seats, are to be a minimum of 3 feet clear in width. Comply with current IBC requirements regarding aisle length and width (if it exceeds the widths stated above) for use in Occupancy Group B.
8. Windows: Computer Classrooms that are adjacent to exterior walls of the building are to have at least one operable window at an exterior wall.
9. Window shades: coordinate selection of window shades for each computer equipped class laboratory with College requirements for daylight dimming, shading or blackout for that room.
10. Doors: the preferred location(s) for classroom door(s) will vary depending on multiple factors, including location of Smart Instructor Work Station and room proportions. Coordinate with the College to select door quantities and locations for each classroom.
11. Computer Equipped Class Laboratory Layout Standards: see the *Computer Equipped Class Laboratory Layout Standards Diagram* below, at the end of *Part 3: Owner Planning and Programming Requirements*.
- E. Planning Standards for Typical Offices:**
1. Room Size/Net Assignable Square Footage: the target NASF for each individual office type, based on personnel positions at the College, is indicated below:

Office for Dean/Vice President/Associate VP:	180 NASF
Office for Associate Dean/Director:	150 NASF
Office for Department Chair:	150 NASF

Office for Professional/Technical Staff:	120 NASF
Office for Faculty/Counselor:	120 NASF
Open Office for Sr. Admin. Aide and Admin. Aide:	110 NASF
Open Office for Clerical:	85 NASF
Office for Part-time Faculty (shared by 4 PT Faculty):	120 NASF

For programming purposes, use these target NASF numbers, and assume 120 NASF as the minimum area for any one person office room. This minimum is based on the College standards for office furniture, and allows some tolerance for the inevitable space constraints that will impact the dimensions of offices during building design phases.

2. Coordinate the office door location with furniture selection and layout, but allow 6” minimum between door opening and a perpendicular wall at the hinge side. Where feasible, provide adequate space for a 12” deep bookcase behind door. Maintain the opportunity for 18” clearance at latch side, at pull side of door.
3. Furniture/Equipment Standards: the preliminary list below is based on a typical 120 NASF Office, for one occupant. The final list of furniture and equipment for each office may vary based on the dimensions of the office and the type and amount of material that the occupant(s) need to store. The locks for all of the furniture within an individual office or workstation are to be keyed alike. Coordinate with the College to determine furniture lists for each office for each personnel position. Larger offices for Department Chairs and other senior positions will likely include a conference table and additional guest chairs, and more file cabinets or bookcases. Secure file storage will be required at or near many senior personnel offices. See the *General Furniture and Fixtures Standards in Part 5: Owner Building Construction Requirements* (reserved) of this document for more detailed information about the standard furniture.
  - a. Pencil/Box/File Drawer Pedestal  
(15”w x 21.5” d x 27”t): 1 per office/station
  - b. File/File Drawer Pedestal  
(15”w x 21.5” d x 27” t): 1 per office/station
  - c. Overhead Bins  
(36” Min. length, total 72” min.) : 2 (1 pair) per office/station
  - d. Work Surface (24” x 60”,  
24” x 30”, corner 36” x 36”): 1 each per office/station
  - e. Lateral File Cabinet  
( 30” w x 21.5” d x 27” tall): 1 per office/station (optional)
  - f. Storage Tower/Wardrobe  
(36” w x 18”d x 68”t): 1 per office/station
  - g. Bookcase (30”w x 12”d,  
height & number of shelves TBD): 1 per office/station (optional)
  - h. Manager Chair: 1 per office/station
  - i. Guest Chair: 1 per office/station
  - j. Task Light (mtd to Overhead Bins): 2 per office/station
  - k. Tack Board: 1 per office/station
  - l. Tool Tile (supports accessories): 1 per office/station
  - m. Computer: 1 per office/station
  - n. Telephone: 1 per office/station
  - o. Window Treatments: 1 per window
  - p. Waste Basket: 1 per office/station

- q. Recycling Bin: 1 per office/station
  - 4. Windows: offices that are adjacent to exterior walls of the building are to have at least one operable window at an exterior wall.
  - 5. Office Layout Standards: see the Office Layout Standards Diagrams below, at the end of *Part 3: Owner Planning and Programming Requirements*.
- F. Planning Standards for Typical Open Office Workstation:**
- 1. Net Assignable Square Footage: each open workstation is considered either an Open Office for Senior Administrative Aide/Executive Secretary, or an Open Office for Administrative Aide/Secretary” or an “Open Office for Secretary/Clerical” and is allotted 80 or 60 NASF respectively, per the list above of office types for personnel positions. A workstation may house full-time or part-time staff, or Student Assistants, and may be shared by more than one part-time person. It is the preference of the College to avoid large open office “pools.” However small numbers of workstations may be grouped together in a shared office, or in an administrative or reception area.
  - 2. Enclosure/cubicle Standards: (reserved)
  - 3. Furniture & Equipment Standards: match the furniture and equipment listed above for a Typical Office. Final list is to be determined in coordination with the occupants.
  - 4. Typical Staff Workstation Layout: (reserved)
- G. Planning Standards for Typical Reception Area with Staff Workstation:**
- 1. Room Size/Net Assignable Square Footage: this space type combines a reception seating area with a staff workstation. The NASF for the space is to be the sum of the NASF for the workstation (85) plus that of the reception area, which is to be calculated at 15 NASF per person for the first 15 seats and 10 NASF per seat beyond 15. Confirm whether the workstation is to be provided at a custom built-in counter or is to be enclosed with a cubicle system.
  - 2. Enclosure/Cubicle Standards: (reserved)
  - 3. Furniture & Equipment Standards: unless otherwise directed, provide a cubicle perimeter configured to accommodate the furniture and functions of a reception counter. The furniture at the workstation is to match the furniture and equipment listed above for a Typical Office. Provide guest chairs based on the quantity of seats assigned in the building program. In addition provide the following:
    - a. Large screen monitor  
w/ internet connection: (optional – for departmental display)
    - b. Printer and stand (networked): 1 each
    - c. Copy machine (high volume): 1 each
    - d. Fax/copy machine: 1 each
    - e. Scanner: 1 each
    - f. Shredder: 1 each
    - g. Paper cutter: 1 each
    - h. Comb binder: 1 each
    - i. Stapler (electric) 1 each
    - j. Pencil Sharpener (electric) 1 each
  - 4. Typical Reception Room Layout: (reserved)
- H. Planning Standards for Typical Workroom:**
- 1. Room Size/Net Assignable Square Footage: this space type is intended to serve multiple functions, including as an administrative work area for printing, copying and assembling projects, a supplies storage area and a kitchenette. The standard room size is to be 160 NASF.

2. Furniture and Equipment Standards: the preliminary list of furniture and equipment for this room type is as follows:
    - a. Wall cabinets (16” deep): 1 each approx. 10’ length
    - b. Open wall shelves (16” deep): 1 each approx. 6’ length
    - c. Base cabinets and countertop: 1 each approx. 16’ length
    - d. Single bowl kitchen sink and faucet: 1 each
    - e. Under cabinet task lighting: 4 each
    - f. Printer and stand (networked): 1 each
    - g. Copy machine (high volume): 1 each
    - h. Fax/copy machine: 1 each
    - i. Scanner: 1 each
    - j. Shredder: 1 each
    - k. Paper cutter: 1 each
    - l. Comb binder: 1 each
    - m. Stapler (electric) 1 each
    - n. Pencil Sharpener (electric) 1 each
    - o. Under counter refrigerator: 1 each
    - p. Bulletin board: 1 each
    - q. Marker board: 1 each
    - r. Work table: 1 each
    - s. Chairs: 4 each
    - t. Window treatment: 1 per window
    - u. Waste basket: 1 each
    - v. Recycling bins: 1 each
  3. Typical Workroom Layouts: (reserved)
- I. **Planning Standards for Typical File and/or Storage Room:**
1. Room Size/Net Assignable Square Footage: the room size is to be determined based upon the amount of storage requirements that are anticipated for the Department/Unit/Subunit.
  2. Furniture and Equipment Standards: the quantity and type of file cabinets, lateral file cabinets, storage cabinets and storage shelving is to be selected based upon the storage requirements that are anticipated for the Department/Unit/Subunit. Some File/Storage Rooms may require the provision of one or more secure file cabinets or secure storage cabinets, and/or need to accommodate a safe/vault.
- J. **Planning Standards for Typical Conference Room:**
1. Room Size/Net Assignable Square Footage: conference rooms are to be sized based on an allotment of 22 NASF per person.
  2. Video Conferencing: the College does not typically install equipment or systems for video conferencing in conference rooms. Video conferencing for special events is supported with mobile equipment. Any requests for installation of fixed video-conferencing equipment are to be forwarded to the College team for coordination.
  3. Furniture and Equipment Standards: the preliminary list of furniture and equipment for this room type is as follows:
    - a. Casework: as required to accommodate A-V equipment
    - b. Computer: 1 each
    - c. Remote/pointer: 1 each
    - d. Telephone: 1 each
    - e. DVD player: 1 each

- f. eLMO (visual presenter): 1 each
  - g. Projector: 1 each
  - h. Projection screen: 1 each
  - i. Flat panel (LCD or plasma): 1 each
  - j. Conference table: 1 each (*modular and* sized for the number of occupants)
  - k. Chairs: 1 per occupant anticipated for room
  - l. Credenza with secure storage: 1 each
  - m. Marker boards: 1 or more (based on room configuration)
  - n. Bulletin board: 1 each
  - o. Polycom device: 1 each (for conference calls)
  - p. Fax/copy machine: 1 each
  - q. Window treatment: As needed to cover windows (room darkening)
  - r. Waste basket: 1 each
  - s. Recycling bins 1 each
4. Typical Conference Room Layouts: (reserved)
- K. **Planning Standards for Lobbies:** (reserved)
  - L. **Planning Standards for Typical Lounge:** (reserved)
  - M. **Planning Standards for Typical IT Network MDF Room:** (reserved)
  - N. **Planning Standards for Typical IT Network IDF Room:** (reserved)
  - O. **Planning Standards for Typical Corridor:** (reserved)
  - P. **Planning Standards for Typical Hallway (corridor within suite):** (reserved)
  - Q. **Planning Standards for Typical Building Service/Custodial Closet:** (reserved)
  - R. **Planning Standards for Typical Mothers/Lactation Room (CONFIRM)**
  - S. **Planning Standards for Typical Serenity Room (CONFIRM)**

### 3.10. FLOOR, ROOM AND DOOR NUMBERING AND NAMING STANDARDS

- A. **Room and Door Numbering Standards:** Room and door numbering in Construction Documents must match College’s requirements for numbering and must serve the identification and wayfinding needs for building operations. Room and door numbering systems must be coordinated with the College’s Campus Planner prior to assigning room numbers on documents. This coordination must occur early in the Schematic Design phase. Criteria for room and door numbers are as follows:
  1. Room numbers are to be three-digit numbers starting with number 101 (First Floor). The sequence is to be started at the primary building entrance and proceed left from there, if possible, and then generally clockwise through the building. The rooms are to be numbered in sequence based on the proximity of doors along the path, regardless of what side of corridors the door (and room) is located on, i.e. from each room to whichever next room has the closest door. The room numbers on each floor are to start in approximately the same location on the floor as they do on the First Floor, and like numbers are to be stacked from floor to floor where feasible. It is advisable to group room and door numbers for discrete areas of a floor into “blocks” of numbers and skip a few numbers between “blocks” of numbers (i.e. if numbers in one area reach up to 136, skip to 140 to start the numbers at the next discrete area). This will allow for flexibility in adding or subtracting rooms and doors later in the design and construction phases. Include all skipped numbers in the Finish Schedule and Door Schedule and indicate as “not used.”
  2. Coordinate with the College for determination of the name or number for each floor level for buildings with more than one floor level that is accessible from the exterior grade.

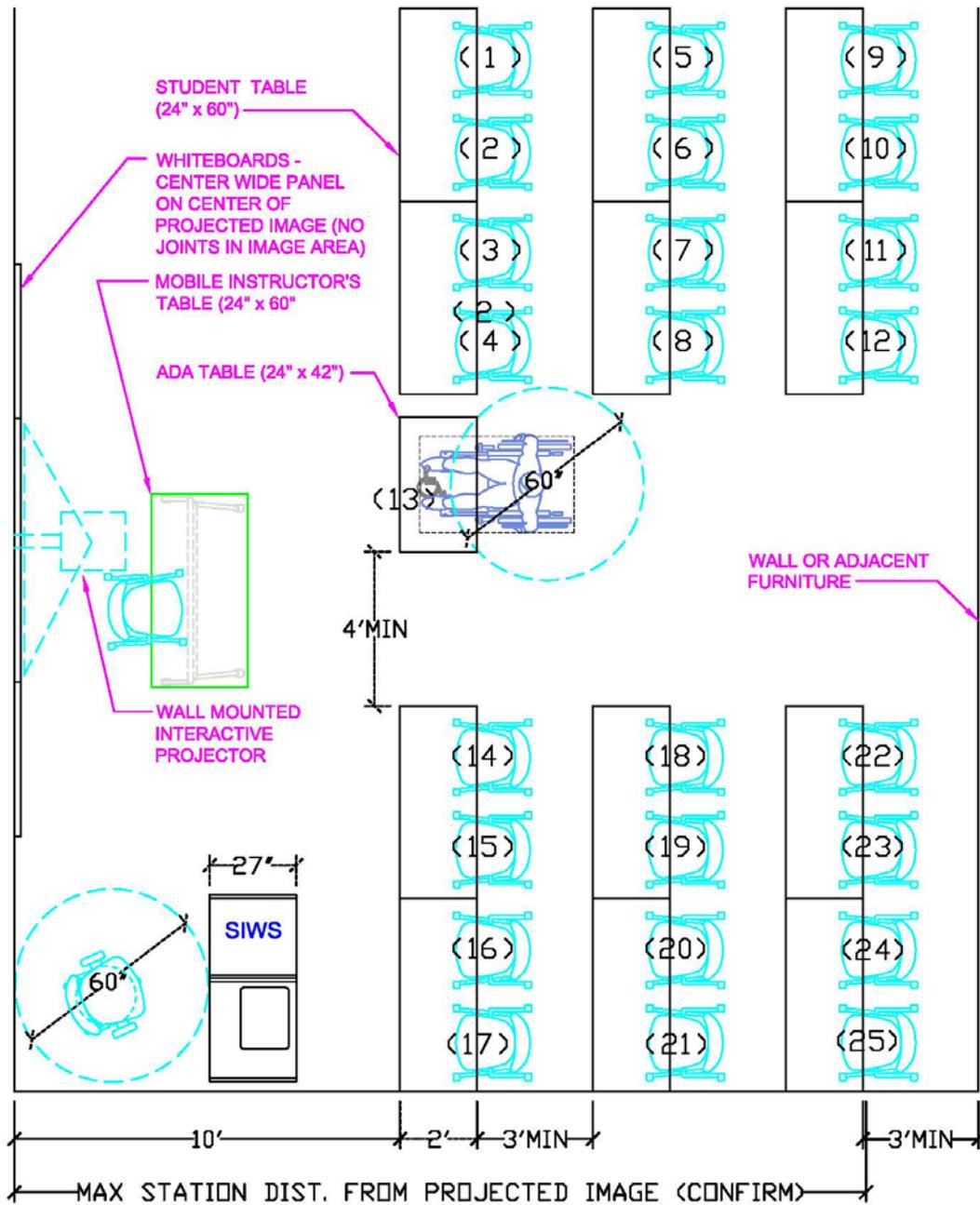
3. Rooms located at levels below the First Floor are to have 3-digit numbers that begin with **0** or the first letter of the floor/level name, and that otherwise follow the instructions given in criteria #1 above.
  4. Number doors to match the room to which they provide entrance. Multiple doors from one or more corridors into the same room use the same room number. Rooms within rooms that have no corridor access, and the doors for those rooms are to receive a letter suffix (A, B, and so on, don’t use I(i) or O) added to all but the first of the doors.
  5. Janitor Closets, Custodial Supply Rooms, Building Service spaces and similar rooms (and their doors) will be numbered in sequence with assignable spaces.
  6. *Corridors and building vestibules, and similar rooms do not receive identification plaques. They are, however, given a number for use by College staff for a variety of purposes. To avoid causing confusion, these spaces that have no room number on their identification plaque will not be numbered in the standard sequence. Number these spaces (and their doors) starting at 190 (as example for First Floor), and sequentially from approximately same starting point and in same direction as room numbers. Vestibules within a suite are to be given a number that matches the number of the room they serve, with the letter A added as a suffix.*
  7. Elevators and stairs are given a room number, but the plaque at the door identifies only a standard room description and/or symbol, with no room number included (similar to corridors and vestibules). *These rooms are identified in documents by a 2 digit number. The 1<sup>st</sup> digit is to be E for Elevators, or S for Stairs. The second digit indicates the location in the room sequence, with Stairs using a letter sequence and Elevators using a numeric sequence. For example, Stairs will be SA, SB, SC, etc. Elevators will be E1, E2, E3, etc. Lifts are to be numbered similarly to Elevators ( L for Lift, then sequence number).*
  8. Room Number Changes through Construction Documents Phase: when a room is divided, added, subtracted, moved, etc., the number for that room and its doors are to be updated and all resulting changes to other room numbers and door numbers are to be updated prior to the issuance of the next documents set. The room number changes are to be coordinated with the College.
- B. **Post-Occupancy Room Number Revisions:** the College maintains a database of all room numbers in all buildings. A 2-letter building abbreviation is added to the beginning of each room number for tracking for college and campus-wide course scheduling. Changes to room numbers result in extensive coordination demands across administrative groups. The Office of Facilities will make changes to room and door numbers, but only if necessary. Notify the Office of Facilities of any proposed changes prior to changes being made in signs or directories so that their database can be updated, and coordinated with the Campus Facilities Office, the Office of Information Technology and the Course and Facilities Scheduler.
- C. **Building Floor Level Naming Standards:** The primary entrance level of a building for which there is only one on-grade or near-grade entry level is to be identified as the First Floor. Where there are two or more major entrances to a building at two different on-grade or near-grade levels, the lowest entry level is to be identified as the “Ground Floor (G),” and the higher entry level is to be identified as the First Floor (1). The levels above the First Floor are to be named/numbered consecutively Second Floor (2), Third Floor (3), etc. A building level that is below grade and below the primary entrance level, and includes programmed space, is to be identified as the “Lower Level.” Where there is more than one such level, the first level down is to be identified as “Lower Level 1(LL1),” and the levels below that are to be named/numbered consecutively as “Lower Level 2 (LL2),” Lower Level 3 (LL3),” etc. Below-grade levels which

house only service space are to be named “Basement (B).” Coordinate with College regarding the naming of intermediate partial floor plates.

- D. **Room Naming Standards:** Room Naming Standards: the names assigned to rooms in Construction Documents must match the College’s requirements for naming and must serve the identification and wayfinding needs for building operations. Room names must be coordinated with the College’s Campus Planner prior to assigning the room names on documents. This coordination must occur early in the Schematic Design phase. General criteria for room names are as follows:
1. Identify general, unassigned rooms by their common room type name, such as: Classroom, Class Lab, Office, Conference Room
  2. Identify assigned rooms by adding the discipline/occupant/function name before the room name, such as: Biology Lab, Counselor Office, Dean’s Office, Mechanical Room
  3. Identify assigned service/support rooms by adding the function/service name after the room name, such as: Biology Lab Storage, Meeting Storage, Facilities Storage, Media Services Storage
  4. Examples of preferred names for various room types are as follows:
    - a. General Space:
      - Circulation: identify circulation spaces with the common functional names, such as: Corridor, Hallway (for corridors within suites), Elevator, Lobby, Stair, Vestibule
      - Building Services: identify building service spaces per the primary functions housed in them, such as: Loading/Recycling, Recycling/Trash, Custodial, Vending
      - Building Engineering Systems: identify rooms for building engineering systems by their system name, such as: Electrical, Mechanical (includes plumbing), Fire Pump Room, Elevator Machine Room. If a building systems’ primary equipment is divided into multiple rooms, identify rooms as needed to distinguish them from other similar rooms, such as: Main Electrical, Emergency Electrical, Mechanical Room South, Mechanical Penthouse
      - Toilet Rooms/Shower Rooms: Identify these rooms by gender, such as: Men’s Toilet, Women’s Toilet, Unisex Toilet, Men’s Shower
      - IT Systems Rooms: Identify IT systems rooms by their specific function, such as: IT MDF, IT IDF, IT Workroom, IT Storage, IT Shop, IT Media Services Storage, IT POP
      - Space for Future Use: identify unfinished and unoccupied, but potentially occupiable, space as “Future”
    - b. Instructional Space:
      - Classrooms: identify general use classrooms with their seat count, such as: Classroom (30). Identify tiered classrooms as “Lecture Hall,” with their seat count, such as: Lecture Hall (50) Identify classrooms that are dedicated to specific functions by adding the function name at the end, such as: Chemistry Lab Recitation, Class/Breakout Room. Identify classroom service spaces by using the service function name, such as: Classroom Storage, Media Resources Storage.
      - Class Laboratories: Identify computer based labs used for a variety of class types as “Class Lab,” and include the seat count, such as: Class Lab (24). Identify computer based class labs dedicated to a particular discipline/subject by the discipline/subject name and include their seat count, such as: Math Lab (32), Language Lab (24), and Computer Class Lab (32). Identify general use lab service rooms by adding the service function name after “Class Lab,” such as:

Class Lab Prep, Language Lab Storage, and Computer Lab Storage. Identify laboratories designed and equipped for a specific discipline or subject with the discipline/subject name, such as: Organic Chemistry Lab, Computer Class Lab, Chemistry Student Project Lab. Identify discipline/subject specific lab service and support rooms with the discipline/subject name and follow with the function name, such as: Anatomy & Physiology Lab Prep, Biotechnology Instrumentation, Biotechnology Lab Stock, Chemistry Solvent Dispensary.

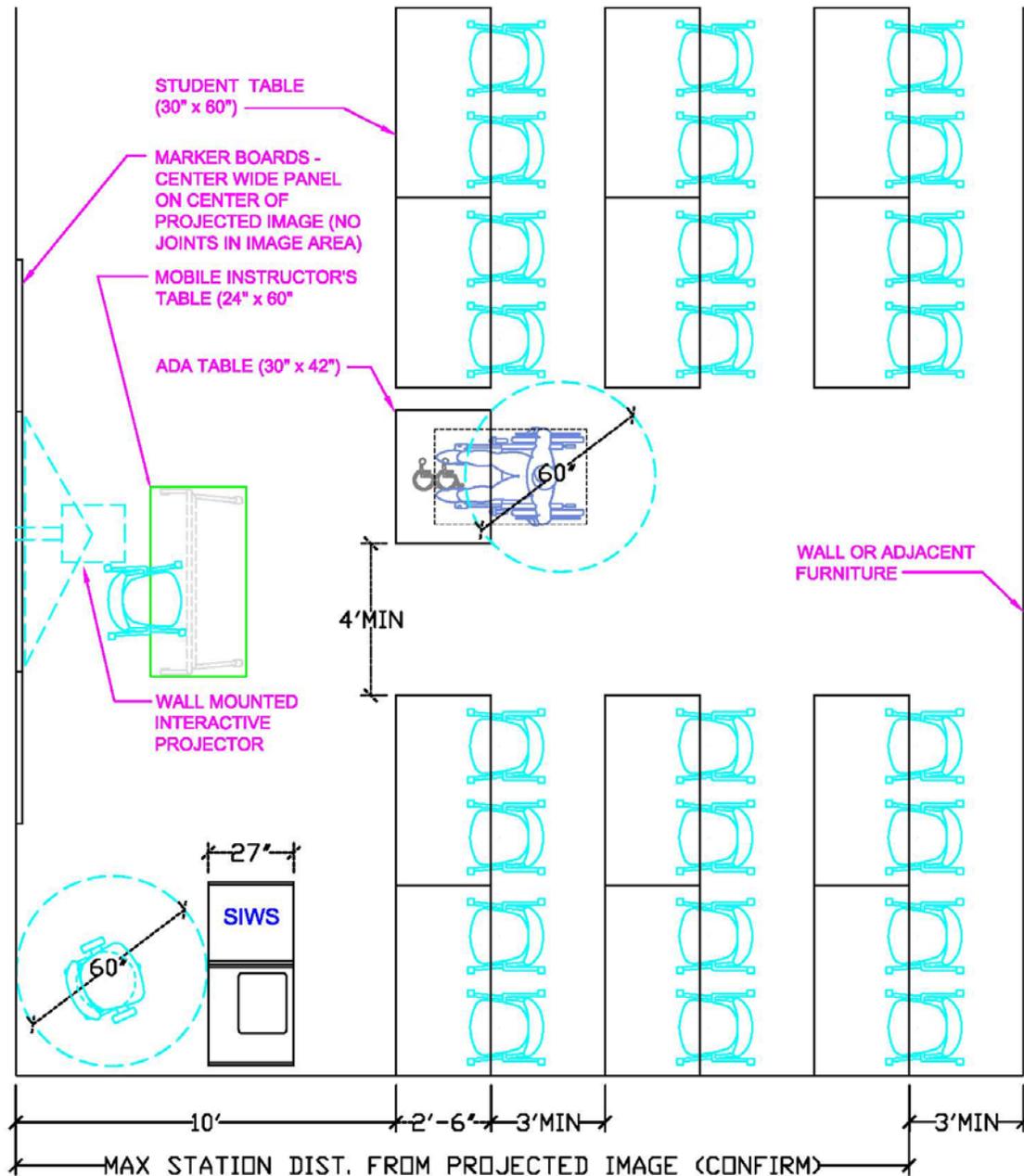
- Open Laboratories: identify open lab spaces dedicated for individual rather than class use with “Open Computer Lab” followed by the number of seats, such as Open Computer Lab (24). Identify discipline or function specific open labs with the function name followed by “Lab,” such as: Student Project Biotech Lab, Student Project Shared Lab, Tutoring Lab. Identify support spaces for open labs by adding the service function name after “lab,” such as: PC Lab Storage
- c. Office Space:
- Identify unassigned offices as simply “Office.” Identify assigned offices by the role of the office resident, or by the function the office serves, such as: Dean’s Office, Department Chair Office, Admin Aide Office, Faculty Office, Counselor Office, Security Office, Reception (for reception area with workstation), Intake Counter (for counter areas with workstation), and Workstation. Identify administrative service areas by the function that is housed or the organization or office with which they are associated, such as: Dean’s Division Workroom, Counseling Workroom, Workroom, Reception (for reception area without workstation), Storage Room, File Room, Secure File Room, Waiting Room, and Media Services Storage. The name “workroom” is generally used to identify service rooms with a sink, copier, miscellaneous administrative equipment, work surfaces, and storage space
  - Identify assigned conference rooms by the organization to which they are assigned, such as: Dean’s Conference Room (16) and the number of seats. Identify unassigned conference and meeting rooms by the room type name and its number of seats, such as: Conference Room (20), Family Conference Room (8), and Meeting Room (40). Conference rooms are intended for use by College faculty, staff and students only. Meeting rooms are made available for scheduling by non-College groups.
- d. Study Space: identify study spaces with descriptors that distinguish the function of the particular study space from other study spaces in the building, such as: Group Study, Group Tutorial, Open Study, Quiet Study, Individual Study
- E. **Signage**: see the *Wayfinding and Signage* section in **5.7 Specialties** in **PART 5: Owner’s Building Construction Standards** of this document and the *Montgomery College Sign System Manual* included as an online appendix to the CDS document.
- F. **Post-Occupancy Signage and Directory Updates**: (reserved)



## CLASSROOM LAYOUT STANDARDS

(25 STATIONS - WITH INTERACTIVE PROJECTOR)

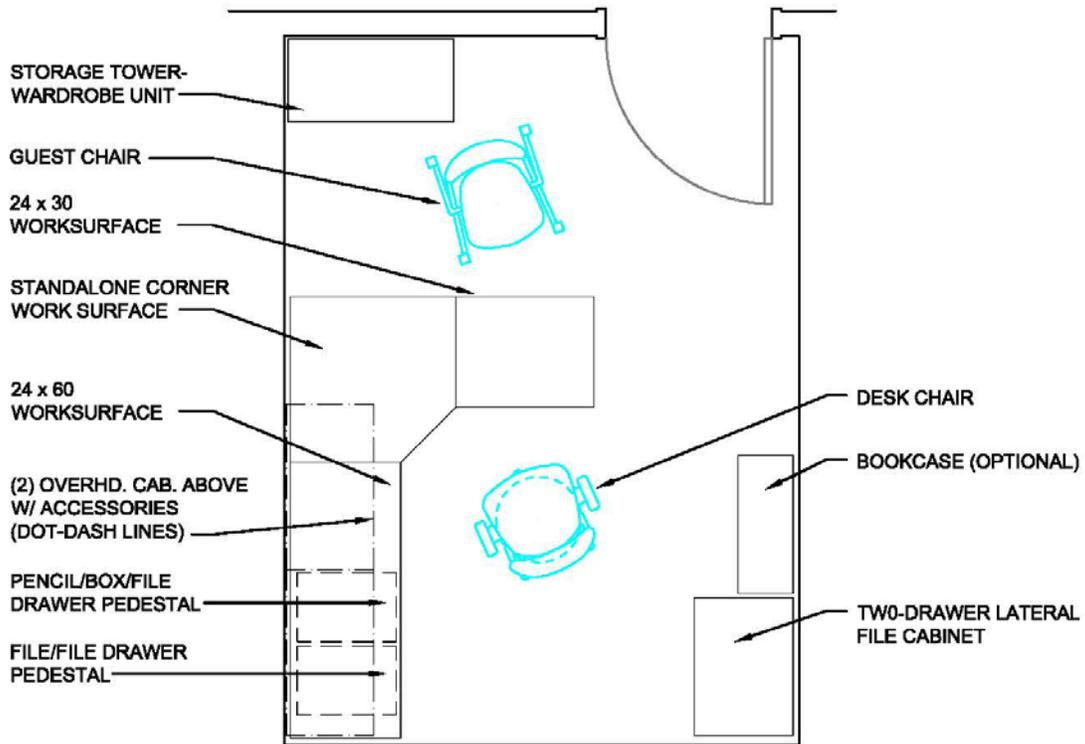
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## COMPUTER EQUIPPED CLASS LABORATORY LAYOUT STANDARDS

(25 STATIONS - WITH INTERACTIVE PROJECTOR)

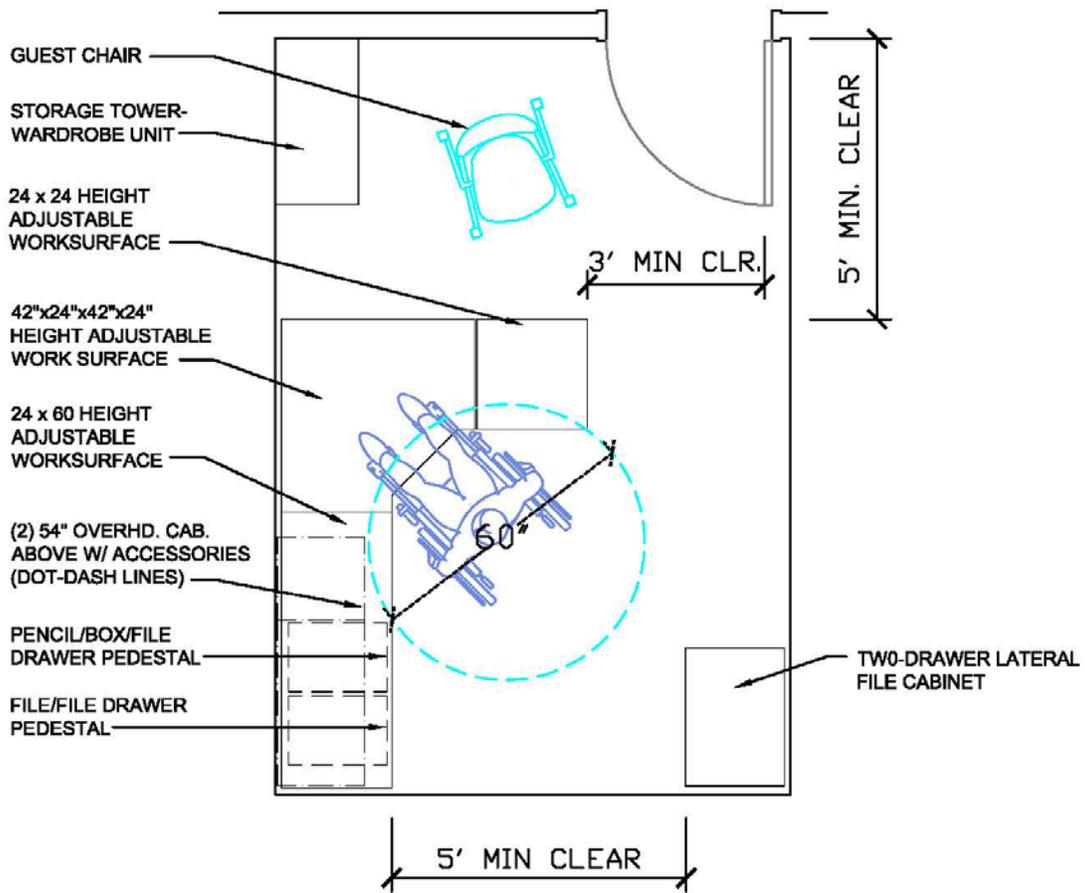
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## TYPICAL OFFICE LAYOUT STANDARDS

(120 NET ASSIGNABLE SQUARE FEET)

NO SCALE



## TYPICAL ADA OFFICE LAYOUT STANDARDS

(130 NET ASSIGNABLE SQUARE FEET)

NO SCALE

## PART 4: OWNER’S SITE STANDARDS

### 4.1. General Site Development Standards

- A. **Site Development:** open space around each project is to be designed to enhance the student learning experience, promote student interaction and engagement, and support community building on campus.
- B. **Integration of Building and Site:** all proposed project landscape design is to be consistent and coherent with the overall campus landscape. The landscape design for each project is to conform to the campus master plan and reinforce a unified character for the campus. The site design is to include integration of all new work with existing conditions and utilities within the proposed Limits of Disturbance (LOD) area and adjacent site and utility conditions. The following resources are to be reviewed for information that is critical to the success of the project:
  - 1. The current Facilities Master Plan and Utility Master Plan contain information regarding existing site and infrastructure conditions and planned future improvements.
  - 2. The most recent version of the **Conceptual Landscape Master Plans** document and the **Standards for Landscape Designs** documents contain the College’s current landscaping standards.
- C. **Demolition and Selective Demolition:** coordinate with the College to confirm extent and scope of demolition to be included in the project. Confirm and document existing conditions, including locations of existing utilities infrastructure, prior to preparing demolition drawings and specifications.
- D. **Subsurface Exploration and Evaluation and Foundation Recommendations:** the requirements for the sub-surface exploration and evaluation and the development of recommendations for foundation design are specific to each project, and are to be developed in coordination between the College team and the A/E during the development of the A/E services contract.
- E. **Site Remediation:** coordinate with the College to confirm the extent and scope of site remediation work for the project. Provide documentation to indicate the scope and the environmental regulations that are to be complied with during the construction phase.
- F. **Hazardous Materials Abatement:** request and review documentation from the College regarding findings from hazardous materials assessments for the project area. The College will perform all abatement of hazardous materials prior to commencement of demolition, renovation or construction, unless otherwise indicated. The A/E is to coordinate with the College to confirm whether any hazardous materials are to remain undisturbed in or adjacent to the project area. The A/E is to alert the College immediately if any hazardous materials are discovered during demolition, renovation or construction.
- G. **Excavations:** coordinate with the College to establish limits for excavation for the project, unit price requirements and documentation requirements. Coordinate the excavation scope with the results of the Subsurface Exploration and Evaluation work.
- H. **Paving:** the standard paver product for typical site conditions at which pavers are indicated is the “Traditional” 4” x 8” paver, in colors “Chocolate” and “Salmon/Charcoal Blend” by Hanover Architectural Products. See the **Landmark Gateway Signage** section below for a description of pavers at designated Landmark Gateway Signage locations.
- I. **Planting:** Consult the **Facilities Master Plan** and the **Standards for Landscape Designs** for hierarchy and vocabulary of the landscape elements on the campus. The following issues should be analyzed before planting material is selected:
  - 1. Maintenance: plants should be chosen for minimum maintenance. Avoid the overuse of ornamental plant materials as they may result in expensive maintenance requirements.

2. Physical conditions of the site: evaluate soil and climate conditions before selecting plant species.
  3. Visibility for security: broad visual access should be maintained in areas immediately adjacent to circulation routes.
  4. Circulation: use suitable plant material to regulate, reinforce and clarify intended movement paths of students, staff and visitors.
  5. Aesthetics: the design should be bold and simple. Forms and scale of the plants should be appropriate to the site and adjacent buildings. Attention is to be paid to seasonal colors of the plant material, to provide for year-round interest.
  6. Landscape sheets of all Construction Document sets must include a copy of all local jurisdiction Forest Conservation requirements for planting methods, soils, protection, etc.
- J. Outdoor furniture**: all outdoor furnishings are to conform to campus standards. Coordinate with the College to confirm current standards. Among other products, the standards include the following:
1. Planters: “Rosa” by Landscapeforms
  2. Table and Chairs: “Carousel” and “Manistee” by Landscapeforms
  3. Seating: “Plexus II” by Landscapeforms
  4. Trash Containers: “Plexus II” by Landscapeforms
  5. Umbrella: “Equinox” by Landscapeforms
  6. Bicycle Rack: “Ceres Bicycle Rack” by Hess America
  7. Bollard: “Regor Barrier Bollard” by Hess America
- K. Light Fixtures**: light fixtures to be located at campus pedestrian areas, parking lots and roads are to be as follows:
1. Light Fixtures for campus pedestrian areas: freestanding light fixtures for campus sidewalks, courtyards and other exterior areas are to be Model UCM LUM (GRN INNER LENS) BEL H3 150MH MT MAL FTG WIRED277V, by Architectural Area Lighting, with the following components:
    - a. Single Head Configuration: one Universe collection, Universe Medium (Horizontal Reflector) head with Bell Hood, Type 3 Horizontal Reflector, flat glass lens instead of sag glass lens, Matte Aluminum finish, Green Acrylic Inner Lens, Pulse start 150 Metal Halide ballast and medium base ED-17 lamp (GE). (#UCM LUM (GRN INNER LENS) BEL H3 150MH MT MAL FTG WIRED277V), one SLA20 Arm, one PR44R14 125 BC6 4 MAL BOLTS – AHEAD POST TOP ARM pole
    - b. Double Head configuration: two Universe collection, Universe Medium (Horizontal Reflector) heads with Bell Hood, Type 3 Horizontal Reflector, flat glass lens instead of standard sag glass lens, Matte Aluminum finish, Green Acrylic Inner Lens, Pulse start 150 Metal Halide ballast and medium base ED-17 lamp (GE). (#UCM LUM (GRN INNER LENS) BEL H3 150MH MT MAL FTG WIRED277V), one SLA20-2 arm, one PR44R14 125 BC6 4 MAL BOLTS – AHEAD POST TOP ARM pole
    - c. *Concrete footing for each pole is to match the College’s standard detail for footings for these poles*
  2. Light fixtures for roadways and parking lots: fixtures for these locations are to be pole-mounted “Archetype” AR Model (150 to 400 watt Mogul Base lamps) and SAR Model (75 to 175 watt Medium Base lamps) aluminum fixtures and poles with “Super TGIC powder coat paint over chromate conversion coating” by Kim Lighting. Coordinate optical system, lamp selection, quantity and array of heads and other fixture options with College to achieve appropriate lighting levels for each site application. *Concrete footing for each pole is to match the College’s standard detail for footings for these poles – see Civil Detail C.27 in Part 7 of this document.*

- L. Site Accessibility:** see the site accessibility standards indicated in the **Accessibility** section in **Part 2 Owner’s Project Requirement** of this document.
- M. Emergency Vehicle Accessibility:** access is to be provided to the building for fire trucks, police vehicles and ambulances. Access requirements for fire apparatus and other emergency vehicles shall be provided for in compliance with the College, Montgomery County Fire and Rescue Service, and local jurisdiction Fire Marshall’s requirements. In all emergency access areas requiring use of walkways for vehicular lanes, the walkways shall comply with structural and dimensional requirements to accommodate those vehicles. The A/E shall confirm requirements and coordinate review of proposed site plans for compliance with the College and the local jurisdiction Fire Marshal’s Office.
- N. Forest Conservation:** all projects are to be developed in accordance with the Forest Conservation procedures and requirements indicated in the pertinent regulations for the jurisdiction in which the project is to be constructed, including referenced Maryland state standards and all tree replacement requirements. A thorough review of the statutes, the regulations, the *Rockville Forest Conservation Manual* and a current approved Forest Conservation Plan for the campus are necessary for a complete understanding of the law, the current agreements, and the A/E’s subsequent responsibilities.
- O. Wetland and Floodplain:** the identification of regulated wetlands and floodplain areas within the site limits is required in accordance with Maryland Department of the Environment (MDE) regulations and guidelines. The identification of such areas shall be the first priority of the site design, and the existence of these areas shall be brought to the immediate attention of the College. Any disturbance within a non-tidal wetland or its buffer is subject to regulation as is construction within any 100-year floodplain. Approval from the appropriate reviewing agency(s) is necessary for any such disturbance or construction.
- P. Service Area Standards:** building service areas are essential to the functioning of the building operations, but can be incompatible with other activities on or adjacent to the building site. Consequently, they shall be designed to minimize adverse visual and audio impacts and be screened as best as possible from adjacent buildings, open areas, and circulation pathways. Service requirements are to be accommodated in the building design starting in the Site Analysis and Program Verification Phase, as these factors will impact the building location, orientation and footprint. The following criteria should govern the design of the service area(s):
1. Separation of public and private areas: the site development should be designed so that public and private spaces are clearly defined. Public parking areas located directly adjacent to service areas without visual separation can be a source of security problems and vehicular circulation conflict. Service areas shall be located to best avoid conflicts with pedestrians, vehicle circulation and incompatible activities such as recreation, and shall be screened from activity areas, public parking and public walkways.
  2. Consolidation, screening and access: service activity functions shall be consolidated in a service area so that loading/unloading impacts can be minimized. Parking for service vehicles shall, if possible, be located in the service area.
  3. Service vehicle access: provide for service vehicle access to the locations of receiving and service areas of the building, including access for delivery vehicles (including overnight deliveries), armored vehicles (if needed), maintenance vehicles and waste container vehicles. Service vehicle requirements are to be confirmed, documented and coordinated by the architect/engineer. See Emergency Vehicle Accessibility section above for related requirements.
  4. Material delivery and removal: delivery of materials for the operations of the building and its occupants’ functions shall be well accommodated. A receiving entrance shall be

created where adequate vehicular access is achievable, separated from pedestrian traffic, screened from adjacent functions and designated as a service entrance. A trash room shall be constructed to serve as a point for trash and recycling to be collected, stored, and transported to a dumpster located on this site or at another site. Design consideration is to be given to providing a loading dock at buildings where large quantities of materials are expected to be transferred into and/or out of the building. A vestibule or some other kind of second barrier should be included at the receiving area to provide a weather/temperature separation between the outdoors and the interior of the building.

5. Lighting: adequate site lighting around the building and at all service areas must be provided at levels that meet safety requirements, the lighting criteria of these College Design Standards, and the Energy Design Guidelines.

**Q. Landmark Gateway Signage:** the College has designated key gateway locations on campuses to be developed with “landmark” signage and landscape projects. Prototype designs for hardscape and signage elements have been developed for the first of these gateway locations, and plant and hardscape material selections have been made. These prototype design elements and plants are to serve as a “kit of parts” for future development of gateway signage at additional locations.

The Landmark Gateway prototype design elements include the following:

1. Curb and gutter (where street intersections are included in design area)
2. Accessible curb transitions and ramps (at walkway conditions)
3. Paving:
  - a. Paver: “Prest® Pavers”, 4x8, 3” thick, traditional natural finish, by Hanover® Architectural Products, Hanover, PA
  - b. Colors: Color A: “Charcoal,” Color B: “Limestone Gray”
4. Sign wall:
  - a. Foundation and wall structure: concrete
  - b. Wall finish (sides): stone veneer to be Alverson Limestone® in Select bluegrey to tan, by Greystone Quarries, Inc., Evans Mills, NY
  - c. Wall finish (top): ½” stainless steel plate
  - d. Letter characters: 0.050 inch thick stainless steel faces, 0.031” thick stainless steel returns, aluminum plate internal reinforcement
  - e. Letter supports: stainless steel
5. LED Display:
  - a. Foundation and wall structure: concrete
  - b. Wall finish (sides): stone veneer to be Alverson Limestone® in Select bluegrey to tan, by Greystone Quarries, Inc., Evans Mills, NY
  - c. Wall finish (top): ½” stainless steel plate
  - d. Display screen and cabinet: W-series, 16mm BOD, by watchFire Signs by Time-O-Matic Inc.
6. Campus Name Panel
  - a. Foundation: concrete
  - b. Base structure: stainless steel
  - c. Panel frame: aluminum
  - d. Panels: stainless steel
  - e. Letters: campus name letters digitally printed on stainless steel panel, in Meta Bold Condensed font
7. Changeable Banner
  - a. Foundation: concrete

- b. Base structure and banner frame: stainless steel
  - c. Banner rods: stainless
8. Lighting for signage, campus name panel and changeable banner

The Landmark Gateway Signage plant species include the following:

1. Nellie R. Stevens Holly (Ilex x “Nellie R. Stevens”)
2. Yoshino Cherry Tree (Prunus x yedoensis)
3. Flowering Quince (Chaenomeles x superb ‘Jet Trail’)
4. Yew (Taxus baccata ‘Repandens’)
5. Lesser Calamint (Calamintha nepetoides ‘White Cloud’)
6. Catmint (Nepeta x faassenii ‘Walker’s Low’)

Coordinate with the College for parameters for adaptation of prototype elements and prior Landmark Gateway Signage project concepts for new project locations. Request more detailed documentation on the prototype elements from the College.

#### 4.2. General Utilities Standards

##### A. Integration of Site and Site Utilities

1. Relationship of Design to Utility Management: (reserved)
2. Integration with existing conditions: the utilities design is to include coordinated solutions for utilities, utility capacities and connections for the building, as well as any proposed project scope for upgrades, re-routing or replacement of existing utilities infrastructure serving adjacent buildings, future buildings, and outdoor areas. The current Utility Master Plan contains information regarding existing infrastructure locations, routes and sizes, and for planned future improvements. The locations and depths below grade of all existing infrastructure that might be impacted by the proposed project, or might impact the proposed design or construction are to be field verified to serve as a basis for project scope confirmation and systems design.
3. Geographical Information System (GIS):
  - a. GIS system description: (reserved)
  - b. Above and below ground utilities GIS data gathering and assimilation: data gathered using GIS technology for utility and site surveys required for a project shall, at a minimum, conform to Utility Quality Level ‘B’ as defined by **CI/ASCE 38-02 Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data**. When installation of new above and below ground utilities or tie-in to such utilities are required in a project, the as-built survey of the involved utilities shall be of Quality Level ‘A’ with associated “Utility Attributes” and “Depictions.” If the General Contractor is to gather the as-built data for the A/E team to compile in the final as-built drawings, this requirement shall be clearly defined in the project specifications

- B. **Stormwater Design:** the stormwater design solution for new construction and renovations must comply with the Maryland Department of the Environment (MDE)’s Stormwater Design Manual, including the requirements for Environmental Site Design (ESD). The goals of ESD are to use surface environmental features in lieu of man-made structures to treat stormwater for quantity and quality. The stormwater management component of new construction and renovation projects must first be served by ESD facilities to the maximum extent practicable. Any requirements not met after all ESD options have been exhausted may be provided by traditional stormwater infrastructure methods.

- C. **Water:** (reserved)
- D. **Sanitary Sewer:** (reserved)
- E. **Natural Gas:** (reserved)
- F. **Heated Water & Chilled Water:** (reserved)

- G. **Electrical Service Distribution to Site and Building:** see the *Electrical Distribution System* subsection of the *General Electrical Systems Standards* section of **Part 5: Owner’s Building Construction Standards** of this document.
- H. **Exterior Below-Grade Conduit and Ducts:** the below-grade routing for electrical service is to comply with the following criteria:
1. Coordinate with the College to determine which below grade power feeds are to be routed through individual conduit, and which are to be routed through grouped conduit in concrete ductbanks.
  2. Quality Assurance: all underground ducts and raceways are to comply with ANSI C2 and NFPA 70
  3. Conduit:
    - a. Rigid Steel Conduit: galvanized. Comply with ANSI 80.1
    - b. Rigid Nonmetallic Conduit: NEMA TC 2, Type EPC-40-PVC and Type EPC-80-PVC, UL 651, with matching fittings, complying with NEMA TC 3 and UL 514B
  4. Below-Grade Duct Application:
    - a. Ducts for Electrical Feeders 600 V and Less: RNC, NEMA Type EPC-40-PVC, in concrete-encased duct bank, 2-inch minimum diameter, unless otherwise indicated
    - b. Ducts for Electrical Branch Circuits: RNC, NEMA Type EPC-40-PVC, in direct buried duct bank, 2-inch minimum diameter, unless otherwise indicated.
    - c. Underground Ducts for Telephone, Communications, or Data Utility Service Cables: RNC, NEMA Type EPC-40-PVC, in concrete-encased duct bank, unless otherwise indicated.
  5. Below-grade Duct Installation:
    - a. Slope: Pitch ducts a minimum slope of 1:300 down toward handholes and away from buildings and equipment. Pitch ducts a minimum slope of 1:50 down away from buildings for first 15 feet from building.
    - b. Curves and Bends: use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches horizontally and vertically, at other locations, unless otherwise indicated.
    - c. Joints: use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer’s written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.
  6. Concrete-Encased Ducts:
    - a. Support ducts on duct separators
    - b. Separator Installation: space separators close enough to prevent sagging and deforming of ducts, with not less than 4 spacers per 20 feet of duct. Secure separators to earth and to ducts to prevent floating during installation of concrete. Stagger separators approximately 6 inches between tiers. Tie entire assembly together using non-metallic straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
    - c. Minimum Space between Ducts: 3 inches between ducts and exterior envelope wall, 2 inches between ducts for like services, and 4 inches between power and signal ducts.
    - d. Depth: install top of duct bank at least 24 inches below finished grade in areas not subject to deliberate traffic, and at least 30 inches below finished grade in deliberate traffic paths for vehicles, unless otherwise indicated.
  7. Direct-Buried Duct Banks:
    - a. Support ducts on duct separators coordinated with duct sizes, duct spacing, and outdoor temperature.

- b. Space separators close enough to prevent sagging and deforming of ducts, with not less than 4 spacers per 20 feet of duct. Secure separators to earth and to ducts to prevent displacement during backfill and yet permit linear duct movement due to expansion and contraction as temperature changes. Stagger spacers approximately 6” between tiers.
  - c. Install ducts with a minimum of 3 inches between ducts for like services and 6 inches between power and signal ducts.
  - d. Depth: install top of ducts at least 36 inches below finished grade, unless otherwise indicated.
  - e. Set elevation of bottom of duct bank below the frost line.
- 8. The use of hand-holes or other exterior below-grade electrical junction/splice boxes is prohibited except with prior written approval by the College. Below-grade Hand-holes and junction boxes will be allowed for pulling cable through, with no splices. Hand-holes with cable splices will be considered for well-drained locations at high points in the grade, where the incursion of water is unlikely.
  - 9. Provide continuous conduit and cable from pole light fixture or other device to the next pole light fixture or other device, making all connections above grade. Coordinate with College regarding the solution for remediation of existing conditions where existing exterior fixtures or power systems will be altered.
- I. **Information Technology:** (reserved)

## PART 5: OWNER'S BUILDING CONSTRUCTION STANDARDS

### 5.1. GENERAL BUILDING DESIGN STANDARDS

- A. **Building Square Footage:** the gross square feet (GSF) in the design of the facility may not exceed the GSF specified in the program. The Architect/Engineer (A/E) must make every attempt to execute a design solution within this limitation. Exceptions to this requirement are allowed only with the approval of the College.
- B. **Orientation, Height and Massing:** the orientation of each building is to optimize the balance between the execution of the Facilities Master Plan design intentions, the local site context, and energy conservation. The height of each building is to achieve a balance between the number of stories necessary to accommodate the building program, and a height and massing that are an appropriate response to the building's context. The massing must accommodate the space and adjacency requirements for the functions within the proposed facility.
- C. **Aesthetic Considerations:** the exterior expression of each building is to be developed to be compatible with the massing, composition, aesthetic language and construction details of the campus and adjacent buildings.
- D. **Access to Equipment:** Mechanical spaces must be accessible from public corridors and not require access through private spaces. Mechanical equipment, aside from roof-top units, or spaces that require rooftop access or allow access from the exterior into the remainder of the building should be avoided. All doors to mechanical spaces shall have a minimum width of 6-foot-4-inches (double doors) and a minimum height of 7-feet-2-inches. If large equipment is to be installed that can't be broken down, then knockout panels of adequate size to accommodate passage of the equipment shall be provided.

### 5.2. GENERAL RESOURCE CONSERVATION AND LEED REQUIREMENTS:

All projects must comply with the requirements of the *Maryland Building Performance Standards*, and the *Montgomery County Building Code*, both of which incorporate the currently adopted version of the *ICC International Energy Conservation Code*. All projects must also comply with the *Montgomery County Code, COMCOR 08, Section 14A.01 Building Energy Design Standards and 08.26.01, Buildings – Energy Efficiency and Environmental Design*, which includes requirements for achieving a USGBC LEED Silver rating, or complying with standards approved by the Director of the Department of Permitting Services as equivalent to the USGBC Silver rating.

Projects at the Rockville Campus are also to comply with the requirements of the *City of Rockville Building Code, Chapter 5, Ordinance 8-10, Article XIV Green Building Regulations*, which incorporate many requirements of LEED for New Construction, 2009, including Energy and Atmosphere credit "EA Credit 1."

The analysis and documentation requirements for sustainable design for individual projects are detailed in the *Instructions to the Consultant* section of the *Part 2 Facilities Construction Program for the project*.

More detailed energy conservation requirements for particular building systems are included in the systems descriptions to be found below in this document.

**5.3. GENERAL BELOW-GRADE ENCLOSURE STANDARDS****A. Foundation Wall:**

1. Drainage materials: Design considerations include selection of appropriate material or product assembly to achieve flow rate required.
2. Filter fabrics: the sub-surface drainage system design is to include filter fabrics to protect drainage layers or aggregate used as a drainage layers and at aggregate around exit drainage piping.
3. Damp proofing: (reserved)
4. Waterproofing membranes: provide waterproofing membrane at all exterior below grade surfaces above 6" below the bottom of the slab on ground. Extend the waterproofing membrane up behind the exterior above grade wall finishes and integrate with the exterior wall air barrier and flashing system for continuous waterproofing. Protect the waterproofing membrane system per manufacturer's recommendations. Coordinate with the College in the selection of the membrane material and product.
5. Protection board: protection board is required to be installed over all waterproofing membranes, including between membranes and drainage layers. Selection of the board type is to be based on waterproofing system manufacturer's recommendation for matching types of installation and conditions. Protection board is to be installed as quickly as allowed per waterproofing membrane manufacturer recommendations.
6. Insulation materials: install insulation at the full height of the exterior side of all below grade walls, with an insulation value determined to be sufficient to prevent condensation at the interior of the foundation walls.
7. Waterstops: the installation of waterstops is required at all construction joints in below grade walls, footings and other elements where a waterproofing system is required.
8. Exit drainage pipe: the installation of exit drainage pipe around the foundations of all buildings, and routing and connection of the pipe for integration with the stormwater system is required. The drainage pipe is to be surrounded with free drainage granular fill, which is to be wrapped with filter fabric. The drainage pipe is to have a slope of at least 1.0%
9. The adjacent ground surface and the surface of any finishes applied on the ground are to slope away from the building a minimum of 5%, for a minimum of distance of 6' from the building.
10. Penetrations: all penetrations through below-grade walls and slabs are to be sealed.

**B. Floor Slabs:**

1. Include a sub-slab drainage pipe systems with exit drains where hydrostatic pressure is anticipated at the bottom of the slab. Provide pumps if required to drain the water.
2. Include a granular drainage layer below all slabs on grade. The drainage layer is to be deep enough to accommodate the drainage pipe systems where such system is to be installed.
3. Waterproof membrane: needed where hydrostatic pressure is present and the granular drainage layer and drainage piping system are not adequate to eliminate the hydrostatic pressure on the floor slab. If a waterproof membrane is needed at a floor slab, a mud slab is to be installed below the membrane, and protection board is to be applied above the membrane immediately to protect the membrane during the preparation for and pouring of the floor slab.
4. Vapor barrier: a vapor barrier comprised of a minimum of two layers of 6 mil polyethylene, with joints staggered and overlapped, is to be installed between the granular drainage material and the floor slab. If the vapor barrier is to be used as a radon barrier as well, it

must be installed with proper laps, sealing of seams, protection during construction, and proper detailing at all terminations and penetrations.

5. Isolation, Contraction and Expansion Joints: design to include isolation, contraction and expansion joints per the current industry best practices.

**C. Plazas, Tunnels and Vaults:**

1. Due to the high likelihood of wear and deterioration of below grade systems, special analysis is to be performed of wearing, moisture protection and isolation and structural support systems for plazas, tunnels and vaults. "Plaza systems" refers to any supported slab that provides support for green-scape, tree planters, or vehicle or pedestrian movement over occupied space. Coordinate with the College regarding the overall design, including the selection of the wearing surface material, the fill slab, the isolation/drainage layer and the flow path system, including drainage basins. An effective sheer relief plane is to be provided between the wearing surface and the waterproof membrane. Vertical isolation is to be provided as needed to avoid damage to rigid elements. A subsurface drainage plain is to be continuous across all surfaces to the drainage basins. The drainage basins are to be selected to collect drainage at both the wearing surface and at the surface of the waterproof membrane above the structural slab. The structural slabs are to be sloped for positive drainage to drainage basins.
2. Provide drainage system of free draining granular material above tunnels and vaults. A waterproof membrane system with protection material is to be provided at all horizontal surfaces at plazas, tunnels and vaults, and at the side walls of tunnels and vaults. The waterproofing membrane is to be fully integrated with adjoining above or below grade waterproofing systems.
3. Insulation is to be provided at the outboard side of the waterproof membrane, as needed to prevent condensation on interior surfaces.

**5.4. GENERAL SUPERSTRUCTURE STANDARDS (reserved)**

**5.5. GENERAL BUILDING ENCLOSURE STANDARDS**

**A. A/E Team Responsibility:**

1. Each building is a complex matrix of dynamic forces and constructed systems. Each element of the building enclosure impacts other elements. Thorough and coordinated design of all elements during the design phases of the project is essential to achieving a weather-tight and durable enclosure that is adequate for a minimum sixty year life span. Many problems with exterior enclosure assemblies are related to the use of performance specifications and delegated design. For that reason, the A/E is to provide a fully developed and coordinated design, and documentation, for the entire exterior enclosure, including below-grade, exterior wall and roofing assemblies. Each of these assemblies is to be fully coordinated within its own systems, and fully coordinated with adjacent systems to minimize air infiltration, water penetration and thermal transfer, and optimize comfort and resource conservation within the building.
2. Performance specifications and delegated design are to be employed only for enhancement of already complete system designs by the A/E. The A/E is to provide a list of all items that are proposed to be documented by performance specification or issued for delegated design to the College for review prior to completion of the Design Development phase of the project. The College reserves the right to prohibit performance specifications or delegated design for any or all building elements and systems.

3. The design of the exterior surfaces must be coordinated between architectural and structural disciplines in order to determine the anticipated loads and movements and adequately design the enclosure to accommodate those movements.
  4. The design of the structural systems, structural backup walls, veneer/curtain wall systems, anchorage systems, thermal insulation, air and moisture barriers and interior finishes are to be coordinated to optimize the weather-resistance and durability of the exterior wall systems.
- B. **Below-Grade Systems:** see section **General Standards for Below-Grade Enclosure** for standards regarding foundation walls, floor slabs and plazas, tunnels and vaults.
- C. **Exterior Wall Assemblies:** the building envelope is to be designed to meet the standards for a 60-year envelope life and the NIST standards for stainless steel flashing, cavity drainage systems, and rain screens, among other components. The walls are to be optimized for IECC Climate Zone 4, in which the College's campuses are located. All exterior walls are to be cavity walls with an exterior cladding material, a drainage cavity, an internal drainage plane, an air and moisture barrier and an insulating layer. No single barrier systems (including EIFS, sealed aluminum panel systems, etc.) are allowed at occupiable spaces. Coordinate with College regarding possible use at mechanical penthouses and similar structures.
1. **Outside Air Infiltration:** infiltration of outside air through the exterior wall is to be minimized. Coordinate with the College to confirm the reference standards for infiltration amounts at different elements of the exterior wall (glazed curtain wall, windows, doors, masonry cavity wall, others). The air barrier is to be rigid enough to survive wind loading and air pressure across it, durable enough to remain intact throughout construction, and installed in such a way that it is continuous between building elements and in three dimensions around openings, penetrations, and other changes in surface plane. The air barrier is not to have vapor barrier properties.
  2. **Insulation:** the primary insulation layer is to be installed on the outboard side of the air and moisture barrier and is to be of a thickness and R-value selected to maximize the likelihood that the dew point will occur outboard of the air and moisture barrier. Insulation materials and installation configuration must comply with all current codes, including codes that limit flammability and fire propagation.
  3. **Vapor Barrier:** It is likely that a vapor barrier will be needed at the interior side of the wall, behind the interior finish, however this design decision is to be coordinated with the College. Air/vapor barrier materials and installation configuration must comply with all current codes, including codes that limit flammability and fire propagation.
  4. **Backup Wall:** the interior structure of exterior walls is to be comprised of Concrete Masonry Units (CMU) of a minimum 8" nominal thickness. Design the CMU backup wythe to carry full design wind loads. Use special reinforcement to carry heavier loads at opening jambs, heads, and sills. Design the CMU backup wythe for crack control to ensure a weather-tight cavity (see **NCMA-TEK 53**). Provide adequate vertical control joints, horizontal joint reinforcement, and isolation joints between the block wythe and the structural frame to accommodate movement of the frame and the block wythe. Comply with local codes regarding seismic reinforcement. In particular circumstances where it is not practical to install a CMU backup wall, a Cold-Formed Metal Stud framing system of a minimum 16 gauge thickness with G90 galvanized coating may be used. Whether built of CMU or steel studs, the backup wall is to be designed for a maximum deflection of L/600 to L/720 under full design wind load, and to withstand all the loads on the wall. The flashing and weep system are to be fully designed and detailed to successfully route all

water from the cavity to the exterior of the building enclosure. All flashing is to be stainless steel.

5. Designers should examine the material properties of each layer in their design, and specifically the vapor permeance, the air permeance, the structural rigidity, the rate of thermal gain and loss, the rate of absorption of moisture, the moisture storage capacity, the rate of wetting and drying, and the contraction and expansion rates of the material under moisture and thermal cycling. Designers will need to ensure their design will create a structure capable of accommodating movement and thermal, moisture, and air flow loads. Elements within the wet zone must be carefully examined for their susceptibility to moisture damage. Examine each element, and then the entire system, to determine if a misplaced or unintended vapor retarder exists that will inhibit the drying of the wall system after wetting events.
  6. Acoustic Performance: design the building shell to meet the Sound Transmission Class (STC) requirements of ***S12.60-2002, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools***. See the ***General Fenestration Systems Criteria*** section below for acoustic requirements at glazed areas of exterior walls a classrooms and other core teaching spaces.
  7. Documentation: Construction Documents are to include thorough detailing of the entire exterior wall assembly, including the integrated air barrier system, drainage plane layer, flashing and the insulation layer. Include three dimensional details where necessary to thoroughly communicate the three dimensional extents and integration of systems.
  8. Mockups of exterior wall assemblies: (reserved)
  9. Performance testing of exterior wall assemblies: (reserved)
  10. Prevention of vermin infestation: all exterior enclosure assemblies are to be sealed against vermin infestation. All mechanical, plumbing and electrical penetrations of exterior enclosure shall be sealed or provided with screen barriers to prevent infestation.
  11. Flashing: *Coordinate closely with the College regarding air barrier, vapor barrier and flashing materials, their durability and their compatibility with building structure and enclosure materials, and regarding flashing locations and detailing, discharge of moisture to the outside of the skin, and minimizing the loss of energy through the envelope..*
- D. **Exterior Wall Finishes**: all exterior finishes are to be selected in coordination with the College. Changes in materials and joints at the exterior skin are to be kept to a minimum in quantity. General standards for acceptable exterior wall finishes are indicated below. For further criteria, see the relevant technical standards in the ***Part 6 Technical Sections*** section of this ***College Design Standards*** document.
1. Cast-in-place concrete: (reserved)
  2. Exterior Insulation and Finish Systems (EIFS): EIFS systems are generally not allowed, particularly at the exterior wall of occupiable spaces. EIFS will be considered for the exterior finish at non-occupied spaces if unusual circumstances make other finishes unfavorable, but can only be used with specific written approval from the College.
  3. Masonry wall finishes: clay masonry units and concrete masonry units are permitted as a veneer finish in cavity drainage wall assemblies. Composite masonry walls without a cavity and drainage plane are not allowed at building enclosures, but are allowed for interior structural walls, site walls and retaining walls.
  4. Panelized metal wall finishes: through-the-face fastened metal wall, soffit and fascia panels, as well as metal-faced composite wall panels, are allowed as an exterior wall finish when used in a drainage wall system with a continuous backup membrane. Metal panel systems with sealed joints for use as a barrier wall finish are not allowed. A separate

continuous air and moisture barrier is to be installed behind the metal wall panel system. The structural backup wall is to be comprised of concrete masonry units unless otherwise agreed to by the College. As the metal panels will contribute little or no thermal insulation value to the wall assembly, insulation is to be provided by supplementary insulation materials located elsewhere in the wall assembly.

5. Precast concrete wall finishes: precast concrete panels of limited sizes included as decorative elements in a masonry wall system are allowed, as are cast stone panels. Precast concrete wall systems are not permitted. All precast concrete panels are to be designed in accordance with PCI Design Handbook-Precast and Pre-stressed Concrete (MNL 120), Design Responsibility for Architectural Precast Concrete Projects (ACI 533.1R-02), and ACI 318 Structural Concrete Building Code. Steel elements of a wall system are designed in accordance with AISC specifications for steel construction. Precast concrete elements are designed in accordance with ACI and PCI specifications. Joints between panels must be wide enough to accommodate thermal expansion and differential movements between panels. Coordinate with the College to determine whether or not joints between panels are to be sealed to prevent water penetration in the wall cavity. The backup wall is to be covered with a continuous air and moisture membrane to provide a secondary line of protection against water penetration into the building.
  6. Thin stone wall finishes: the use of thin stone wall finishes (2" or less in thickness) is discouraged. Coordinate with the College prior to proposing the use of these materials at any locations.
  7. Terra Cotta Panels: terra cotta panels may be proposed for the exterior finish at a drainage wall assembly, and will be considered by the College for use.
  8. Durable Exterior Finishes: all exterior finishes at buildings are to be selected and executed to provide long term resistance to deterioration caused by water infiltration, freeze-thaw cycles, salts and other chemicals to be used on the site, and wear from normal usage. Finishes that are likely to result in a maintenance and repair burden are to be avoided. An example of an exterior finish that require excess maintenance is concrete walls formed using wood grain formwork and/or exposed formwork holes.
- E. **General Fenestration Systems Criteria:**
1. Daylighting and lighting coordination: (reserved)
  2. Window-to-wall ratio: best practices indicate that a 30% window-to-wall ratio is optimum for a balance of daylighting and energy conservation. An exterior enclosure design that slightly exceeds this percentage for purposes of improving daylighting will be considered by the College if the energy analysis required for the project demonstrates that there are no negative impacts on energy conservation and the design meets energy code and LEED certification requirements. Such a design option must be developed and analyzed during the early phases of the project, in close coordination with the College.
  3. Exterior fenestration systems at classrooms and other core teaching spaces are to achieve an STC rating of 35 or better.
- F. **Glazing**: (reserved)
- G. **Windows**: a minimum of one small operable window is required at an exterior wall of each office, classroom and computer classroom and in other occupiable spaces. Coordinate with the College to determine the type, size and locations for these windows. See the **Glazing** subsection above for glazing criteria.
- H. **Aluminum Framed Entrances and Storefronts**: (reserved)
- I. **Glazed Curtainwalls**:

1. *Field quality control for glazed curtainwall (and storefront systems) is to match or exceed the following:*
  2. *Testing Services: Testing and inspecting of representative areas of glazed aluminum curtain walls shall take place as installation proceeds to determine compliance of installed assemblies with specified requirements.*
  3. *Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article, but not more than 0.50 cfm/sq. ft., of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft.*
  4. *Test Area: Perform initial test on the project mock up for curtain wall installation in masonry and in metal framed wall.*
  5. *In the event of failure, rework and adjust mock up wall and retest until the assembly passes.*
  6. *Conduct a minimum of three additional tests on installed curtain wall in areas as directed by Architect. Test areas to be a minimum of three bays wide by height of assembly. Perform tests at approximately 35, 70 and 100 per cent completion of curtain wall installation.*
  7. *Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.*
  8. *Test Area: Perform initial test on the project mock up for curtain wall installation in masonry and in metal framed wall.*
  9. *In the event of failure, rework and adjust mock up wall and retest until the assembly passes.*
  10. *Conduct a minimum of three additional tests over the course of the work on installed curtain wall in areas as directed by Architect. Test areas to be a minimum of three bays wide by height of assembly. Perform tests at approximately 35, 70 and 100 per cent completion of curtain wall installation.*
  11. *Water Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.*
  12. *Test Areas: A minimum of four test areas, each a minimum of three bays wide by full height of the curtain wall.*
  13. *Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.*
  14. *Prepare test and inspection reports.*
- J. **Sloped Glazing:** (Reserved)
- K. **Exterior Doors:** Glazed entry doors are to be the Model #SL-14 "Monumental" Medium Stile Aluminum door by Special-Lite, Inc., 1 ¾" thick, with 3 5/8" stiles (confirm w/ emergency exit device), 10" bottom rail, 4" center rail (6 1/2" at doors with emergency exit devices, and, for visual consistency, at all doors grouped in one entry area with such a door ) and 6 ½" top rails. Doors are to be constructed of minimum 1/8" aluminum wall thickness with true mortise and tenon joinery and full-width top and bottom tie rods secured with hex nuts. Glazing is to be ¼" tempered glazing. Doors to be provided with a keyed removable center mullion between paired doors. Coordinate with the College for review and approval of door products for use as part of a larger Glazed Aluminum Framed Entrance/Storefront system.
- L. **Field quality control for aluminum-framed entrances:** match or exceed the following:  
*Conduct tests of mock-ups and project building in the presence of the Architect, the Contractor, the Installer and the Exterior Envelope Consultant. Proceed with each test only after acceptance of the detailed outline of test procedure. All static test pressure, static pressures and maximum allowable air leakage amounts for the tests are to be determined by*

the Exterior Envelope Consultant, in coordination with the College.

Test protocol requires that air infiltration testing precede water tests. Should it be necessary for a water test to be performed in advance of the air test, the specimen must be allowed to completely dry before air test. The wind machine for the dynamic water test shall generate wind speeds equivalent to 10 psf. Center deflection readings shall be taken for glass during testing.

**Tests:** Make the following tests of the mock-ups and project building in the order listed:

1. Operable Windows and Doors: Perform field testing on each unique window/door type included in the exterior wall assembly mock-up and two instances of each unique fenestration type after first installation on the project building in accordance with ASTM E 1105 and ASTM E783.
    - a. Water Penetration Testing: Conduct at static test pressure of \_\_\_\_\_ PSF with no water penetration.
    - b. Air Leakage Resistance: Conduct at static pressure of \_\_\_\_\_ PSF with maximum allowable air leakage of \_\_\_\_\_ CFM/SF.
  2. Storefronts and Curtain Wall: Perform field testing on each unique storefront/curtain wall included in the exterior wall assembly mock-up and two instances of each unique fenestration type after first installation on the project building in accordance with ASTM E 1105 and ASTM E 1186.
    - a. Water Penetration Testing: Conduct at static test pressure of \_\_\_\_\_ PSF with no water penetration.
    - b. Air Leakage Resistance: Conduct at static pressure of \_\_\_\_\_ PSF with maximum allowable air leakage of \_\_\_\_\_ CFM/SF.
  3. Testing: Use full laboratory test pressure. No 1/3 reduction will be accepted as permitted in AAMA 502 and 503.
  4. Ensure only the perimeter primary air and water seals or transition from the fenestration to the weather barrier is installed at the time of test. Redundant seals or flashing should not be installed at the time of testing to promote visual inspection of the primary seal. Ensure interior drywall and other construction do not obstruct review of the test subject or perimeter conditions during testing.
  5. Provide scaffold, hose, and water supply to perform tests, plus repeat unsuccessful tests after remedial work. For each failed specimen, another installation of the same fenestration type should also be tested until the first test passes. Failure is defined as any water uncontrolled, or otherwise undrained, which surfaces inside the inside plane of the glazing captured in the window, curtain wall or storefront.
  6. Ensure remedial measures maintain standards of quality and durability of original design. Apply remedial measures to all applicable fenestration including those previously installed. Remedial measures are subject to approval of Architect.
  7. Structural-Sealant Adhesion: Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.
    - a. Test a minimum of six areas on each building facade.
    - b. Repair installation areas damaged by testing.
  8. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
  9. Prepare test and inspection reports.
- M. **Exterior Shading Devices:** (reserved)
- N. **Roof Systems and Roof-Related Systems:** All roof design shall comply with the requirements indicated in **Chapter VII Standards for New Roofing**, in the Maryland Department of General Services document **Procedure Manual for Professional Services** (See **List of Reference Documents** in **Part 1: Document User Guide** of this **College Design Standards** document). See the

1. Roof Slope: the selection of either a steep slope or low slope roofing system shall be based on the results of a 60 year life cycle cost analysis. This analysis shall consider the scope impact on building structural, mechanical and electrical systems required to configure the building for a steep slope and for a low slope roofing system, as well as the maintenance and replacement intervals and costs for both roofing systems.
2. For Roof Replacement Projects: the selection of the replacement roofing system shall be based on an evaluation of costs associated with factors affecting the proposed system, including span dimension, structural condition, foundation design/capacity, and disposition or accommodation of roof top equipment.
3. Drainage: roofs on new construction shall be pitched to drains or gutters, with the roof slope achieved structurally.
4. Asbestos: all materials used for roofing systems shall be asbestos free.
5. Steep Slope Roofs: roofs with a minimum slope of 2-1/2 inches per foot, may be finished with a standing seam metal or sheet metal system or a fiberglass shingle system surfaced with ceramic coated mineral aggregate. All steep slope roofs must have a full width (36") of modified bitumen ice dam protection membrane installed at all eaves and valleys. Steep slope roofs shall be provided with adequate means for interior ventilation through eave or soffit louvers, ridge vents, ventilation boards and thermostatically controlled power fans to prevent moisture condensation and excessive heat under roofing or sheathing. Insulation shall be provided in the attic space above the ceiling and shall achieve an insulation value of R-38.
  - a. Standing seam metal roof systems: shall be fabricated metal panel systems from nominal 22 gauge G-90 galvanized steel conforming to ASTM A446 Grade A and ASTM A525. Alternative panel thickness of 24 gauge or 20 gauge may be considered based on an evaluation of roof framing and purlin spacing. All standing seams shall be double locked with a seam height no greater than 1½ inches. The system shall conform to the requirements of ANSI Publication A58.1, the IBC Chapter 15, and the American Institute of Steel Construction Manual. The panels shall have a UL Class 120 rating and the structural uniform uplift load capacity shall be in accordance with ASTM E330. The finish shall be equal to at least 70% Kynar and shall be tested in accordance with ASTM procedures. The system shall have a 20 year manufacturer's weatherproof warranty. The Kynar color finish shall also be covered by a 20 year manufacturer's warranty.
  - b. Asphalt shingle: shall be reinforced with fiberglass wind resistant type, UL Class A, and comply with ASTM D3462 and ICBO ES AC 127. Shingle manufacturer shall provide a 40 (+) year warranty covering repair or replacement of defective shingles as necessary to eliminate leaks. Where "Nailbase" insulation is used ventilation must be provided. Metal drip edges must be installed on all eave and rake edges.
6. Low Slope Roofs: shall be required to have a minimum slope of ¼ inch per foot. New buildings shall be designed to achieve the minimum slope of 1/4 inch per foot structurally. Existing buildings may have to be provided with tapered insulation to achieve the minimum slope. Lightweight concrete shall not be used to create slope.
  - a. Low slope roofs shall have a modified bitumen four ply built up roof system. For further information refer to **Section 075200 Low-Slope Roofing** of **Part 6 Technical Standards** of this **College Design Standards** document. The top ply of the built up roofing is to have white granules to achieve the Solar Reflectance Index necessary to comply with the Sustainable Sites "Heat Island Effect-Roof" credit for LEED. Provide

- pre-manufactured closure assemblies at all roof penetrations. Pitch pockets are not allowed.
- b. Thermo Plastic Single Ply Roofing: the use of Thermo plastic single ply roofing is discouraged. Coordinate with the College before proposing use at any locations. If use is approved, the installation shall comply with Chapter 15 of the IBC and shall have a minimum slope of  $\frac{1}{4}$ " per 12" (2%). The roof covering shall comply with ASTM D6878.
  - c. Include "Roof-Gard" roofing pads by Humane, in  $\frac{3}{4}$ " thickness, for walkways to all equipment, roof access points and roof perimeter.
  - d. Electronic Leak Detection System: Modified Bitumen multi-ply built up roof systems shall incorporate a permanent low voltage electronic leak detection system. Leak detection equipment shall deliver pulsating low voltage to create an electronic potential difference between the roof membrane surface and the structural deck. Using a receiver, the technician will vector in on breaches identified by an electronic connection. Conductive wire used to deliver pulsating charge around perimeter of area being tested and to isolate grounds. Composite polywire has 9 strands of .07 inch stainless steel wire interwoven into the braided polyethylene strands. Tapes and sealants used to secure conductive wire shall be compatible with manufacturer's membrane. The basis of design product is by Honza Group Inc.; [www.honzagroupinc.com](http://www.honzagroupinc.com); telephone: 301-953-7210.
7. Roof access: permanent access is to be provided to all roofs for all buildings from the inside of the building. Comply with code-mandated egress requirements for rooftops, rooftop mechanical areas, and rooftop spaces. A roof access hatch and a "ship" type ladder are to be provided at a minimum and a stairwell and elevator to serve the roof are to be provided if affordable, or if required for egress. Multi-story access must be provided for all multi-level roofs from the second story up. Inorganic roof walkway pads shall be provided from roof access to roof mounted equipment. Modified bitumen membrane is acceptable.
  8. Rooftop Equipment: Consideration should be given to and an evaluation performed regarding the possibility of constructing a rooftop penthouse to protect the HVAC equipment. A penthouse reduces the cost of equipment, protects the equipment better, yields longer equipment life, reduces equipment maintenance costs and reduces the quantity of roof penetrations. A penthouse, however, is generally considered part of Gross Square Footage, and generally is not achievable given the standard Net to Gross calculations. Furthermore, an occupiable penthouse is generally counted as a floor, so including such a penthouse may reduce the number of program occupied floors allowed in the building in order to stay within a height limit. Analysis and a cost comparison of the two scenarios (penthouse vs. penthouse type equipment) is to be performed, and a request is to be made for an exemption from the assignment of the Penthouse as GSF, to allow it to be classified and counted as NASF, based on the benefits of the Penthouse (fewer roof penetrations, less expensive equipment, reduced equipment maintenance costs, etc.). Roof mounted equipment shall be installed on curbs and shall be provided with suitable vibration isolation devices and proper flashing. If it is necessary to mount equipment above the roof, without using a curb, sufficient clearance shall be provided under the equipment to permit maintenance of the roofing system, as well as adequate clearance for future roof replacement.
  9. Roofscape: the design of the roofscape shall be given attention at all phases to assure an orderly and attractive appearance of rooftop elements, including their location, color and

shape. Additionally, roof top equipment (e.g. exhaust fans, mechanical louvers, etc.) shall be minimized and located to preclude visual exposure from the street and the proposed pedestrian mall. Equipment screens must be provided to conceal all roof top equipment.

10. Energy Generation on Roof: the A/E shall give consideration to, and perform an evaluation of, the benefits of installing photovoltaic panel arrays and/or wind turbines on the roof.
11. Green Roofing Systems: the A/E is to perform an evaluation of the benefits of installing a modular tray planted "green" roof system. All green roofing systems shall comply with the requirements of the International Building Code (IBC) (Latest Edition) Chapters 15 and 16. All systems must comply with ANSI/SPRI VF-1 and current ANSI wind design guidelines. Green roofs shall be designed for uniform design live load in the landscaped area as indicated in Section 1607.11.3 of the IBC. The weight of the landscaping materials shall be considered as dead load and shall be computed on the basis of saturation of the soil. The basis for design is to be systems manufactured by "LiveRoof" with "soil elevation" and "moisture portals" features. Modules are to be pre-vegetated and placed on a heavy duty, roofing grade HDPE, polypropylene, TPO, PVC or EPDM slip sheet/root barrier of 45-60 mil thickness, with effectively bonded seams. Slipsheet/roof barrier material is to be compatible with roofing system.
12. *An Electronic Field Vector Mapping (EFVM) leak detection system is required at all SBS Modified Bitumen Torch Applied system roofs. These systems are not required at TPO Single Ply system locations. Coordinate with College regarding specifications for the system.*

#### 5.6. GENERAL INTERIOR CONSTRUCTION STANDARDS:

- A. **Acoustic Performance and Design**: each space is to be designed for optimal hearing conditions. Consideration is to be given to the isolation of each space from adjacent spaces and other sources of noise to insure the successful function of the space. Spaces that will contain noise-generating sources shall be located away from spaces requiring quiet, thereby allowing for acoustic buffer spaces, or shall be adequately isolated acoustically in accordance with College standards and best practices. Meeting and gathering spaces require special design and finishes to obtain optimal hearing conditions, including appropriate reverberation levels. Consideration shall be given to the use of sculpted ceilings, acoustical flooring, non-parallel walls, and other techniques to optimize acoustic performance. Partition assemblies for each room type or condition are to be designed to achieve the STC ratings indicated in section **5.6.C.Partitions**, item **.3 Acoustic Performance** below. Horizontal assemblies separating mechanical equipment rooms from classrooms, offices and other occupiable spaces are to have an STC rating of 50 or more, and are to be designed to mitigate low frequency sound ranges not measured by STC, to reduce background noise levels to 40 dBA or less. Similarly, HVAC systems for classrooms and other core learning spaces are to be designed to limit background noise levels to 40 dBA or less.
- B. **Prevention of vermin infestation**: doors and frames and all floor, ceiling and partition penetrations shall be sealed against pests and vermin. All penetrations by pipe, conduit, duct, etc. shall be sealed. If any form of cavity wall is selected for exterior walls, special attention must be paid to prevention of infestation in the cavity.
- C. **Partitions**:
  1. Impact and abrasion resistance: (Reserved)
  2. Fire separation – UL Design Assemblies: (Reserved)
  3. Acoustic performance: partition assemblies for each room type or condition are to be designed to achieve the STC ratings indicated below, as measured in field testing:

- a. Partitions between classroom/class lab and classroom/class lab: minimum STC 47
  - b. Partitions between classroom/class lab (and other core teaching spaces) and corridors: minimum STC 50
  - c. Partitions between classroom/class lab and Recitation Room: minimum STC 50
  - d. Partitions between classroom/class lab and office: minimum STC 47
  - e. Partitions around offices: minimum STC 47
  - f. Partitions between Mechanical Room and classrooms and other core teaching spaces: STC rating of 50 or more, as needed to reduce background noise in the teaching space to 40 dBA or less. These partitions are also to be designed to mitigate low frequency sound ranges not measured by STC.
4. Documentation of proposed partition types: see the ***Instructions to the Consultant*** portion of the ***Part 2 Facilities Construction Program*** for the individual project under consideration.
  5. Blocking and bracing: blocking and bracing are to be provided inside partitions to support all anticipated furnishings and equipment to be mounted on partitions. Locations, heights, material and attachment for blocking are to be indicated in the Construction Documents.
- D. **Doors:** (Reserved)
- E. **Door hardware:**
1. Hardware selection: *door hardware selections vary between campuses. Coordinate with the College for each project to receive door hardware product lists. A door hardware consultant is required to be included in the design team on all projects unless an exception to this requirement is approved by the College.*
  2. Keying: (Reserved)
  3. Coordination with electronic access control: (Reserved)
  4. All ADA door operator push buttons are to be located such that the door swing does not encroach into the required clear space to access the button (*the required clear area at the door button does not overlap the door swing or any other obstructions*). *Door operator button locations must be shown in the construction documents.*
- F. **Built-ins, Fixtures and Equipment:** the A/E is to identify in the construction documents as "built-in" all fixtures and equipment items that the Contractor is to provide and/or install. The A/E is to include in the contract documents the manufacturer, style, sizes, finishes, color, and location of all such equipment that is not provided by the College. The A/E shall require that the Contractor provide this equipment and any necessary utilities and services as part of their contract.
- G. **Casework:** (Reserved)
- H. **Ceiling Layouts:** (Reserved)
- I. **Finishes:** Interior materials and finishes shall be selected to meet the following criteria: aesthetic considerations, durability, ease of maintenance, acoustical requirements, and conservation of energy. All materials and design details shall be analyzed for their durability and ease of maintenance, particularly those to be used at areas of high traffic (corridor), water or chemicals (toilets), and other special use functions. Select finishes to provide for a monolithic, scrubbable surface, free of cracks or ridges.
1. Floor finishes are to be selected to support the function and acoustical needs of the space and to minimize maintenance needs. Unless otherwise directed by the College, epoxy terrazzo is to be used for all high impact areas, and is to include recycled materials for aggregate in the mix. Use carpet where acoustical needs and comfort are of high importance. Provide for the needs of the visually disabled where changing from one floor surface to another. Floor-to-wall joints must be designed to allow easy cleaning. Recessed

walk-off mats are to be installed at building entrances to provide for the removal of dirt and sand.

2. **Acoustic Tile Ceiling:** ceiling tiles are to be "Fine Fissured" Square Lay-in, medium texture #1830 (2"x4"x5/8") and #1831 (2"x2"x5/8") by Armstrong World Industries, unless otherwise approved by the College. Ceiling suspension track is to be "Donn DX/DXL" Series, in white, by USG, unless otherwise approved by the College.
3. **Paint:** all paint types, products and colors are to be selected in coordination with the College. Paint types, products and colors are to match College standard types, products and colors unless otherwise approved by the College.
4. *Exposed concrete columns and other structural elements are permitted in lobbies and along paths of travel, but are not permitted in full-time occupied rooms. Coordinate with the College regarding any exceptions.*

J. **Roof Access:**

*Provide an interior stairway to the roof. Coordinate with the College to confirm the need for an elevator to the roof and penthouse. Ladder access to the roof to be sloped ship's ladder with full treads. No alternating tread stairs allowed.*

5.7. **GENERAL SPECIALTIES STANDARDS:**

- A. **Visual Display Units:** coordinate with the College to confirm the preferred product(s)
- B. **Wayfinding and Signage:** a **Maryland Accessibility Code** compliant identification and directional system is to be incorporated throughout each building. The interior and exterior graphic systems are to be designed to assist individuals moving to and within the facilities. In accordance with **Maryland Accessibility Code** requirements, particular attention must be given to the needs of individuals with disabilities to access the building from parking areas and walkways and to move freely throughout the building. All signage is to comply with the standards indicated in the **Montgomery College Sign System Manual**, and the **Addendum to the Montgomery Colleges Signage Standards Manual (September, 2014)** All signage is to be adequately illuminated. The graphic system is to include, at a minimum, the following items. Coordinate the location of each element with the College:
  1. A campus map located outside the building (*confirm need at each building with the College*).
  2. Exterior building identification signs at the main entrance(s).
  3. A building floor plan located inside the building, in close proximity to the primary entrance(s).
  4. An interior building directory at the main entrance(s) on each floor and all elevator lobbies.
  5. Room number / identification plaques for all rooms including offices, support areas, elevators, stairwells and corridors. See the **Room and Door Numbering Standards** section in **Part 3: Owner's Planning and Programming Requirements** of this document. See the **Montgomery College Sign System Manual** for design standards and definition of content for the room number/identification plaques. Coordinate exact content with the College.
  6. Signs for all identification of hazardous areas, and communication of evacuation procedures and means of egress in accordance with the fire and building codes.
  7. Directional signs as required.
  8. Traditional bulletin boards in public and departmental areas as required.
- C. **Art Display:** provisions are to be made for the secure and attractive display of hanging artwork, and for appropriate lighting.
- D. **Toilet Compartments:** (reserved)

- E. **Wall and Door Protection:** (reserved)
- F. **Toilet Accessories:** coordinate with College for current list of products
- G. **Safety Specialties:** (reserved)
- H. **Emergency Aid Specialties:**  
*Automated External Defibrillators (AED): provide Physio-Control model CR+, including white semi-recessed cabinet (14" H x 17 1/8" W (inside dimensions)) at locations throughout the building, to be selected by the College. Power and alarm infrastructure is to be provided at each unit. Audible and flashing light alarms in the unit are to be connected to the building's internal security system. At each cabinet, provide the manufacturer's standard carrying case, AED Quick-Pak Training Electrode Sets for adult and infant/child, an AED Location Sign (tent style), a Quick Reference Instruction Card, and an AMBU Res-cue Mask First Responder Kit, a spare battery and a pair of paramedic scissors.*
- I. **Fire Protection Specialties:** (reserved)
- J. **Storage Specialties:** (reserved)

### 5.8. GENERAL EQUIPMENT STANDARDS

- A. **Commercial Equipment:**
  1. WEPA Kiosk (wireless printing): confirm all requirements with the College Office of Information Technologies, as those listed here may be superseded.
    - a. Size: 21" wide, 25" deep, 63" tall
    - b. Weight: total weight of Printer + cart (fully stocked with paper) and Kiosk + components = 400 pounds
    - c. Network requirements:
      - Internet access
      - One RJ-45 jack (highly preferred). Wifi is a backup option
      - DHCP or Static IP address per kiosk
      - Port 443 outbound
    - d. Voltage requirements:
      - 110v AC, 50hz-60hz, Grounded 3-prong outlet
      - Wattage while the WEPA Kiosk is idle: 265 watts idle
      - Wattage while the WEPA Kiosk is printing a document: 1,435 watts peak

### 5.9. GENERAL FURNITURE AND FIXTURES STANDARDS

- A. **General:** See **3.8 Room Planning Standards** in **PART 3: OWNER'S PLANNING AND PROGRAMMING REQUIREMENTS** of this document for a listing of the quantity of individual furniture and equipment items that are to be standard for each typical room type. Detailed product information for furniture is indicated below. Coordinate locations of furniture and electrical and IT infrastructure requirements for furniture with College team.
- B. **Movable FF&E:** The College will give direction to the A/E during the Schematic Design phase as to which furniture, fixtures, and equipment will be considered "in construction contract" versus those that will be purchased and installed separately as moveable furniture, fixtures, and equipment. Movable furniture and equipment will be selected by the College and generally will be procured *through a contract that is separate from the construction contract*. See the **Room Planning Standards** in **PART 3: OWNER'S PLANNING AND PROGRAMMING REQUIREMENTS** for preliminary lists of the furniture to be provided at each typical room type.

- C. Cubicles:** it is the College preference to house each personnel workstation in a single or shared office. However, in instances where cubicles are to be used, the furniture is to be freestanding, separate from the cubicles. All cubicles are to be KI "WireWorks" series. The configuration and fabric selections are to be developed in coordination with the College.
- D. Typical office furniture:** the following is a preliminary list of the standard furniture that is to be provided in each typical office. This list is intended for planning and programming phase work only. The exact furniture selection, quantity and dimensions to be provided for each office will be determined through coordination with the building occupants during the programming and design phases of the project, and in the final Furniture, Fixtures and Equipment selection process. Unless otherwise directed by the College, all furniture is to be manufactured by KI.

**1. Pencil/Box/File Drawer Pedestal:**

Product Group: ATPE All Terrain Pedestals  
 Model: ATPE1523PBF Pencil/Box/File (3" Pencil Drwr, 6" Box Drwr, 10.5" File Drwr)  
 Top: Steel Top  
 Pull: S1 Steel/Inset Plastic Pull  
 Casters: 4CW 4 Black/White Casters/2 Lock  
 Color: To be determined

**2. File/File Drawer Pedestal:**

Product Group: ATPE All Terrain Pedestals  
 Model: ATPE1524YY 10.5" File/File (Two 10.5" File Drwrs)  
 Top: Steel Top  
 Pull: S1 Steel/Inset Plastic Pull  
 4CW 4CW 4 Black/White Casters/2 Lock  
 Color: To be determined

**3. Overhead Cabinets:**

Product Group: WireWorks Balance Overhead  
 Model: BLCS Balance Overhead w/Solid Color Upper Door, Load Bar Mount, (2 each – width to be selected based on room dimension, minimum of 36".)  
 Mounting Height: Coordinate with College to confirm the mounting height, and to select rooms and mounting heights for fully ADA compliant and adaptable offices. Maximum side approach reach height is 48". Blocking is to be installed at multiple heights at adaptable stations.  
 Cabinet Paint Color: To be determined

**Balance Overhead Accessories:**

- Universal Shelf: steel shelf divider with powder-coated finish (7 ¼"x11 ½")
- Wall Mounted Load Bar (width to be selected to match pair of overhead cabinets)
- Balance Overhead Task Light, 24" Wide for 30" and 36" Overhead
- Tackboard/Toolbar Attachment Bar, 36" Wide
- Overhead Tackboard, 20" H x 36" Wide
- Tool Rail, 42" wide x 20" high
- WireWorks Plastic Diagonal Storage Unit, Warm Grey
- WireWorks Plastic Paper Tray Unit, Warm Grey
- WireWorks Plastic Pencil Cup, Warm Grey

- WireWorks Vertical Storage Warm Grey
- Wire Works Accessory Tray Warm Grey

**Blocking:** Construction Documents are to indicate two continuous bands of nominal ¾" thick, 12" tall plywood backing behind the partition finish, attached to the partition studs, to support the Overhead bins. The lower band is to be centered at 5'-7" AFF and the upper band is to be centered at 7'3" AFF. This blocking is to be provided for the attachment of the horizontal load bars for the Overhead bins. Verify the blocking material dimensions and locations with the cabinet manufacturer. Coordinate with the College for mounting heights for additional blocking at offices/stations that are to be adaptable for full ADA compliance.

4. **Worksurfaces:**

Model:	WorkZone "Basic Worksurface", Laminate Top (1 each 24x30, 1 each 24x60, 1 each "standalone corner worksurface" 24x36x36x24)
Height:	29"
Edge:	PVC
Horiz. Wire Mangmt:	No wire management trough is required (optional)
Frame Style:	Beam Frame or Modesty Panel Frame
Leg Location/Type:	Standard or Transitional (6" shorter length foot for use at inside corners or other locations where leg room is required)
Leg Style:	Streamline
Grommet Option:	Worksurface grommets to be included as required by layout
Trim Color:	To be determined
Base Option:	With glides(standard)
Surface Finish:	KI Laminates "Kensington Maple"
Edge Color:	Warm Grey Edge/Grommet

Worksurface Accessories:

- Center Drawer (pencil drawer, mounts below work surface): one per office

Worksurface Notes:

- No modesty panel is to be included at work surfaces that face walls
- Wiring troughs are not consistently included or excluded
- May in some configurations need a WorkZone surface "with shared leg," which is solution for mounting one surface to another, with hardware, rather than including a separate leg at the adjoining end of the surface.
- May use peninsula side or peninsula end work surface (radiused end) with 3" diameter metal support leg)
- Worksurfaces at offices requiring ADA compliant desk furniture are to be "Genesis Tri-pod Corner," (24"x42"x42"x24"), "Genesis Basic Rectangular" (24"x30") and "Genesis Basic Rectangular" (24"x60") with crank handle height adjustment by KGE (supplied by KI) with standard finishes to match WorkZone products.

5. **Manager's/Desk Chair:** the "Engage" chair in black, by KI is to be used in State funded projects. In projects funded from other sources the "RPM" task chair in black, by Knoll may be used. The fabric for either chair is also to be black.

6. **Guest Chair:**

Product Group: TGU Torsion On The Go Chair

Model: TGWAPB with Arm Poly Back  
 Color: (BL) Black Finish  
 PBL (PBL) Black Shell Color  
 Casters: Carpet Caster  
 Seat: (US) Upholstered Seat  
 Arms: (ADL) Black Arms

7. **Two-Drawer Lateral File Cabinet (one per office):**

Product Group: ASLH All Terrain Lateral Files  
 Model: ASLH3022YY 2 Drwr, 30 x 21 5/8 x 26 3/4 (w/hanging file partit.)  
 Top: Steel Top (option: use 3/4" laminate top w/ 74P edge)  
 Color: To be determined  
 Casters: 4CW 4 Black/White Casters/2 Lock

8. **Storage Tower ("Wardrobe" Unit – one per office):**

Product Group: AS66 A/T Storage Towers 66" Hght  
 Model: AT66302MW61BLP 66"-W61BLP MOD  
 AT66302MW61B 12"W Frt. Wardrobe-RT  
 Cupboard Front Face -24"D 21x22  
 21" W Drawers: (3 each 12")  
 (Config. May vary, coordinate with College)  
 Pull: SI Steel Inset/Plastic Pull  
 Top: NT No optional top (steel)  
 Color: To be determined  
 Casters: 4CW – 4 Black/White Casters/2 Lock

9. **Bookcases:**

Product Group: CIBKU Bookcases  
 Series: S70 700 Series Bookcase  
 Model: 30" wide x 12" deep (height & quantity of shelves to be determined)  
 Color: To be determined  
 Top: S7TP 700 Series Laminate Tops, 3012T, 30x12 (confirm steel or laminate top)  
 Laminate edge: Self Edge  
 Laminate color: Kensington Maple 10776-60

**E. Typical General Purpose Classroom Furniture:**

1. **Chair:**

Product Group: Torsion  
 Model: Torsion "On the Go" Armless Chair, Upholstered  
 Color: Black Poly  
 Casters: 4 casters

2. **Chair (tablet arm):**

Product Group: Torsion  
 Model: Torsion Four Leg Tablet Arm  
 Color: Black Poly  
 Casters: 4 casters  
 Seat Finish: Upholstered

3. **Table:**

Model: Hurryup Table, Rectangular  
 Flip Top/Nesting: Confirm

Laminate:	Kensington Maple
Edge:	Warm Grey PVC Edge
Two Station Table:	24x60
ADA Station Table:	24x42
Modesty Panel:	(Confirm)
Wireway:	No
Grommet:	No
Casters:	4 casters or 2 casters, 2 glides (Confirm)
Option:	ganging kit

4. **Instructor Table:**

Model:	Match room-standard table
Accessories:	Include Center Drawer

5. **Smart Instructor Workstation (SIWS):**

The Office of Facilities will provide a copy of the current standards document for the Smart Instructor Workstations.

**F. Typical Computer Classroom Furniture:**

1. **Chair:**

Product Group:	Torsion
Model:	Torsion Pedestal Base Armless Chair, Upholstered
Color:	Black Poly
Casters:	4 casters
Seat Finish:	Upholstered

2. **Table:**

InTandem Table System (powered, w/o laptop garage)	
Two-station Table:	30 x 60
ADA station Table:	30 x 42 (with adjustable worksurface height)
Laminate:	Kensington Maple
Edge:	Warm Grey PVC Edge
Grommet:	1 per station

3. **Instructor Table:**

Model:	Match room-standard table
Accessories:	Include Center Drawer

4. **Smart Instructor Workstation (SIWS):**

The Office of Facilities will provide a copy of the current standards document for the Smart Instructor Workstations.

**G. Typical Conference Room Furniture:** (reserved)

1. *Conference Table: to be a modular grouping of tables, selected and arranged for the occupant capacity and shape of the room, with integral ports for power and data connections. Coordinate product selection with the College.*

**H. Laboratory Equipment:** (reserved)

**I. Library Equipment:** (reserved)

**J. Food Service Equipment:** (reserved)

**K. Vehicle and Pedestrian Equipment:** (reserved)

**L. Window Treatments:** (reserved)

**M. Specialty Casework/laboratory casework:** (reserved)

**5.10. GENERAL CONVEYING SYSTEMS STANDARDS**

- A. **Non-proprietary:** all elevators are to be non-proprietary. Coordinate with College for copy of outline specification and to confirm all requirements. See **Part 6 Technical Standards** for further information.

**5.11. GENERAL FIRE SUPPRESSION SYSTEMS STANDARDS**

- A. **Codes and Standards:** the suppression systems shall comply with all applicable codes, standards, engineering best practices, requirements of the authority having jurisdiction, and Montgomery College guidelines and standards. The design of the building sprinkler systems shall comply with NFPA 13 and all other NFPA standards for suppression systems.
- B. **Water Supply:** the College shall provide hydrant flow data for the two fire hydrants closest to the site for determining if a fire pump is required. Provide a fire pump if the analysis of the available water supply and the projected hydraulic demand indicate the need. A fire department connection shall be provided at the fire department response point.
- C. **Sprinkler and Standpipe System:** Provide a combined sprinkler/standpipe system for the entire building, including a complete automatic wet-pipe sprinkler protection system with quick response sprinklers. No flexible piping is allowed in these systems. The standpipe system shall include hose connections at intermediate stair landings, or as otherwise required by local regulations. The combined system shall be supplied by the local campus water loop. If required, a pre-action sprinkler system shall be provided for the elevator shaft, and be released by the main building fire alarm control panel. All automatic sprinkler systems shall be monitored by the fire alarm system.
- D. **Commissioning:** Commissioning of all fire suppression systems shall be included in the project commissioning scope.
- E. **Questions:** Contact Montgomery College's Office of Facilities at (240) 567-5363 if there are any questions regarding fire suppression systems or the standards for these systems.

**5.12. GENERAL PLUMBING SYSTEMS STANDARDS**

- A. **General:** all plumbing systems are to be integrated with the existing campus systems and be constructed to accommodate anticipated changes in the campus systems. The current Montgomery College Utilities Master Plan and IT Master Plan documents include extensive detail regarding existing and proposed systems in the area of the proposed building site, and are to be consulted as reference documents for the planning and design of the project.
- B. **Codes and Standards:** the plumbing systems and plumbing fixture counts shall comply with all applicable codes, standards, engineering best practices, requirements of the authority having jurisdiction, and Montgomery College guidelines and standards.
- C. **Water Supply:** the College shall provide information on the available water flow and pressure. If the analysis of the available pressure and the projected hydraulic demand indicate the need, a domestic water pump is to be provided as part of the project. The building is to have separate master water meters unless a master water meter is provided by the local water authority. Submeters to be provided for landscaping hose-bibs, cooling tower water make-up and other non-sewered uses.
- D. **Domestic Hot Water:** provide life cycle cost analysis, as described in *Energy Design Guidelines*, to evaluate centralized (storage tank), point of use HW tanks, and instantaneous hot water production. Life cycle costing is especially important with instantaneous heating.
- E. **Sewage:** perform assessment to determine whether or not there is a need for a sewage ejector pump for the building.

- F. **Plumbing Fixtures:** coordinate with the College on the selection of plumbing fixtures for conformance with College standards. Fixtures are to be durable, readily repaired, and have replacement parts readily available. Any alternate fixtures suggested must be market proven to hold up to wear and tear in the same type of occupancy and demand conditions as in the proposed building. Fixtures are to be low-flow to reduce water usage.
- G. **Water Closet “Courtesy Flush Button” Location:** automatic flush valves that include a courtesy flush button shall be install in such a way that the button is located on the open (accessible) side of the water closet in order to provide access to the button. This requirement is to be specified in the Construction Documents.
- H. *Drinking fountains are to include bottle refilling stations. Use Elkay Model ezH2O bottle filling station, unless otherwise approved by the College. Exact model/configurations are to be submitted to the College for approval.*
- I. **Natural Gas:** (reserved)
- J. **Commissioning:** Commissioning of all plumbing systems shall be included in the project commissioning scope.
- K. **Questions:** Contact Montgomery College’s Office of Facilities & Public safety at 240-567-5363 if there are any questions regarding plumbing systems or the standards for these systems.

#### 5.13. GENERAL HVAC SYSTEMS STANDARDS

- A. **General:** all HVAC systems are to be integrated with the existing campus systems and be constructed to accommodate anticipated upgrades to the campus systems. The current Montgomery College Utilities Master Plan and IT Master Plan documents include extensive detail regarding existing and proposed systems in the area of the proposed building site, and are to be consulted as reference documents for the planning and design of the project.
- B. **Codes and Standards:** design shall comply with applicable jurisdictional codes and jurisdictional adopted standards including ASHRAE and SMACNA and engineering best practices. The A/E is to coordinate with the College to identify the degree of environmental control needed at each space, any special heating, air conditioning and ventilation needs, and the capacity of any existing systems that are to be extended or connected to the new building.
- C. **Resource Conservation:** See the ***Resource Conservation and Integrated Systems Approach*** in the ***Part 3: Owner’s Planning and Programming Standards*** for a discussion of the mandated integrated systems approach to building design, of which HVAC design is a critical element.
- D. **Reliability:** the work shall be designed for maximum reliability. This includes the avoidance of systems which have an inadequate history of satisfactory performance. The work shall be designed for maximum maintainability. Provide adequate service clearance for all equipment.
- E. **Specifications:** All equipment manufacturers specified shall be approved by the College. A/E shall list approved equivalent model numbers from approved alternate manufacturers in the Specifications *after assuring that the alternates are able to fit into the physical location.*
- F. **O & M Manuals:** The College employs a maintenance and operations staff capable of troubleshooting and repairing most mechanical, plumbing, electrical, and telecommunication systems equipment. Therefore, it is required that five copies of suitable manuals are furnished with the equipment and systems. The following items and information are minimum requirements:
  - 1. Manufacturer's catalog descriptions of specific items of equipment.
  - 2. Manufacturer's operating and maintenance instructions.
  - 3. Wiring diagrams for inter- and intra- connections of components.

4. Schematics and location drawings of components and systems with "troubleshooting" guidance.
5. Component breakout lists for ordering replacement parts, etc.
6. *Operations and Maintenance Manuals shall be provided to the Montgomery College Office of Facilities & Public Safety two weeks in advance of any testing or commissioning of any equipment.*

**G. HVAC System Criteria:** the mechanical systems, piping, and valves are to match the College's standard HVAC system criteria as follows:

1. Roof-mounted variable air volume (VAV) air handling unit. The air handling units shall be of highest quality designed for rooftop exposure. They shall be of the penthouse type with double wall construction, durable finishes, airtight doors, and internal access walkways. An actual penthouse to protect the rooftop equipment is preferred to provide better protection for high performance equipment, and should be explored as an option provided net-to-gross square footage ratios can be met.
2. Hot water heating coils.
3. Chilled water cooling coils.
4. Water treatment for HVAC systems is to be integrated with existing Central Plant treatment. The College retains an independent contractor to maintain the HVAC water treatment for the College HVAC systems. Coordinate with the College to confirm the requirements for water treatment, the project scope regarding water treatment and the connection of new systems to existing campus or building systems. Indicate clearly in the specifications that the existing campus HVAC system (or building system from prior development phase) will supply treatment to the building's new systems. Upon completion of construction of the new system, the Contractor is to flush the new system, clean system with approved cleaning agent/chemical, filter system to remove particulate and then flush again to remove all traces of cleaning agents. The Contractor's chemical treatment representative is to provide certification that the systems are properly cleaned, filled with city water and ready for startup. After that certification is provided the building systems can be opened to the campus system loop, allowing treatment from the campus plant to circulate in the new systems. All treatment products introduced to the systems after the Contractor's required flushing of the new systems are to be provided by the College's water treatment vendor.
5. Low temperature (approximately 40degF) supply air.
6. Variable frequency drives to modulate the airflow.
7. Single duct VAV terminals with hot water reheat.
8. Return fans in the exhaust position preferred.
9. Dampers shall be motor-operated with tight fitting stainless steel perimeter and lip seals.
10. Air handlers are to be appropriately sound and vibration isolated with dampening and sound lining so that noise is not transmitted to the building structure or to the ductwork.
11. Ductwork shall be of appropriate class and thickness, sound lined and insulated to minimize fan horsepower and minimize sound transmission. Ductwork shall meet the leakage requirements for the class of duct and minimize moisture and heat transfer. The ductwork shall be provided with access doors for inspection and duct cleaning. All ductwork from air-handling units to the terminal devices shall be of insulated, double-wall galvanized steel construction, *round or flat oval*. Insulated flexible ductwork may be used on the low side of the terminal devices to the diffusers, provided the runs are limited to providing flexibility in diffuser to ceiling grid alignment. Return air shall generally flow

through ceiling plenums and into return air ducts. The return air ducts shall be extended into the plenums in order to provide balanced flows throughout the building.

12. Ventilation fan systems shall be designed to provide quiet and appropriate exhaust flows. All ventilation systems shall have dampers with motor operators that are interlocked to the motor starter circuits. The dampers shall be low leakage, tightly fitting with stainless steel perimeter and lip seals. All exhaust fans shall be connected to the Energy Management Control System and interlocked with their respective air handling system.
  13. *Central Plant to building connections for heating and chilled water are to be designed to comply with the requirements indicated in the drawing sheet titled "Central Plant to Building Connection Details," sheet M-1(revised 12/10/2012), which is included as **Appendix G** to this College Design Standards document.*
- H. **Elevator Equipment & IT Rooms:** the scope is to include supplemental split systems for elevator equipment and IT rooms. Primary cooling shall be through building HVAC system, with supplemental systems to serve as backup.
  - I. **Control Systems:** the scope is to include native BACnet direct digital control system. See the **General Integrated Automation Standards** below.
  - J. **Commissioning:** commissioning of all HVAC systems shall be included in the project commissioning scope.
  - K. **Questions:** contact Montgomery College's Office of Facilities & Public Safety at 240-567-5363 if there are any questions regarding HVAC systems or the standards for these systems.

#### 5.14. GENERAL INTEGRATED AUTOMATION SYSTEMS STANDARDS

- A. **General:** the building's Energy Management and Control System (EMCS) shall be a stand-alone Direct Digital Control (DDC) and **ASHRAE Standard 135**, native BACNet system that will be integrated to the campus-wide system only after the entire building system has been tested and is working properly. The system shall consist of DDC terminal devices networked to a Graphical User Interface (GUI) terminal through a network of intermediate control units. The GUI shall provide a real time display of all HVAC and mechanical systems, contain all of the standard DDC control programming, and provide secure local and remote operator access.
- B. **Dedicated GUI Room:** a dedicated and secure space shall be provided in the building to locate the GUI and provide sufficient work area and storage for the building's drawings and other records. Communications through modem phone lines and a telephone shall be provided.
- C. **Real-time Networked System:** College standard control sequences and demand management capabilities will be integrated with real time utility pricing signals and "Smart Grid" technologies. BACnet Ethernet messages will be transmitted over the College's Facilities Network (FNet), have virtual local area network capabilities (VLAN), and use the College's standard object and network numbering scheme.
- D. **Further Criteria:** see **Part 6: Technical Standards** section **25000 Integrated Automation** for additional information, including the typical building controls network arrangement and the object name, device instance and network number conventions.
- E. **Commissioning:** commissioning of all integrated automation systems shall be included in the project commissioning scope.
- F. **BTU Meters:** all BTU Meters are to be the System-10-BAC BTU Meter, BACnet/IP Compatible, by Onicon, Incorporated. Coordinate with College for approval of final model selection.
- G. **Flow Meters:** all Flow Meters are to be the F-3500 Series Electromagnetic Flow Meter by Onicon, Incorporated. Coordinate with College for approval of final model selection.

- H. **Questions:** contact Montgomery College's Office of Facilities & Public Safety at 240-567-5363 if there are any questions regarding integrated automation systems or the standards for these systems.

#### 5.15. GENERAL ELECTRICAL SYSTEMS STANDARDS

- A. **General:** All electrical systems are to be integrated with the existing campus systems and be constructed to accommodate anticipated upgrades to the campus systems. The current Montgomery College Utilities Master Plan and IT Master Plan documents include extensive detail regarding existing and proposed systems in the area of the proposed building site, and are to be consulted as reference documents for the planning and design of the project. *Pepeco provides only 3-Phase 460 volt power. No 480 volt power is available at any MC campus.*
- B. **Codes and Standards:** The design shall comply with all applicable codes, standards, engineering best practices, and Montgomery College guidelines and standards. Specifically the design of the building electrical systems shall comply with **ASHRAE 90.1**, and the **National Electric Code**. The College has standardized selections for many materials, devices, fixtures, and equipment which shall be specified for use in the building. An Overcurrent Protective Device Coordination Study is required for building with large electrical demand, with large motors, pump, chillers or other large demand equipment.
- C. **Energy Efficiency:** All spaces shall be controlled to conserve energy either by sensors or by other means. All equipment, transformers, and motors will be energy efficient types designed to minimize the production of harmonic distortion. Although energy efficiency is of major consequence, priority consideration in the design of the facility shall be given to environmental safety and operational, functional, and flexibility requirements.
- D. **Electrical Power Systems:** The building shall be designed with provisions for life safety, lighting, equipment, receptacle, HVAC and emergency power. Building power shall be segregated to the separate load classes and sized in accordance with **ASHRAE 90.1**, among other codes. All electrical power systems within buildings shall be encased in steel conduit and properly supported from the overhead structure. Intermediate Metal Conduit (IMC) conduit shall be used in mechanical rooms and anywhere that may be exposed to damage. Electrical Metallic Tubing (EMT) conduit is acceptable for use above ceilings and when concealed from harm. Compression type fittings are required for EMT. The minimum diameter allowed for any conduit is ¾." Metal Clad (MC) cable is acceptable as a pathway from a box located in the space served to the final device. Conduits shall not be buried in the slab of the building unless it is the primary underground feed from the building transformer to the main distribution panels. Underground electrical conduits shall be Schedule 40 PVC of 2" minimum diameter. The elbows at the transition points from below to above grade shall be Schedule 80. Motors shall be premium efficiency and meet IEEE standards for Variable Frequency Drive compatibility. All cable and conductors are to be copper. No aluminum is allowed for use as conductor. No splices in new cable, or splices of new cable with existing cable are allowed.
- E. **Exterior Below-Grade Ducts, Raceways and Junction Boxes:** see the **Exterior Below-Grade Ducts, Raceways and Junction Boxes** subsection of the **General Utilities Standards** section of **Part 4 Owner's Site Standards** of this document.
- F. **Electrical Distribution System:** The A/E shall coordinate the provision of power from the electrical utility with the College's Office of Facilities. Power will be provided by PEPCO at 13.2 kV. A load letter is required to establish service. The service transformers shall be vault type and the service lateral shall be underground. Coordinate the size and location of the metering cabinet with the PEPCO representative to the campus. The designer shall give particular attention to the location of the primary power taps for this service. Normally the power will be

stepped down by dry-type transformers to 120/208 volt, three phase service for receptacle power and other less consequential loads. In addition, the main electrical distribution systems usually consist of 480/277 volt, three phase main switchboards, distribution and branch circuit panelboards for lighting and some HVAC loads, and 120/208 volt, three phase branch circuit panelboards for receptacles, and associated appurtenances for a complete electrical distribution system. Each IT Independent Distribution Facility (IDF) room shall be provided with a dedicated 12-breaker subpanel to support the equipment that will be housed therein. The engineer of record shall determine the service entrance voltage and phasing, providing an energy and economic analysis of the factors that led to the voltage and phasing.

- G. Fire Separation at Power to Fire Pump:** the Montgomery County Department of Permitting Services has determined that due to uncertainties about the validity of the rating, fire rated cable may not provide adequate fire protection for power to fire pumps. Design documents for all College projects that include a fire pump or routing electrical power to a fire pump are to include a requirement for a 2-hour fire separation rated assembly around all power conduit to fire pumps, or a min. 2" concrete cover around the conduit. Confirm specific current requirements with the Montgomery County Department of Permitting Services and any other local authorities having jurisdiction.
- H. Emergency Power System:** Emergency power and protection equipment will be provided to support the life safety, emergency, and fire protection requirements. The emergency power system shall include a status monitoring system with annunciation at the building's management system. A new emergency generator shall be provided that is sized to handle emergency loads (i.e., fire pumps, emergency and egress lighting, fire alarm requirements, telephone, and security systems). A sub-base, diesel fuel tank, automatic transfer switch with provisions for manual bypass, weatherproof housing, and muffler shall be included in the generator package. The generator location shall be determined in coordination with the College. The generator may be required to support a building fire pump and domestic water booster pump and a possible sewage ejector pump, and potentially existing circuits at other nearby buildings. Note that stand-alone split system HVAC units will be used to cool elevator machine rooms, security system spaces, IDF, data, PoP and other telecommunication equipment spaces. Some or all of these DX type systems will also be backed up by the generator. All emergency power distribution systems are to be designed to comply with the "Emergency Power Distribution System Guidelines" indicated in drawing sheet E-1, titled "One Line Diagram," which is included in this standards document as Appendix H. Confirm current code requirements and coordinate all emergency power distribution design with the College team.
- I. Lighting:** Lighting systems shall be designed based on consideration of the normal tasks performed in the area or room, reflectance of surfaces, special lighting effects required, normal sight lines and zone control of larger surfaces. Fixture selection and layout of the lighting shall be in accordance with the latest engineering practices, IES recommendations, and ASHRAE 90.1 to meet the standards for quality and energy efficiency. Coordinate with the College for a current list of acceptable manufacturers and campus standard fixtures prior to specifying fixtures. Lighting in special design spaces, such as lobbies, may vary from the College's prescribed standards for light fixtures, with written approval from the College.

Daylighting and individual lighting controls shall be considered in support of energy efficiency and achieving the minimum LEED Silver status. The lighting layouts shall be coordinated with the architectural design so as to control interior and exterior brightness and glare.

Point-by-point lighting analysis is required for most spaces. The A/E shall optimize the use of natural daylight, analyze the applicability of day-light controls to turn lights off or dim them in response to natural light availability, and provide appropriate lighting controls, to include use of occupancy/vacancy sensors and interior photocells in conjunction with dimming or step switching ballasts. Lutron should be considered as the basis of design for ballasts and dimming controls.

Exterior and site lighting shall be LED sources. Step lights, ground level lights and bollard lights are to be avoided where feasible. Fixture selection is to be coordinated with LEED criteria for minimizing light pollution. Site lighting is described in the **Site Lighting** subsection of the **General Site Development Standards** section of **Part 4 Owner's Site Standards** of this document.

Interior lighting shall be LED sources. Fixtures in public spaces, including instructional spaces, shall be 2-tube fixtures with 3500°K lamps. Wall-washing fixtures for illuminating marker boards in instructional spaces shall be the "Style 210" adjustable recessed linear fixture by Elliptipar, with one 3500°K lamp. All "recessed can" fixtures are to have a minimum 6" diameter trim aperture, *and are to illuminate the ceiling around the fixture, in addition to the space below.* Fixtures in corridor areas shall be 2-lamp fixtures with 3500°K lamps, on ten to fourteen foot centers. No incandescent lamps are allowed. Occupancy sensors are required for lighting control in most areas and shall include auxiliary dry contacts for connection to the spare auxiliary dry terminals on the DDC terminal equipment controllers. The actual building lighting loads shall be used to size the electrical system and HVAC system.

Lighting fixtures shall be located with regard to actual and potential locations of desks, chalkboards, marker boards or other visual display units. The location and proximity of windows and the photometric characteristics of the luminaires shall be considered when locating fixtures. Learning resource areas shall be accommodated in a similar manner in accordance with IES recommended design practice. The lighting systems in these areas shall also be designed so that lighting levels can be adjusted for audio/visual presentations using control banks of lights that are controlled by on/off switches. Rooms with high ceiling spaces shall be provided with suspended direct/indirect luminaires. Lighting power densities for the various areas of the building shall comply with applicable guidelines. A building-wide target value of 0.5 to 0.75 watts / square foot should be pursued.

The basis of design for occupancy sensors shall be ceiling mounted "Omni-DT" series by Hubbell Building Automation, Inc. Wall mounted sensors shall be used only where specifically approved by the College, and shall match model "LHMTD2" by Hubbell Building Automation, Inc.

Emergency (twenty-four hour) lighting and exit signs are to be served by emergency circuits. Battery backup units are not allowed.

Light fixtures shall be located such that the light source and fixtures can be readily replaced without requiring building staff to work in unsafe conditions or to take expensive or extreme measures to provide safe conditions for the work. Replacement solutions for fixtures and lamps in high ceiling spaces and other locations where replacement will be challenging must be reviewed and approved by the College during Design Development Phase.

- J. **Lightning Protection System:** A lightning protection analysis shall be performed to evaluate the requirement for a lightning protection system. If it is required, the lightning protection system shall be comprised of solid copper, nickel plated air terminals (depending on parapet flashing material) located around the perimeter of the roof, flat copper conductor cables, copper down leads and ground loop and copper coated steel ground rods. The down lead system is not to be connected to the building structural steel system. This system should be installed by a certified lightning installer in full compliance with *ANSI/UL 96* and *ANSI/NFPA 768* or latest editions, and have a UL Master Label when completed. Coordinate with College for selection of air terminal type and fastening method.
- K. **Commissioning:** Commissioning of all electrical systems shall be included in the project commissioning scope. For further information see the *Instructions to the Consultant* section of the *Part 2 Facility Construction Program* which is incorporated in the *Request for Proposal* for the specific project.
- L. **Questions:** Contact Montgomery College's Office of Facilities & Public Safety at 240-567-5363 if there are any questions regarding electrical systems or the standards for these systems.

#### 5.16. GENERAL COMMUNICATIONS SYSTEMS STANDARDS

- A. **General:** All communication systems are to be integrated with the existing campus systems and be constructed to accommodate anticipated upgrades to the campus systems. The current Montgomery College Utilities Master Plan and IT Master Plan documents include extensive detail regarding existing and proposed systems in the area of the proposed project, and are to be consulted as reference documents for the planning and design of the project.
- B. **IT Standards:** All cabling materials, products and work, and all work at MDF and IDF Communications Rooms is to comply with the current ***Voice/Data/Video Cabling MDF/IDF Communications Room Standard*** document, issued by the Montgomery College Office of Information Technology. The Office of Facilities & Public Safety will provide the current version of this standards document to the design team, upon request. *Layouts for equipment racks in IDF and MDF rooms are to be provided by the College. No racks are to be installed until a College approved layout has been provided, and confirmed in the field.*
- C. **AV Standards:** All Audio Visual materials, products and work is to comply with the current version of the ***Montgomery College Audio Visual Standards***, issued by the Montgomery College Office of Information Technology. The Office of Facilities will provide the current version of this standards document to the design team, upon request.  
**Smart Instructor Work Station (SIWS):** The Smart Instructor Work Station that is used at Classrooms, Computer Classrooms and other instructional spaces is to be designed per the current version of the "MC Smart Instructor Work Station Standards." The Office of Facilities & Public Safety will provide the current version of this standards document to the design team. *Coordinate with the College for requirements for special construction needed at locations for ceiling mounted projectors, to carry and stabilize the equipment and mount.*  
**MCTV Connectivity:** Connection panels and cabling for operation of MCTV cameras, and simultaneous viewing of MCTV broadcast may be required in this project. The Office of Facilities will provide the current version of this standards document to the design team, upon request.
- D. **Emergency Responder Radio Coverage:** The Montgomery County Department of Permitting Services (DPS) publishes the current requirements for emergency responder radio coverage within certain public buildings. These regulations apply to all buildings on Montgomery College campuses, and generally in-building amplification systems are needed, to achieve the required radio coverage. Refer to the current version of the DPS document "Emergency

Responder Radio Coverage, In-Building Radio Signal Amplification System Standard" for the applicable requirements for systems and performance.

- E. **Commissioning:** Commissioning of all communication systems shall be included in the project commissioning scope.
- F. **Questions:** Contact Montgomery College's Office of Facilities & Public Safety at 240-567-5363 if there are any questions regarding communication systems or the standards for these systems.

#### 5.17. GENERAL ELECTRONIC SAFETY AND SECURITY SYSTEMS STANDARDS

- A. **General:** All communication systems are to be integrated with the existing campus systems and be constructed to accommodate anticipated upgrades to the campus systems. The current Montgomery College Utilities Master Plan and IT Master Plan documents include extensive detail regarding existing and proposed systems in the area of the proposed project, and are to be consulted as reference documents for the planning and design of the project.
- B. **Emergency Notification System:** *New technical standards for MC's emergency/mass notification system are in development. Coordinate with the College for the up to date standards for the emergency management system and the fire alarm system.*
- C. **Security System:** A conduit, back box, and cable system shall be installed per the College's standard system and manufacturer's requirements for any security system equipment and devices. At a minimum, the following system elements should be considered by the A/E and evaluated for their applicability: closed circuit television surveillance, electrically operated locks at ground level stairwell exit doors, electrical security device at each desktop computer in computer labs, intrusion alarm systems at areas subject to break-in, and proximity/card access systems to control access to various parts of the building and ground floor entrances (with door contact/door position switch at all doors on the systems). Monitoring of alarms shall be within the Office of Safety and Security. Any inter-connection between a building security system and an external monitor shall be designed in coordination with the College. The basis of design for security software should be Infographics. See Technical Sections **281300 Access Control** and **282300 Video Surveillance** for further information.
- D. **Emergency "Blue" Phone System:** Exterior emergency phones are to be model #RR73 "one button phone model" by Ramtel, on a Ramtel PLC-8 stainless steel column, with a 906 backbox/enclosure, for a flush mount bezel. *Interior emergency phones are to be Ramtel model RR733 with a 906 Back Box. Specify model RR733-906 for correct phone and backbox/enclosure, for exterior and interior phones. Indicate, in construction documents, the concrete base that is required: 3'-6" tall, 1'-8" square, top at 4" above surrounding grade, or ¾" above adjacent paving (if paving on all sides), with ¾" bevel at top edges.*
- E. **Commissioning:** Commissioning of all electronic safety and security systems shall be included in the project commissioning scope.
- F. **Questions:** Contact Montgomery College's Office of Facilities & Public Safety at 240-567-5363 if there are questions regarding electronic safety and security systems or the standards for these systems.

**PART 6 – TECHNICAL NOTES AND STANDARDS****PART 6: TECHNICAL STANDARDS****6.1 Technical Notes (in CSI category sequence):**

- 02 00 00 Existing Conditions (reserved)**
- 03 00 00 Concrete (reserved)**
- 04 00 00 Masonry (reserved)**
- 05 00 00 Metals (reserved)**
- 06 00 00 Wood, Plastics, and Composites (reserved)**
- 07 00 00 Thermal and Moisture Protection (reserved)**
- 08 00 00 Openings (reserved)**
- 09 00 00 Finishes (reserved)**
- 10 00 00 Specialties (reserved)**
- 11 00 00 Equipment (reserved)**
- 12 00 00 Furnishings (reserved)**
- 13 00 00 Special Construction (reserved)**
  
- 14 00 00 Conveying Equipment**
  - 14 06 00 Schedules for Conveying Equipment**
    - 14 06 20 Schedules for Elevators
      - 14 06 20.13 Elevator Equipment Schedule
  - 14 08 00 Commissioning of Conveying Equipment**
    - 14 08 20 Commissioning of Elevators
  - 14 20 00 Elevators**
    - 14 21 00 Electric Traction Elevators**
      - 14 21 13 Electric Traction Freight Elevator
        - No MRLs
    - 14 24 00 Hydraulic Elevators**
      - 14 24 13 Hydraulic Freight Elevators
      - 14 24 23 Hydraulic Passenger Elevators
    - 14 27 00 Custom Elevator Cabs and Doors**
      - 14 27 13 Custom Elevator Cab Finishes
      - 14 27 16 Custom Elevator Doors
    - 14 28 00 Elevator Equipment and Controls**
      - Non-proprietary – College’s elevator consultant must be part of contract
      - 14 28 16 Elevator Controls
      - 14 28 19 Elevator Equipment
        - 14 28 19.13 Elevator Safety Equipment
        - 14 28 19.16 Elevator Hoistway Equipment
  
- 21 00 00 Fire Suppression (reserved)**
- 22 00 00 Plumbing (reserved)**
  
- 23 00 00 Heating, Ventilating, and Air Conditioning (HVAC) (reserved)**
  - 23 01 00 Operation and Maintenance of HVAC Systems**

**PART 6 – TECHNICAL NOTES AND STANDARDS**

- 23 01 10 Operation and Maintenance of Facility Fuel Systems
  - *Confirm need – only one MC building has such a system*
- 23 01 20 Operation and Maintenance of HVAC Piping and Pumps
- 23 01 30 Operation and Maintenance of HVAC Air Distribution
  - 23 01 30.51 HVAC Air-Distribution System Cleaning
    - *Never*
- 23 01 50 Operation and Maintenance of Central Heating Equipment
- 23 01 60 Operation and Maintenance of Central Cooling Equipment
- 23 01 60.71 Refrigerant Recovery/Recycling
- 23 01 70 Operation and Maintenance of Central HVAC Equipment
- 23 01 80 Operation and Maintenance of Decentralized HVAC Equipment
- 23 01 90 Diagnostic Systems for HVAC

**23 05 00 Common Work Results for HVAC**

- 23 05 05 Selective Demolition for Heating, Ventilating, and Air Conditioning (HVAC)
- 23 05 13 Common Motor Requirements for HVAC Equipment
  - *Premium Efficiency, Inverter Duty*
- 23 05 16 Expansion Fittings and Loops for HVAC Piping
- 23 05 17 Sleeves and Sleeve Seals for HVAC Piping
  - *Link Seal*
- 23 05 19 Meters and Gages for HVAC Piping
  - *Pressure gauges, isolation valves, snubbers*
  - *Temperature gauges, self-powered solar digital, Weiss*
- 23 05 23 General-Duty Valves for HVAC Piping
  - *¾"-2" – full port ball valve*
  - *2.5 – larger – high performance, full lug body butterfly – Dezurik, Keystone*
- 23 05 29 Hangers and Supports for HVAC Piping and Equipment
  - *Vibration isolation*
- 23 05 33 Heat Tracing for HVAC Piping
- 23 05 48 Vibration and Seismic Controls for HVAC
  - *Analysis*
- 23 05 53 Identification for HVAC Piping and Equipment
- 23 05 93 Testing, Adjusting, and Balancing for HVAC

**23 06 00 Schedules for HVAC**

- 23 06 10 Schedules for Facility Fuel Service Systems
- 23 06 20 Schedules for HVAC Piping and Pumps
  - 23 06 20.13 Hydronic Pump Schedule
    - *Bell & Gossett*
    - *See College Standard Base Mounted Pump Configuration*
    - *Flex Connectors -*
- 23 06 30 Schedules for HVAC Air Distribution
  - 23 06 30.13 HVAC Fan Schedule
    - *Fan Wall*
  - 23 06 30.16 Air Terminal Unit Schedule
    - *Non-fan powered, hydronic re-heat, Titus or Nailor*
  - 23 06 30.19 Air Outlet and Inlet Schedule
    - *Coanda effect diffusers*

**PART 6 – TECHNICAL NOTES AND STANDARDS**

- 23 06 30.23 HVAC Air Cleaning Device Schedule
  - *MERV 13 Camfil with local Magnahelic & BAS monitoring.*
- 23 06 50 Schedules for Central Heating Equipment
  - 23 06 50.13 Heating Boiler Schedule
    - *New boilers?*
- 23 06 60 Schedules for Central Cooling Equipment
  - *Carrier*
  - *Frick*
  - *Tecochill*
  - 23 06 60.13 Refrigerant Condenser Schedule
  - 23 06 60.16 Packaged Water Chiller Schedule
    - *Carrier*
    - *Frick*
    - *Tecochill*
- 23 06 70 Schedules for Central HVAC Equipment
  - 23 06 70.13 Indoor, Central-Station Air-Handling Unit Schedule
  - 23 06 70.16 Packaged Outdoor HVAC Equipment Schedule
- 23 06 80 Schedules for Decentralized HVAC Equipment
  - 23 06 80.13 Decentralized Unitary HVAC Equipment Schedule
    - *RTUs – TMI, etc.*
    - *Mitsubishi splits or VRF systems.*
  - 23 06 80.16 Convection Heating and Cooling Unit Schedule
  - 23 06 80.19 Radiant Heating Unit Schedule
    - *Underfloor – Taco Xpump Block, Rehau*

**23 07 00 HVAC Insulation**

- 23 07 13 Duct Insulation
  - *See duct spec.*
- 23 07 16 HVAC Equipment Insulation
- 23 07 19 HVAC Piping Insulation
  - *Interior - Fiberglas, vapor barrier, formed PVC jacket*
  - *Exterior - Fiberglas, vapor barrier, formed Aluminum jacket*

**23 08 00 Commissioning of HVAC****23 09 00 Instrumentation and Control for HVAC**

- 23 09 13 Instrumentation and Control Devices for HVAC
  - *Reliable as represented by Pritchett Controls*
- 23 09 13.13 Actuators and Operators
  - *Belimo*
  - *Belimo Energy Valve*
- 23 09 13.23 Sensors and Transmitters
- 23 09 13.33 Control Valves
  - *Belimo*
  - *Belimo Energy Valve*
- 23 09 13.43 Control Dampers
  - *Stainless steel lip and edge seals*

**PART 6 – TECHNICAL NOTES AND STANDARDS**

- *Oil-lite Brass Bushings*
- *Opposing blade*
- 23 09 23 Direct-Digital Control System for HVAC
  - 23 9 23.11 Control Valves
    - *Belimo*
    - *Belimo Energy Valves*
  - 23 09 23.12 Control Dampers
    - *Stainless steel lip and edge seals*
    - *Oil-lite Brass Bushings*
    - *Opposing blade*
    - *Ruskin*
  - 23 09 23.13 Energy Meters
    - *Onicon-BACNet*
  - 23 09 23.14 Flow Instruments
    - a. *Onicon*
- 23 09 93 Sequence of Operations for HVAC Controls
  - 23 09 93.11 Sequence of Operation for HVAC DDC

**23 10 00 Facility Fuel Systems****23 11 00 Facility Fuel Piping****23 12 00 Facility Fuel Pumps****23 13 00 Facility Fuel-Storage Tanks****23 20 00 HVAC Piping and Pumps****23 21 00 Hydronic Piping and Pumps**

- 23 21 13 Hydronic Piping
  - 23 21 13.13 Underground Hydronic Piping
    - *Permapipe*
  - 23 21 13.23 Aboveground Hydronic Piping
    - *Carbon Steel, Schedule 40, A53 Grade B, Welded no Victaulic for dynamic systems.*
- 23 21 16 Hydronic Piping Specialties
- 23 21 23 Hydronic Pumps
  - 23 21 23.13 In-Line Centrifugal Hydronic Pumps
    - *Bell & Gossett*
  - 23 21 23.16 Base-Mounted, Centrifugal Hydronic Pumps
    - *Bell & Gossett*
  - 23 21 23.19 Vertical-Mounted, Double-Suction Centrifugal Hydronic Pumps
    - *Bell & Gossett*
  - 23 21 23.23 Vertical-Turbine Hydronic Pumps
  - 23 21 29 Automatic Condensate Pump Units
    - *Little Giant*

**23 22 00 Steam and Condensate Piping and Pumps****23 23 00 Refrigerant Piping****23 24 00 Internal-Combustion Engine Piping****23 25 00 HVAC Water Treatment**

**PART 6 – TECHNICAL NOTES AND STANDARDS**

## 23 25 13 Water Treatment for Closed-Loop Hydronic Systems

- *Campus Provider*
- *WSSC/COR sub-meter*
- *College sub-meter connected to DDC.*

## 23 25 33 HVAC Makeup-Water Filtration Equipment

**23 30 00 HVAC Air Distribution****23 31 00 HVAC Ducts and Casings**

## 23 31 13 Metal Ducts

## 23 31 13.13 Rectangular Metal Ducts

- *Duct-in-Duct Configuration, only allowed by approval*

## 23 31 13.16 Round and Flat-Oval Spiral Ducts

- *Duct-in-Duct Configuration – **This is the preferred duct***

## 23 31 13.19 Metal Duct Fittings

- *Factory installed, Flanged and bolted, NO slip connections.*

## 23 31 16 Nonmetal Ducts

- *Limited to 6' or less on discharge of terminal devices.*
- *Interior liner and exterior insulation individually banded to hard duct.*

**23 32 00 Air Plenums and Chases****23 33 00 Air Duct Accessories**

## 23 33 13 Dampers

## 23 33 13.13 Volume-Control Dampers

- *Ruskin*

## 23 33 13.16 Fire Dampers

## 23 33 13.19 Smoke-Control Dampers

## 23 33 13.23 Backdraft Dampers

- *Actuated dampers only, no gravity.*

## 23 33 19 Duct Silencers

## 23 33 23 Turning Vanes

- *Airfoil vanes only*

## 23 33 33 Duct-Mounting Access Doors

- *Ductmate/ductmate style – non hinge -*

## 23 33 38 Duct Security Bars

## 23 33 46 Flexible Ducts

- *Limited to 6' or less on discharge of terminal devices.*
- *Interior liner and exterior insulation individually banded to hard duct.*

## 23 33 53 Duct Liners

- *No exposed duct liners*

**23 34 00 HVAC Fans****23 35 00 Special Exhaust Systems**

## 23 35 16 Engine Exhaust Systems

- *Low sound silencers*

**PART 6 – TECHNICAL NOTES AND STANDARDS****23 36 00 Air Terminal Units**

23 36 13 Constant-Air-Volume Units

23 36 16 Variable-Air-Volume Units

- *Titus, Nailor, non-fan powered, hydronic re-heat all boxes.*

**23 37 00 Air Outlets and Inlets**

23 37 13 Diffusers, Registers, and Grilles

- *Titus - Coanda*

23 37 13.43 Security Registers and Grilles

23 37 23.13 HVAC Gravity Dome Ventilators

- *Actuated dampers only, no gravity.*

23 37 23.16 HVAC Gravity Louvered-Penthouse Ventilators

- *Actuated dampers only, no gravity.*

23 37 23.19 HVAC Gravity Upblast Ventilators

- *Actuated dampers only, no gravity.*

**23 38 00 Ventilation Hoods****23 40 00 HVAC Air Cleaning Devices****23 43 00 Electronic Air Cleaners****23 50 00 Central Heating Equipment****23 51 00 Breechings, Chimneys, and Stacks****23 52 00 Heating Boilers**

23 52 16 Condensing Boilers

23 52 16.13 Stainless-Steel Condensing Boilers

- *Fulton*

**23 53 00 Heating Boiler Feedwater Equipment****23 54 00 Furnaces****23 55 00 Fuel-Fired Heaters****23 56 00 Solar Energy Heating Equipment****23 57 00 Heat Exchangers for HVAC**

23 57 19.13 Plate-Type, Liquid-to-Liquid Heat Exchangers

23 57 19.16 Shell-Type, Liquid-to-Liquid Heat Exchangers

**23 60 00 Central Cooling Equipment****23 61 00 Refrigerant Compressors**

23 61 13 Centrifugal Refrigerant Compressors

23 61 13.13 Non-Condensable Gas Purge Equipment

23 61 16 Reciprocating Refrigerant Compressors

23 61 19 Scroll Refrigerant Compressors

23 61 23 Rotary-Screw Refrigerant Compressors

**23 62 00 Packaged Compressor and Condenser Units**

23 62 13 Packaged Air-Cooled Refrigerant Compressor and Condenser Units

23 62 23 Packaged Water-Cooled Refrigerant Compressor and Condenser Units

**PART 6 – TECHNICAL NOTES AND STANDARDS**

23 62 46 Packaged Variable-Refrigerant-Flow Air-Conditioning Systems

**23 63 00 Refrigerant Condensers**

23 63 13 Air-Cooled Refrigerant Condensers

23 63 23 Water-Cooled Refrigerant Condensers

23 63 33 Evaporative Refrigerant Condensers

**23 64 00 Packaged Water Chillers**

23 64 16 Centrifugal Water Chillers

- *See CT building – ( high efficiency at lower loads)*

23 64 16.16 Water-Cooled Centrifugal Water Chillers

23 64 26 Rotary-Screw Water Chillers

23 64 26.16 Water-Cooled, Rotary-Screw Water Chillers

**23 65 00 Cooling Towers**

23 65 14 Induced-Draft Cooling Towers

- *BAC only*

23 65 14.14 Open-Circuit, Induced-Draft Crossflow Cooling Towers

**23 70 00 Central HVAC Equipment****23 71 00 Thermal Storage**

23 71 19 Ice Storage

- *BAC only*

23 71 19.16 External Ice-on-Coil Thermal Storage

**23 72 00 Air-to-Air Energy Recovery Equipment**

23 72 13 Heat-Wheel Air-to-Air Energy-Recovery Equipment

23 72 16 Heat-Pipe Air-to-Air Energy-Recovery Equipment

**23 73 00 Indoor Central-Station Air-Handling Units**

23 73 13 Modular Indoor Central-Station Air-Handling Units

23 73 23 Custom Indoor Central-Station Air-Handling Units

23 73 33 Indoor Indirect Fuel-Fired Heating and Ventilating Units

23 73 33.13 Indoor Indirect Oil-Fired Heating and Ventilating Units

23 73 33.16 Indoor Indirect Gas-Fired Heating and Ventilating Units

23 73 39 Indoor, Direct Gas-Fired Heating and Ventilating Units

**23 74 00 Packaged Outdoor HVAC Equipment**

23 74 13 Packaged, Outdoor, Central-Station Air-Handling Units

23 74 16 Packaged Rooftop Air-Conditioning Units

23 74 16.11 Packaged, Small-Capacity, Rooftop Air-Conditioning Units

23 74 16.12 Packaged, Intermediate-Capacity, Rooftop Air-Conditioning Units

23 74 16.13 Packaged, Large-Capacity, Rooftop Air-Conditioning Units

23 74 23 Packaged, Outdoor, Heating-Only Makeup-Air Units

23 74 23.13 Packaged, Direct-Fired, Outdoor, Heating-Only Makeup-Air Units

23 74 23.16 Packaged, Indirect-Fired, Outdoor, Heating-Only Makeup-Air Units

23 74 33 Dedicated Outdoor-Air Units

**PART 6 – TECHNICAL NOTES AND STANDARDS****23 75 00 Custom-Packaged Outdoor HVAC Equipment**

- 23 75 13 Custom-Packaged, Outdoor, Central-Station Air-Handling Units
- 23 75 16 Custom-Packaged, Rooftop Air-Conditioning Units
- 23 75 23 Custom-Packaged, Outdoor, Heating and Ventilating Makeup-Air Units
- 23 75 33 Custom-Packaged, Outdoor, Heating and Cooling Makeup Air-Conditioners

**23 76 00 Evaporative Air-Cooling Equipment****23 80 00 Decentralized HVAC Equipment****23 81 00 Decentralized Unitary HVAC Equipment**

- 23 81 13 Packaged Terminal Air-Conditioners
  - 23 81 13.11 Packaged Terminal Air-Conditioners, Through-Wall Units
  - 23 81 13.12 Packaged Terminal Air-Conditioners, Freestanding Units
  - 23 81 13.13 Packaged Terminal Air-Conditioners, Outdoor, Wall-Mounted Units
- 23 81 16 Room Air-Conditioners
- 23 81 19 Self-Contained Air-Conditioners
  - 23 81 19.13 Small-Capacity Self-Contained Air-Conditioners
  - 23 81 19.16 Large-Capacity Self-Contained Air-Conditioners
- 23 81 23 Computer-Room Air-Conditioners
  - 23 81 23.11 Small-Capacity, Computer-Room Air-Conditioners, Floor Mounted Units
  - 23 81 23.12 Large-Capacity, Computer-Room Air-Conditioners, Floor-Mounted Units
  - 23 81 23.13 Computer-Room Air-Conditioners, Ceiling Mounted Units
  - 23 81 23.14 Computer-Room Air-Conditioners, Console Units
  - 23 81 23.16 Computer-Room Air-Conditioners, Rack Mounted, Space-Cooling Units
  - 23 81 23.18 Computer-Room, Rack-Cooling Equipment
- 23 81 26 Split-System Air-Conditioners
  - 23 81 26.13 Small-Capacity Split-System Air-Conditioners
  - 23 81 26.16 Large-Capacity Split-System Air-Conditioners
- 23 81 29 Variable Refrigerant Flow HVAC Systems
- 23 81 43 Air-Source Unitary Heat Pumps
- 23 81 46 Water-Source Unitary Heat Pumps
- 23 81 49 Ground-Source Unitary Heat Pumps

**23 82 00 Convection Heating and Cooling Units**

- 23 82 19 Fan Coil Units
- 23 82 26 Induction Units
- 23 82 29 Radiators
- 23 82 33 Convectors
- 23 82 36 Finned-Tube Radiation Heaters
- 23 82 39 Unit Heaters
  - 23 82 39.13 Cabinet Unit Heaters
  - 23 82 39.16 Propeller Unit Heaters
  - 23 82 39.19 Wall and Ceiling Unit Heaters
- 23 82 41 Water-to-Water Heat Pumps

**23 83 00 Radiant Heating Units**

**PART 6 – TECHNICAL NOTES AND STANDARDS****23 84 00 Humidity Control Equipment**

23 84 19 Desiccant Dehumidification Units

**25 00 00 Integrated Automation (reserved)****26 00 00 Electrical Standards****26 01 00 Operation and Maintenance of Electrical Systems**

26 01 20 Operation and Maintenance of Low-Voltage Electrical Distribution

26 01 26 Maintenance Testing of Electrical Systems

26 01 30 Operation &amp; Maintenance of Facility Electrical Power Generating &amp; Storing Equipment

26 01 40 Operation and Maintenance of Electrical Protection Systems

26 01 40.13 Operation and Maintenance of Lightning Protection Systems

26 01 50 Operation and Maintenance of Lighting

26 01 50.51 Luminaire Relamping

26 01 50.81 Luminaire Replacement

**26 05 00 Common Work Results for Electrical**

26 05 05 Selective Demolition for Electrical

26 05 19 Low-Voltage Electrical Power Conductors and Cables

- *Copper – no Aluminum*

- *No taps/splices – all homeruns*

26 05 19.13 Undercarpet Electrical Power Cables

26 05 19.23 Manufactured Wiring Assemblies

26 05 23 Control-Voltage Electrical Power Cables

26 05 26 Grounding and Bonding for Electrical Systems

- *Building steel is not a path to ground*

- *All buses, copper or other, (e.g, used for IT) etc. shall have grounds running from the bus bar or other grounding connection point to the building ground in the building's electrical room.*

26 05 29 Hangers and Supports for Electrical Systems

- *In general: trapeze for conduit*

26 05 33 Raceway and Boxes for Electrical Systems

- *All steel*

- *No wireways*

- *Busways and ??????OK with approval.*

26 05 33.13 Conduit for Electrical Systems

- *Service entrance to panels – threaded IMC*

- *Panels to classroom/office/room interiors (generally to center of space) EMT with compression fittings only*

- *No quick connect*

- *¾ inch minimum*

26 05 33.16 Boxes for Electrical Systems

- *Steel*

26 05 33.23 Surface raceways for Electrical Systems

- *Wiremold*

26 05 36 Cable Trays for Electrical Systems

**PART 6 – TECHNICAL NOTES AND STANDARDS**

- 26 05 39 Underfloor Raceways for Electrical Systems
- 26 05 43 Underground Ducts and Raceways for Electrical Systems
- 26 05 44 Sleeves and Sleeve Seals for Electrical Raceways and Cabling
- 26 05 46 Poles for Electrical Systems
- 26 05 48 Vibration and Seismic Controls for Electrical Systems
  - 26 05 48.16 Seismic Controls for Electrical Systems
- 26 05 53 Identification for Electrical Systems
  - *Phenolic style with engraved name with rivet of SS screw attachment. Adhesive only when rigid not physically capable of application or desired to use*
- 26 05 73 Power System Studies
  - 26 05 73.13 Short-Circuit Studies
    - *Required*
  - 26 05 73.16 Coordination Studies
    - *Required*
  - 26 05 73.19 Arc-Flash Hazard Analysis
    - *Required*
  - 26 05 73.23 Load Flow Studies
  - 26 05 73.26 Stability Studies
  - 26 05 73.29 Harmonic-Analysis Studies
- 26 05 76 Photometric Studies
- 26 05 83 Wiring Connections

**26 06 00 Schedules for Electrical**

- 26 06 20 Schedules for Low-Voltage Electrical Distribution
  - 26 06 20.13 Electrical Switchboard Schedule
  - 26 06 20.16 Electrical Panelboard Schedule
  - 26 06 20.19 Electrical Motor-Control Center Schedule
  - 26 06 20.23 Electrical Circuit Schedule
  - 26 06 20.26 Wiring Device Schedule
- 26 06 30 Schedules for Facility Electrical Power Generating and Storing Equipment
- 26 06 40 Schedules for Electrical Protection Systems
- 26 06 50 Schedules for Lighting
  - 26 06 50.13 Lighting Panelboard Schedule
  - 26 06 50.16 Lighting Fixture Schedule

**26 08 00 Commissioning of Electrical Systems****26 09 00 Instrumentation and Control for Electrical Systems**

- 26 09 13 Electrical Power Monitoring
  - *At service entrance and additional as required*
- 26 09 15 Peak Load Controllers
- 26 09 16 Electrical Controls and Relays
- 26 09 19 Enclosed Contactors
- 26 09 23 Lighting Control Devices
- 26 09 26 Lighting Control Panel boards
  - *Main breaker*
  - *20A min circuit brkr*
  - *Bolt on Circuit brkr*
  - *Circuit brkr AIC match main (fully rated)*

**PART 6 – TECHNICAL NOTES AND STANDARDS**

- 26 09 33.13 Multichannel Remote-Controlled Dimmers
  - *In general we avoid complex lighting control (digital)*
- 26 09 33.16 Remote-Controlled Dimming Stations
- 26 09 36 Modular Dimming Controls
  - 26 09 36.13 Manual Modular Dimming Controls
  - 26 09 43.13 Digital-Network Lighting Controls
    - *Existing BAS system*
  - 26 09 43.16 Addressable Luminaire Lighting Controls
    - *Try to avoid*
  - 26 09 43.19 Wireless Network Lighting Controls
    - *Try to avoid*
  - 26 09 43.23 Relay-Based Lighting Controls
- 26 09 61 Theatrical Lighting Controls
  
- 26 20 00 Low-Voltage Electrical Distribution**
  
- 26 21 00 Low-Voltage Electrical Service Entrance**
  - 26 21 16 Low-Voltage Underground Electrical Service Entrance
    - *Spares are preferred*
  
- 26 22 00 Low-Voltage Transformers**
  - 26 22 13 Low-Voltage Distribution Transformers
    - *K=All copper*
    - *Meet DOE 2016 standard*
    - *85° C temp rise*
  
- 26 23 00 Low-Voltage Switchgear**
  - 26 23 13 Paralleling Low-Voltage Switchgear
  
- 26 24 00 Switchboards and Panelboards**
  - 26 24 13 Switchboards
    - *Eaton*
    - *Square D*
    - *Include metering*
    - *Probably 2 -3 MDP blanks*
  - 26 24 16 Panelboards
    - *Same as Service Entrance*
  - 26 24 16.16 Electronically Operated Circuit-Breaker Panelboards
  - 26 24 19 Motor-Control Centers
  
- 26 25 00 Low-Voltage Enclosed Bus Assemblies**
  - 26 25 13 Low-Voltage Busways
  
- 26 27 00 Low-Voltage Distribution Equipment**
  - 26 27 13 Electricity Metering
    - *BacNet*
  - 26 27 16 Electrical Cabinets and Enclosures
  - 26 27 19 Multi-Outlet Assemblies
  - 26 27 23 Indoor Service Poles

**PART 6 – TECHNICAL NOTES AND STANDARDS**

- 26 27 26 Wiring Devices
- 26 27 33 Power Distribution Units
- 26 27 73 Door Chimes

**26 28 00 Low-Voltage Circuit Protective Devices**

- 26 28 13 Fuses
- 26 28 16 Enclosed Switches and Circuit Breakers
  - 26 28 16.13 Enclosed Circuit Breakers
    - *Match manufacturer*
  - 26 28 16.16 Enclosed Switches

**26 29 00 Low-Voltage Controllers**

- 26 29 13 Enclosed Controllers
  - 26 29 13.13 Across-the-Line Motor Controllers
    - *See College's electronic motor starter list*
  - 26 29 13.16 Reduced-Voltage Motor Controllers
- 26 29 23 Variable-Frequency Motor Controllers
  - *ABB ACH 550*
- 26 29 33 Controllers for Fire Pump Drivers
  - 26 29 33.13 Full-Service Controllers for Fire Pump Electric-Motor Drivers
  - 26 29 33.16 Limited-Service Controllers for Fire Pump Electric-Motor Drivers
  - 26 29 33.19 Controllers for Fire Pump Diesel Engine Drivers

**26 30 00 Facility Electrical Power Generating and Storing Equipment****26 31 00 Photovoltaic Collectors****26 32 00 Packaged Generator Assemblies**

- 26 32 13 Engine Generators
  - *PEPCO provides 460V service – not 480V*
- 26 32 13.13 Diesel-Engine-Driven Generator Sets
  - *MTU - Baltimore*
- 26 32 23.13 Horizontal-Axis Wind Turbines
- 26 32 23.16 Vertical-Axis Wind Turbines

**26 33 00 Battery Equipment**

- 26 33 23.13 Central Battery Equipment for Emergency Lighting
  - *Myers Power Products- Pennsylvania*

**26 36 00 Transfer Switches**

- 26 36 23 Automatic Transfer Switches
  - *Four wire*

**26 40 00 Electrical Protection****26 41 00 Facility Lightning Protection**

- *Master Label Certification*
- *Aluminum air terminal is OK if flashing is Aluminum. However, the roof loop should be copper with copper downleads concealed within the building*

**PART 6 – TECHNICAL NOTES AND STANDARDS**

26 41 13 Lightning Protection for Structures  
 26 41 13.13 Lightning Protection for Buildings

**26 43 00 Surge Protective Devices**

26 43 13 Surge Protective Devices for Low-Voltage Electrical Power Circuits

**26 50 00 Lighting****26 51 00 Interior Lighting**

26 51 19 LED Interior Lighting

- *Blackbody temp = 3500° K*
- *See Colleges list of approved/suggested fixtures*
- *Point by Point required for typical classrooms, offices and untypical spaces.*
- *Built-in dimming*
- *In general – no cans – if cans, then no smaller than eight inches in diameter*
- *Cans not used for general lighting in an area*
- *No direct view LEDs anywhere – interior/exterior*
- *Occupancy sensors – no vacancy sensor mode*
- *No building wide central lighting control/monitoring*
- *Dual technology OS – infra-red/ultrasonic*
- *Local office/classroom control – Wattstopper*

**26 52 00 Safety Lighting**

26 52 13 Emergency and Exit Lighting

26 52 13.13 Emergency Lighting

- *No battery – all on generator*

26 52 13.16 Exit Signs

- *See College's list of approved fixtures*

**26 55 00 Special Purpose Lighting**

26 55 53 Security Lighting

- *White security lighting in the hallway – stairway, etc., lighting always on – no OS control on these.*
- *Exit egress lighting on building's emergency photo cell*

**26 56 00 Exterior Lighting**

26 56 13 Lighting Poles and Standards

- *Powder coated*

26 56 19 LED Exterior Lighting

- *Manufacturers: KIM for parking lots –AAL for interior/campus lighting – see College standards-both are Hubbell companies. We have standard fixtures for these applications*
- *No direct view LEDs*
- *Blackbody temp = 4000° K*

**27 00 00 Communications (reserved)**

**28 00 00 Electronic Safety and Security (reserved)**

**31 00 00 Earthwork (reserved)**

**32 00 00 Exterior Improvements (reserved)**

**33 00 00 Utilities (reserved)**

**PART 6 – TECHNICAL NOTES AND STANDARDS**

**6.2 Technical Standards**

075200 – Low Slope Roofing

275100 – Distributed Audio-Visual Communication – Emergency Call Box

281300 – Access Control

282300 – Video Surveillance

283111 – Addressable Fire Detection & Alarm System

## SECTION 075200 - LOW-SLOPE ROOFING

### 1. GENERAL

- A. Owner Project Requirements:** see the *Roof Systems and Roof-related Systems* section of *Part 5: Owner's Building Construction Requirements* of this *College Design Standards* document for additional information related to low-slope roofing.
- B. The roofing installation includes the following materials:**
1. Two-ply, modified bituminous roofing.
  2. Roofing insulation.
  3. SBS Base Sheet.
  4. SBS Cap Sheet.
  5. Walkways.
- C. Performance Requirements**
1. General: Install a watertight, modified bituminous membrane roofing and base flashing system with compatible components that will not permit the passage of liquid water and will withstand wind loads, thermally induced movement, and exposure to weather without failure. On low slope roofs of slopes greater than 2 inches per foot, all felt plies shall be back nailed. The system shall consist of four plies of roofing felts alternately placed, overlapped and saturated with hot asphalt bitumen. Gravel surfacing to be set in hot asphalt. Steep roofing asphalt shall conform to ASTM D-312.
  2. FM Listing: Provide modified bituminous membrane, base flashings, and component materials that meet requirements of FM-4450 and FM-4470 as part of a roofing system and that are listed in FM's "Approval Guide" for Class-1 or noncombustible construction, as applicable. Identify materials with FM markings.
  3. Roofing system shall comply with the following:
    - a. Fire/Windstorm Classification: Class-1A-690
    - b. Hail Resistance Rating: MH
  4. Roofing System Design: Provide a roofing system that complies with roofing system manufacturer's written design instructions.
- D. Warranty**
1. The roofing system shall be covered by a 20 year Total System, No Dollar Limit (NDL) Warranty and must include all flashings and sheet-metal work. All materials and workmanship are to be fully guaranteed by the roofing manufacturer issuing the warranty. All materials must be manufactured by the manufacturer who is to supply the warranty. Any materials that are not made by the Roofing Materials Manufacturer but submitted for approval must be accompanied by a letter from the Roofing Materials Manufacturer issuing the 20 year NDL warranty, stating that this material is suitable for use with their system and fully covered under their 20 year NDL warranty.
  2. Insulation materials shall be considered an integral component of the roofing system, shall be furnished or approved by the roofing system manufacturer and shall be covered fully by the roofing system warranty.

### 2. PRODUCTS

- A. Basis-of-Design Product:** Subject to compliance with requirements, provide Firestone Building Products or comparable product by one of the following:
1. SBS-Modified Bituminous Roofing System:
    - a. Siplast Roofing Systems
    - b. Tremco Incorporated
  2. Polyisocyanurate Board Insulation:

- a. CertainTeed Corp.
- b. Atlas Insulation Co.
3. Rubber Walkpad Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Roof Gard Pads by Humane Equipment Company.
  - b. Permagard Rubber Roof Protection Pads by Evans Product Company.

#### **B. SBS-Modified Bitumen Sheets**

1. SBS-Modified Bituminous Sheet, Base Surfaced: SBS-modified asphalt sheet, smooth surfaced, dusted with fine parting agent on both sides; suitable for application method specified; manufacturer's standard thickness and weight; for use and of reinforcing type as follows:
  - a. Use: Base ply of 2-ply, modified bituminous membrane roofing.
  - b. Reinforcing: Glass-fiber mesh or non-woven glass-fiber mat.
2. SBS FR-Modified Bituminous Sheet, Mineral Surfaced: SBS-modified asphalt sheet, with continuous layer of mineral granules factory applied to top exposed surface; suitable for application method specified; with physical properties and for use with reinforcing type and granule color as follows:
  - a. Use: Finish ply of 2-ply, modified bituminous membrane roofing and base flashing.
  - b. Reinforcing: Non-woven polyester with glass fiber reinforcing in machine direction.
  - c. Granule Color: White, high albedo.

#### **C. Auxiliary Membrane Materials**

1. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with SBS-modified bituminous roofing.
  - a. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.
2. Asphalt Primer: ASTM-D-41.
3. Roofing Asphalt: ASTM-D-312, Type-IV.
4. Roofing Asphalt: ASTM-D-312, Type-IV, as recommended by modified bituminous membrane manufacturer.
5. Asphalt Roofing Cement: ASTM-D-4586, SBS modified asbestos free, of consistency required by roofing system manufacturer for application.
6. Mastic Sealant: Polyisobutylene, plain or modified bituminous, non-hardening, non-migrating, non-skinning, and non-drying.
7. Fasteners: Factory-coated steel fasteners complying with corrosion-resistance provisions of FM-4470; designed for fastening base flashings and acceptable to roofing system manufacturer.
8. Roofing Granules: Ceramic-coated roofing granules, No.-11 screen size with 100 percent passing No.-8 (2.36-mm) sieve and 98 percent of mass retained on No.- 40 (0.425-mm) sieve.
  - a. Color: White.
9. Glass-Fiber Fabric: Woven glass cloth, treated with asphalt; complying with ASTM-D-1668, Type-1.
10. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

**D. Walkways**

1. Walkway Pads: Reinforced asphaltic composition pads with slip-resisting mineral-granule surface, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, 3/4 inch thick, minimum.
  - a. Pad Size: 36x48 inches
2. Adjustable Pedestal Pavers:
  - a. Description: Concrete pavers mounted on adjustable supports.
  - b. Basis-of-design: Hanover Glacier White Precast Paver.
    - Size: Nominal 12 x 12 x 1-1/2.
  - c. Basis-of-design: Hanover Elevator System of adjustable supports

**E. Insulation Materials**

1. General: Provide preformed, roofing insulation boards that comply with requirements, selected from manufacturer's standard sizes.
  - a. Provide preformed, tapered insulation boards as needed for sloping to drain. Fabricate with the following taper:
    - 1/4 inch per 12 inches (1:48),
    - As indicated on Drawings.
  - b. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
2. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation with core formed by using HCFCs as blowing agents complying with ASTM-C-1289-02 with an LTTR R-Value of: 30 and a thickness of 5": classified by facer type as follows:
  - a. Facer Type: Type-II, felt or glass-fiber mat on both major surfaces.

**F. Insulation Accessories**

1. General: Furnish roofing insulation accessories recommended by roof system manufacturer for intended use and compatible with roofing material.
2. Cover Board: Factory primed, glass-fiber faced gypsum sheathing (Dens-Deck by Georgia-Pacific or approved equal) complying with ASTM-E-136, & E 84, 1/2 inch thick.

**G. Exclusions (reserved)****3. EXECUTION**

- A. Install modified bituminous membrane roofing system according to roofing system manufacturer's written instructions and applicable recommendations of NRCA/ARMA's "Quality Control Recommendations for Polymer Modified Bitumen Roofing."
- B. Install roofing system according to applicable specification plates of NRCA's "The NRCA Roofing and Waterproofing Manual."
- C. All low slope roofing systems shall include insulation. The majority of the insulating value shall be accomplished with the necessary thickness of flat poly-isocyanurate boards. Where necessary, roof slope shall be developed with tapered perlite board. Insulation material installed between the roof deck and the roof ply shall be compatible with the roof ply material and asphalt bitumen binder or other adhesive used in the roofing system. Organic insulation material shall not be used under built-up roofs. In all cases a minimum 1/2" cover board **must** be installed over the Isocyanurate insulation. Perlite and wood fiber are acceptable cover board materials. For new buildings the insulation value of the roof area envelope is to be a minimum of R-30 for low-slope roofs. Coordinate with College to determine the actual target R-value. For roof replacements/renovations on older buildings, a lower "R" value will be considered. The first ply of insulation systems over metal decks and wood decks shall be mechanically fastened using steel fasteners acceptable to the manufacturer furnishing

guarantee of roofing system. Insulation shall be applied in several layers, with the joints staggered, in accordance with the manufacturer's recommendations. Insulation shall also be installed in accordance with Factory Mutual System Class 120 wind uplift guidelines.

- D. Flashing is part of the roofing system and shall meet requirements of manufacturer furnishing roofing system. Where roof meets a parapet or adjacent building wall, the base flashing shall extend up the wall at least 8 inches, but generally not more than 14 inches unless necessary to be consistent with existing conditions or design requirements. If flashing height is greater than 14 inches, a 2 piece flashing system may be required. Other than base flashing - metal flashing, including expansion joint flashing, shall be in accordance with SMACNA Standards and the NRCA Roofing and Waterproofing Manual and fully covered under the 20 year 'NDL' warranty.
- E. Pitch pockets shall be avoided. Where that is not possible, pitch pockets shall be filled with a pourable urethane sealer. Roof penetrations will be flashed with preformed flexible flashing, using clamps and tents, unless the penetration is such a complex shape that
- F. A pitch pocket is required.
- G. All parapet walls must be covered with a metal coping cap over a "peel and stick" type modified bitumen membrane and any necessary wood blocking/nailers, etc.
- H. Roof drains shall be provided with shallow sumps, gravel stops, and minimum 4.0 pound lead flashing in accordance with the NRCA Roofing and Waterproofing Manual and the International Plumbing Code. Roof drains shall be located at the low points, and crickets must be provided between drains in structurally formed valleys and around any structure impeding the flow of water in the drain field to assure positive water flow to the drains.
- I. Roof drainage patterns should be designed to locate roof drains at the mid-points between columns and beams. Overflow scuppers should be provided through perimeter parapet walls, or overflow relief drains should be provided at roof drain locations, to relieve storm water build-up caused by clogged roof drains.
- J. Splash blocks shall be provided at all ground discharge points from exterior downspouts, or downspouts may discharge directly into a storm drainage systems.

## SECTION 275100 - DISTRIBUTED AUDIO-VISUAL COMMUNICATION - EMERGENCY CALL BOX

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes requirements for emergency call box units.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Ramtel – No Exceptions

#### 2.2 EXISTING SYSTEMS

- A. The emergency call box units provided under the scope of this project shall be completely integrated with the existing systems.

#### 2.3 EMERGENCY CALL BOX

##### A. General

1. The Emergency Call Box shall consist of an outdoor-rated, vandal resistant and ADA-compliant hands-free speakerphone communications device with a stainless steel faceplate and metal buttons.
2. The Emergency Call Box shall have one red anodized aluminum tactile button labeled "EMERGENCY" and one 0.375" diameter red light emitting diode (LED) labeled "LIGHT ON INDICATES CALL RECEIVED". The unit shall be programmable from a remote location and have a two number dialing capability, reverting to the second number if the first is busy or does not respond. The unit shall be totally hands-free on both sides after connection is initiated at site or by attendant. The unit shall be phone line powered, requiring no outside power source or battery back-up. DIP switch programming, push to talk devices, and devices requiring external power are not acceptable. The unit shall have a dedicated communication line.

##### B. Construction

1. Chassis, back box and face plate shall be constructed of stainless steel.
2. Faceplate shall be 12 gauge #4 brushed stainless steel measuring 9.5" W x 11.75" H.
3. Unit shall weigh approximately 8 lbs.
4. Signage shall be constructed of cast metal with lettering and Braille raised approximately 3/32" for ADA compliance.
5. Word "EMERGENCY" and button shall be red.
6. Push button and switch shall be a single assembly rated for 1,000,000 cycles.
7. Speaker and microphone shall be protected by non-ferrous metal screen to provide a barrier against vandalism, rain and snow.

##### C. Features

1. Unit shall be capable of operating on standard phone lines or analog PBX extensions.
2. Unit shall dial at approximately 10 tones per second.
3. Output sound level shall be greater than 80 dB at one meter for normal conversation.
4. All programming shall be stored in non-volatile EEPROM memory.
5. Button shall provide tactile feedback.
6. Unit shall be programmable from a remote telephone via keypad entry.
7. Call timer shall be programmable from 1 to 4320 minutes.
8. LED for the hearing impaired shall illuminate to indicate when calling party may speak (when receiving party is silent).
9. Unit shall be programmable with two different telephone numbers of up to 18 digits each including pauses. If first number does not answer or is busy, unit shall automatically call the second number. If that number is busy or does not answer, unit shall call the first number again. Unit shall continue alternating until call is answered or call timer limit is reached.

10. Unit shall include two auxiliary outputs and one auxiliary input that are opto-isolated from the telephone line to 1,000 volts. Outputs shall be activated, providing a dry contact closure, either automatically when Emergency Phone is activated or manually by guard keypad operation. Input shall allow unit to be activated by any device or switch that provides a contact closure.
11. Incoming and outgoing volume shall be adjustable separately.
12. Unit shall be capable of automatically notifying attendant of location via programmable 6 digit ID.
13. Unit shall be capable of silent monitoring.
14. Unit shall utilize tone dialing.
15. When call is finished, unit shall automatically shut off.
16. Unit shall answer any call placed to it from any other telephone.
17. Two levels of programmable passwords shall be available.
18. Unit shall be varistor lightening suppressed and full wave polarity guarded.
19. Unit shall have parallel tip and ring connected to an RJ-11 connector for quick installation.
20. Unit shall be compatible with RAMTEL's All Campus Alert System.
21. Unit shall comply with Part 68 of the FCC rules for the United States.

#### **D. Environmental**

1. Speaker: Unit shall have a 3.5 inch waterproof speaker with a vinyl-impregnated cloth cone. Magnet and solid aluminum voice coil area shall be protected from ferrous and non-ferrous particles by a special sealed design. The speaker shall be capable of operating without deterioration of sound quality after total immersion in water for 96 hours. Speaker shall operate at temperatures of -55°C to +85°C. Steel basket shall have a zinc dichromate finish for protection against corrosion.
2. Microphone: Unit shall include a gold, water-resistant microphone.
3. Push Button/Switch: Button and switch shall be a single assembly. Epoxy seals shall protect contacts and terminals from hostile environments and solder flux. Unit shall be waterproof and submergible to 3 feet in water. Unit shall have a mechanical life of 1,000,000 cycles. Case shall be moisture-proof, dust-tight and designed to accommodate the high shock military specifications of MIL-STD-202, method 207. Case shall be aluminum alloy, anodized clear. Button shall be red anodized aluminum. Switch shall be rated to operate from -55°C to +80°C.
4. PC boards and Other Electronic Components: Boards and components shall withstand a corrosive atmosphere of 90% H<sub>2</sub>S for 16 hours. PC boards shall be rated R4. Unit shall be designed to operate at temperatures from -20°C to +65°C and humidity levels up to 95% relative humidity at 49°C.
5. Protective Sealing of Completed PC Boards: Once the unit has been wave soldered and inspected and the completed boards tested, the entire circuit board apparatus shall be uniformly coated by dipping rather than spraying (Mil-I416058C amend 6). The microprocessor chip shall then be installed in its socket and sealed in place with a special electrical grade RTV type sealant. At this point the boards can be sprayed with water without affecting the operation of the unit.

#### **E. Electrical**

1. Unit shall be fully phone line powered, requiring no external power or battery back-up.
2. One dedicated, twisted-shielded communication pair shall provide a minimum of 24VDC and 20mA while off hook.

#### **F. Model**

1. The emergency call box shall be a Ramtel model RR-733

#### **G. Options**

1. Contractor shall provide custom silk screening of the Owner's logo and the words "Montgomery College" on each emergency call box faceplate. The specified

manufacturer has the College design template.

2. For indoor installations Contractor shall provide flush mount bezel produced by the call box manufacturer.

#### 2.4 WALKWAY LED

- A. Walkway LED devices are required only in special conditions and may not be required on the project. Coordinate with the College to determine whether or not there is a need, and on all aspects of the items below.
- B. Provide walkway LED illumination for indoor wall mounted call boxes with technical features as follows:
  1. Electrical:
    - a. 1W LED powered by 120V primary, 3W 350mA non-dimmable integral driver.
    - b. Input Current: 350mA
    - c. Input Voltage: 4V DC
    - d. Power Consumption: 1W
  2. Dimming: Dimmable with remote driver (not included). Consult factory.
  3. Weight: 0.99lbs (0.45kg).
  4. Material: 303 stainless steel and polycarbonate lens.
  5. Mounting: Mounts to standard 4" (102mm) octagonal box (1-1/2" (38mm) deep minimum) with flush mounted tamper proof screws.
  6. Approval: Dry locations. Approved to UL standards by CSA/US.
- C. Manufactured unit shall be MP Lighting L21 Walkway LED or approved equal.

#### 2.5 EMERGENCY CALL BOX TOWER MOUNT

- A. **Illumination**
  1. The tower mount has three (3) different lights.
    - a. Sodium Vapor Blue Light - A high intensity 50 watt light illuminates immediate area around the tower. The blue light is continuously lit.
    - b. Strobe Light - A one million candle power strobe housed in a blue Fresnel Lexan polycarbonate lens is provided. The strobe flashes continuously when the emergency call button is pushed and shuts off when the calling party hangs up.
    - c. Phone Panel Light - A five (5) watt fluorescent light illuminates the emergency call box face plate.
- B. **Construction**
  1. 0.25" thick non-rusting, non-magnetic stainless steel
  2. Dimensions - 9' x 11" sq.
  3. Weight - 175 lbs.
  4. Mounting - Four (4) 5/8" x 16" J-Bolts cast into a concrete footer.
  5. Color - Coordinate with Owner
  6. Finish - Powder Coat
  7. Graphics - "EMERGENCY" on all four sides
  8. Graphics Color - Coordinate with Owner
  9. Power - 120 VAC
- C. **Model**
  1. The emergency call box tower mount shall be a Ramtel model PLC-8
- D. **Options**
  1. Contractor shall provide the optional internal heating unit
  2. Contractor shall provide top-mount camera arm. Installed by Owner.

### PART 3 - EXECUTION

#### 3.1 INTERCOMMUNICATION SYSTEMS

- A. Installation:
  1. The Contractor shall install all system components including Owner furnished equipment, and appurtenances in accordance with the manufacturer's instructions, ANSI C2 and as shown, and shall furnish all necessary connectors, terminators, interconnections, services, and adjustments required for a complete and operable emergency communications

system. College will perform crossconnect to PBX to provide dial tone.

**B. Tamper Resistant Substations:**

1. The Contractor shall locate emergency call boxes where shown on the drawings. Provide tamper resistant center post torx screws for mounting the emergency call box units to the tower mounts.

**PART 4 - SYSTEM PROGRAMMING**

- 4.1 The College programs PBX, the vendor is responsible for programming RamTel unit per college direction.

END OF SECTION 275100

## SECTION 281300 – ACCESS CONTROL

### PART 1- GENERAL

#### 1.1 SUMMARY

- A. This Section includes access control devices to be connected to the Security Management System
- B. (SMS).
- C. **Access Control:**
  - 1. Regulating access through doors, gates, traffic-control bollards and others access controls as specified in drawing documents.
  - 2. Anti-passback where required.
  - 3. Surge and tamper protection.
  - 4. Secondary alarm annunciator.
  - 5. Card readers.
  - 6. Biometric identity verification equipment.
  - 7. Push-button switches.
  - 8. RS-232 ASCII Interface.
  - 9. Reporting.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. **Security Management System Software**
  - 1. GE Security Facility Commander
- B. **Security Management System Field Hardware**
  - 1. GE Security ACULX16 Network Intelligent Controller – No Exception
  - 2. GE Security Remote Reader Electronics – No Exception
- C. **Card Reader**
  - 1. *HID multiClass SE RP40 Proximity Card Reader – No Exception*
  - 2. *HID multiClass SE RP10 Mini Prox Reader*

#### 2.2 FACILITY COMMANDER ENTERPRISE EDITION SECURITY MANAGEMENT PLATFORM

- A. Security devices and hardware shall be integrated with the owner's existing Security Management system (SMS). The SMS server is located in the main MDF room of the Computer Science Center located on the Montgomery College, Rockville, MD campus. Security devices and hardware provided under this project shall communicate with the SMS server via the Owner's proprietary MC F-Net network. Network Intelligent Controllers shall be terminated at the Owner furnished, Contractor (by others) installed MC F-Net switches.
- B. The Contractor is responsible for providing all software licenses required to complete this work.

#### 2.3 NETWORK INTELLIGENT CONTROLLER

- A. **General:**
  - 1. The Networked Intelligent Controller (NIC) shall be a microprocessor-based device, which utilizes a 32-bit processor and a 32-bit bus structure. The controller shall have a minimum clock speed of 90 MHz, and shall be provided with at least 16 Mbytes of battery backed dynamic RAM. The controller shall feature a direct LAN/WAN connection to the controller bus structure in addition to two RS-232 or RS-485 connections, all of which should be designed for use in communication with the ACAM server. The communication architecture of the NIC shall be such that in the event that the primary communication channel to the ACAM server is lost, the unit shall be capable of automatically switching to a secondary communication channel using one of the host RS-232 or RS-485 connections,

- and if required shall be able to establish communications via dial-up modem.
2. The NIC shall be provided with a parallel printer port, which will enable it to print transaction data during loss of communication with the ACAM server. The NIC shall be capable of dynamically allocating its memory between database information and transaction history, which shall be stored if the controller has lost communication with the ACAM server. Such transaction history shall be automatically uploaded to the ACAM server once communication has been restored. In its maximum configuration, the NIC shall be capable of storing 250,000 cardholders, and its memory utilization shall be such that if storing database information for 10,000 cardholders, it shall also be capable of storing 500,000 transactions.
  3. The NIC shall support the monitoring and control of 16 card readers, with or without keypads. It shall also be provided with at least 12 five-state, fully supervised and fully configurable input points, and at least 12 fully configurable auxiliary output control relays mounted on the main circuit board.
  4. Each controller must also be capable of expansion, by external Remote Input Modules (RIMs) and/or Remote Relay Modules (RRMs), to support a combination of up to 172 fully configurable five-state supervised input points or 156 output relays per NIC depending on configuration.
  5. Each NIC shall be provided with a UL Listed uninterruptible power supply (UPS) mounted within the NIC enclosure. It shall provide sufficient battery backup to sustain complete operational effectiveness including Remote Reader Electronic (RRE) modules, card readers, electric locks (fail secure), RIMs and RRM's for a minimum of four [eight] hours of normal operation.
  6. Each NIC shall utilize on-board self-diagnostic LEDs, removable terminal strips and a pop-in/pop-out circuit board.
  7. Each NIC in addition to its on-board LAN/WAN connection shall support RS-232 and multi-drop RS-485 communication topologies. Provision of external LAN terminal server devices that are connected through serial communications to the NIC are not acceptable.
  8. Each NIC shall support RS-485 bi-directional communication paths (dual multi-drop paths back to ACAM file server) with no additional hardware or firmware required.
  9. Each NIC shall be supplied with all specified options available, including a locking enclosure with a tamper switch.
  10. Each NIC shall be capable of reporting the following alarm conditions to the ACAM file server:
    - a. enclosure door tamper
    - b. primary power failure
    - c. low battery conditions
    - d. loss of communications
    - e. all access control violations
  11. The Network Intelligent Controller shall be a GE Security ACULX 16

## 2.4 REMOTE READER ELECTRONIC MODULES

### A. General:

1. The Remote Reader Electronic (RRE) modules shall be provided to support all card readers, door contact switches, request-to-exit devices and electric locks. The RRE modules shall support all industry standard card reader technologies (magnetic stripe, Wiegand, bar code, barium ferrite, and proximity) as well as keypads and compatible biometric devices. These modules shall be available in configurations suitable to support the connection of one, two or four card devices as required.
2. Each RRE module shall support five-state supervised input points, output relays, and shall provide power outputs of 5-VDC, 12-VDC and 24-VDC output at 500-Ma to power card readers, biometric devices, request to exit (REX) devices and door strikes. Each RRE module shall be capable of being

powered by the on-board UPS of a NIC to avoid the need for power supplies and 115-volt outlets to be located near controlled doors. Each RRE shall also be capable of being powered by a local 24-VDC UPS where required.

3. RRE modules shall utilize on-board self-diagnostic LEDs, removable terminal strips and popin/pop-out circuit boards.
4. RRE modules shall be supplied with all specified options available, including an enclosure with an enclosure tamper switch.
5. Quantity and location of RRE modules shall be as specified in Contract Documents and drawings.

## **2.5 ACULX 16 NETWORK INTELLIGENT CONTROLLER POWER SUPPLY**

- A. The ACULX 16 requires a power supply/charger that transforms 120 VAC to 27.5 VDC. The Contractor shall provide the ACU-8APWR power supply/charger assembly to power the ACULX 16 and the supporting RREs. The ACU-8APWR becomes an uninterruptible power supply when stand-by batteries are connected. It has a special power limiting circuit that allows the batteries to be charged. The batteries are protected with an automatic resetting circuit breaker and diode for over current and accidental reversed battery hookup. Float charging means faster recovery time for the batteries. There is no switch over or voltage drop when power fails. Contractor shall size batteries of 8 hours of backup power with a connected load.

## **2.6 ACCESS CONTROL POWER SUPPLY**

- A. Electrified locksets shall be powered from a power supply that is exclusively for electrified locks. The power supply shall provide eight (8) fused protected Fail Secure and/or Fail Safe 24VDC 10 Amps outputs. Power supply shall be a filtered, electronically regulated power source with a built in charger. The power supply shall be provided with sealed gel type batteries for backup power. In the event primary power fails, the power supply shall automatic switch-over to standby battery power, and back when primary power is restored. The transfer to and from backup power shall not cause other electrical anomalies such as false alarms loss of communication etcetera. The power supply shall be provided with thermal and short circuit protection with auto reset, fused battery protection, AC input and DC output LED indicators, and AC power and low battery supervision relays (Form "C", SPDT).
- B. Each 24 VDC power supply shall be supplied with a minimum of two 12 VDC 7 AH rechargeable batteries for standby power operation. If necessary, additional batteries shall be supplied by the Contractor to meet a four (4) hour standby time.
- C. All power supplies shall be labeled with permanent labels for their intended purpose and input and output voltage. AC ground shall have continuity to both the mounting panel and the housing. If necessary, the Contractor shall provide grounding straps from the mounting board to the housing.
- D. Power Supply shall feature a fire alarm disconnect. The fire alarm disconnect can be latch or non-latching and is individually selectable for any or all of the 8 outputs. The fire alarm disconnect can be either Normally Open (NO) or Normally Closed (NC).
- E. Acceptable equipment shall be Altronix Power Supply AL1024ULACM or equivalent.

## **2.7 CARD READERS**

### **A. Proximity Card Readers**

1. Provide surface mounting style 125 KHz proximity card readers suitable for wall or US 2-S single-gang box mounting, and for mounting configurations as shown on the project plans.
2. The reader shall be capable of reading access control data in standard Wiegand formats up to 84 bits in length from any HID Proximity card or equivalent, outputting the data in one of the following configurations:
  - a. The card reader shall output credential data in compliance with the SIA AC-01Wiegand standard, compatible with all standard access control systems.

- b. The card reader shall output credential data using a Clock and Data interface, and be compatible with systems requiring a magnetic stripe reader.
3. The reader shall be capable of outputting a periodic reader supervision message at a configurable time interval, enabling the host system to signal an alarm condition based on the absence of this message.
4. The Proximity card reader shall provide the ability to change operational features in the field through the use of a factory-programmed command card. Command card operational programming options shall include:
  - a. Reader beeps and flashes green on a card read, LED normally red, single line control of LED.
  - b. Reader flashes green on a card read, LED normally red, single line control of LED.
  - c. Reader beeps on a card read, LED normally red, single line control of LED.
  - d. Beeper and LED are controlled by host only, LED normally red, single line control of LED.
  - e. Reader beeps and flashes green on a card read, LED normally off, red and green LED's controlled individually.
  - f. Reader flashes green on a card read, LED normally off, red and green LED's controlled individually.
  - g. Reader beeps on a card read, LED normally off, red and green LED's controlled individually.
  - h. Beeper and LED are controlled by host only, LED normally off, red and green LED controlled individually
  - i. Change from Wiegand to Mag Stripe output format
  - j. Change from Mag Stripe to Wiegand output format
  - k. Reset to Factory Defaults
5. Proximity card readers shall provide the following programmable audio/visual indication:
  - a. A piezoelectric sounder shall provide an audible tone upon successful power up/self test, good card read, or whenever the beeper control line is asserted by the host.
  - b. A bi-color, red/green LED shall light upon successful power up/self test, good card read, or whenever the LED control line(s) are asserted by the host.
  - c. The reader shall have individual control lines for the sounder, and for red and green LED indication. When the LED control lines are asserted simultaneously, an amber LED indication will occur.
6. The reader shall have a configurable hold input, which when asserted shall either buffer a single card read or disable the reader, until the line is released. This input may be used for special applications or with loop detectors.
7. The reader shall require that a card, once read, must be removed from the RF field for one second before it will be read again, to prevent multiple reads from a single card presentation and anti-passback errors.
8. Proximity card readers shall meet the following physical specifications:
  - a. Dimensions: 4.80 x 3.3 x 1.0" (12.2 x 8.4 x 2.4 cm)
  - b. Weight: 7.7oz (220g)
  - c. Material: UL94 Polycarbonate
  - d. Two-part design with separate reader body and mounting plate.
  - e. Color: Black
9. Proximity card readers shall meet the following electrical specifications:
  - a. Operating voltage: 5– 16 VDC, reverse voltage protected. Linear power supply recommended.
  - b. Current requirements: (average/peak) 20/115mA @ 12 VDC
10. Proximity card readers shall meet the following environmental specifications:
  - a. Operating temperature: -31 to 150 degrees F (-35 to 65 degrees C)
  - b. Operating humidity: 5% to 95% relative humidity non-condensing

- c. Weatherized design suitable to withstand harsh environments The reader shall be of potted, polycarbonate material, sealed to a NEMA rating of 4X (IP55).
11. Proximity card reader cabling requirements shall be:
    - a. Cable distance: Wiegand: 500 feet (150m); Clock & Data: 50 feet (15m)
    - b. Cable type: 5-conductor #22 AWG w/overall shield. Additional conductors will be required for 2-line LED control, beeper, hold, or card present functions.
    - c. Standard reader termination: 18" (.5m) cable pigtail
  12. Warranty of Proximity card readers shall be lifetime against defects in materials and workmanship.
  13. *Proximity card reader shall be HID Corporation Model iCLASS SE R40*

#### **B. Proximity Card Reader (Mullion Mount)**

1. Provide surface mounting style 125 KHz proximity card readers suitable for door or window mullion mounting, and for minimal space mounting configurations as shown on the project plans.
2. The reader shall be capable of reading access control data in standard Wiegand formats up to 84 bits in length from any HID Proximity card or equivalent, outputting the data in one of the following configurations:
  - a. The card reader shall output credential data in compliance with the SIA AC-01 Wiegand standard, compatible with all standard access control systems.
  - b. The card reader shall output credential data using a Clock and Data interface, and be compatible with systems requiring a magnetic stripe reader.
3. The reader shall be capable of outputting a periodic reader supervision message at a configurable time interval, enabling the host system to signal an alarm condition based on the absence of this message.
4. The Proximity card reader shall provide the ability to change operational features in the field through the use of a factory-programmed command card. Command card operational programming options shall include:
  - a. Reader beeps and flashes green on a card read, LED normally red, single line control of LED.
  - b. Reader flashes green on a card read, LED normally red, single line control of LED.
  - c. Reader beeps on a card read, LED normally red, single line control of LED.
  - d. Beeper and LED are controlled by host only, LED normally red, single line control of LED.
  - e. Reader beeps and flashes green on a card read, LED normally off, red and green LED's controlled individually.
  - f. Reader flashes green on a card read, LED normally off, red and green LED's controlled individually.
  - g. Reader beeps on a card read, LED normally off, red and green LED's controlled individually.
  - h. Beeper and LED are controlled by host only, LED normally off, red and green LED controlled individually
  - i. Change from Wiegand to Mag Stripe output format
  - j. Change from Mag Stripe to Wiegand output format
  - k. Reset to Factory Defaults
5. Proximity card readers shall provide the following programmable audio/visual indication:
  - a. A piezoelectric sounder shall provide an audible tone upon successful power up/self test, good card read, or whenever the beeper control line is asserted by the host.
  - b. A bi-color, red/green LED shall light upon successful power up/self test, good card read, or whenever the LED control line(s) are asserted by the host.
  - c. The reader shall have individual control lines for the sounder, and for red and green LED indication. When the LED control lines are asserted simultaneously, an amber LED indication will occur.

6. The reader shall have a configurable hold input, which when asserted shall either buffer a single card read or disable the reader, until the line is released. This input may be used for special applications or with loop detectors.
7. The reader shall require that a card, once read, must be removed from the RF field for one second before it will be read again, to prevent multiple reads from a single card presentation and anti-passback errors.
8. Typical proximity card read range shall be up to:
  - a. 5.2" (13 cm) using HID Proxcard II card.
  - b. 5" (12.5 cm) using HID ISOProx or DuoProx cards
  - c. 2" (5 cm) using HID ProxKey II key fob
  - d. 2.5" (6.25 cm) using HID Microprox Tag
  - e. 5" (12.5 cm) using HID iCLASS Prox
  - f. 2" (5.0 cm) using HID Prox/Wiegand Card
9. Proximity card readers shall meet the following physical specifications:
  - a. Dimensions: 1.9 x 4.1 x 0.9" (4.8 x 10.3 x 2.3cm)
  - b. Weight:
    - (i) Terminal Strip: 3.5 oz (99 gm)
    - (ii)
  - c. Weight: Pigtail: 3.9 oz (113 gm)
  - d. Material: UL94 Polycarbonate
  - e. Two-part design with separate reader body and mounting plate.
  - f. Color: Black
10. Proximity card readers shall meet the following electrical specifications:
  - a. Operating voltage: 5 – 16 VDC, reverse voltage protected.  
Linear power supply recommended.
  - b. Current requirements: (average/peak)  
20/110mA @ 12 VDC
11. Proximity card readers shall meet the following environmental specifications:
  - a. Operating temperature: -31 to 150 degrees F (-35 to 65 degrees C)
  - b. Operating humidity: 5% to 95% relative humidity non-condensing
  - c. Weatherized design suitable to withstand harsh environments The reader shall be of potted, polycarbonate material, sealed to a NEMA rating of 4X (IP55).
12. Proximity card reader cabling requirements shall be:
  - a. Cable distance: Wiegand: 500 feet (150m); Clock & Data: 50 feet (15m)
  - b. Cable type: 5-conductor #22 AWG w/overall shield. Additional conductors will be required for 2-line LED control, beeper, hold, or card present functions
  - c. Standard reader termination: 18" (.5m) cable pigtail
  - d. Optional reader termination: 10 screw terminals located under reader cover.
13. Warranty of Proximity card readers shall be lifetime against defects in materials and workmanship.
14. *Proximity card reader shall be HID Corporation iCLASS SE R10*

## 2.8 LINE SUPERVISION

- A. Communications between the host computer and the data gathering panels shall be protected against compromise. The system shall detect substitution of resistance or electrical potential, substitution of like equipment, and introduction of synthesized signals. Protective circuits (alarm inputs) shall be protected between the data gathering panel and the sensing devices (door contacts, motion detectors, etc.). Each circuit shall be supervised by end or line resistors located at the sensing device. The system shall detect resistance changes and report alarm and trouble signals at designated values defined by the system manufacturer. The system shall register a minimum of four (4) states: normal, alarm, trouble open (cut), and trouble closed (shorted). Trouble signals shall be displayed to the operator in a format readily identifiable by the operator as a supervisory condition.

**2.9 SYSTEM SENSORS AND RELATED EQUIPMENT**

- A. The EECS (Electronic Entry Control System) and related Equipment provided by the Contractor shall meet or exceed the following performer specifications:
- B. **Request To Exit Detectors:**
  - 1. The electrified door hardware provided by the Division 8 Door Hardware Contractor shall feature an integrated request to exit device. Electrified door hardware shall be installed by the Division 8 Door Hardware Contractor. The Security Contractor is responsible for performing final terminations to the EECS.
- C. **Magnetic Contacts**
  - 1. Recessed Single Pole Double Throw Door Contact
    - a. The door contact shall contain a hermetically sealed magnetic reed switch. The reed shall be potted in the contact housing with a polyurethane based compound. Contact and magnet housing shall snap-lock into a 25.4 mm (1 in) diameter hole. Housing shall be molded of flame retardant abs plastic. Color of housings shall be off-white, grey or mahogany brown. Choice of color to depend on door decor. The contact shall contain a single pole double throw (SPDT) switch with an open or closed loop. Contacts and magnets shall be treated with a thin coat of RTV silicone to hold the contact and magnet in place. Card reader controlled doors, biased and recessed perimeter door contacts, shall be GE model # 1078 or equivalent.

**PART 3 - EXECUTION****3.1 GENERAL**

- A. The Contractor shall install all system components and appurtenances in accordance with the manufacturers' instructions, ANSI C2, and shall furnish all necessary interconnections, services, and adjustments required for a complete and operable system as specified. Control signals, communications, and data transmission lines grounding shall be installed as necessary to preclude ground loops, noise, and surges from affecting system operation. Equipment, materials, installation, workmanship, inspection, and testing shall be in accordance with manufacturers' recommendations and as modified herein.
- B. Consult the manufacturers' installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation. Refer to the Riser/Connection diagram for all schematic system installation/termination/wiring data.
- C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., sensors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

**3.2 CURRENT SITE CONDITIONS**

- A. The Contractor shall visit the site and verify that site conditions are in agreement with the design package. The Contractor shall report all changes to the site or conditions which will affect performance of the system to the Owner in a report as defined in paragraph Group II Technical Data Package. The Contractor shall not take any corrective action without written permission from the Owner.

**3.3 EXAMINATION**

- A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.
- B. Examine roughing-in for LAN and control cable conduit systems to PCs, Controllers, card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.4 PREPARATION**

- A. Comply with recommendations in SIA CP-01.

- B. Comply with EIA/TIA-606, "Administration Standard for the Telecommunications Infrastructure of Commercial Buildings."
- C. Obtain detailed Project planning forms from manufacturer of access-control system; develop custom forms to suit Project. Fill in all data available from Project plans and specifications and publish as Project planning documents for review and approval. All forms shall be completed in accordance with specified timelines outlines in Group Technical Data Packages in Section 280500.
  - 1. Record setup data for control station and workstations.
  - 2. For each Location, record setup of Controller features and access requirements.
  - 3. Access Lists
  - 4. Propose start and stop times for time zones and holidays, and match up access levels for doors.
  - 5. Set up groups, facility codes, linking, and list inputs and outputs for each Controller.
  - 6. Assign action message names and compose messages.
  - 7. Set up alarms. Establish interlocks between alarms, intruder detection, and video surveillance features.
  - 8. Prepare and install alarm graphic maps.
  - 9. Develop user-defined fields.
  - 10. Develop screen layout formats.
  - 11. Propose setups for guard tours and key control.
  - 12. Discuss badge layout options; design badges.
  - 13. Complete system diagnostics and operation verification.
  - 14. Prepare a specific plan for system testing, startup, and demonstration (see the Testing section for requirements).
  - 15. Develop acceptance test concept and, on approval, develop specifics of the test.
  - 16. Develop cable and asset management system details; input data from construction documents. Include system schematics and Visio Technical Drawings.
  - 17. Develop data gathering panel matrices that conform to Section 280500.
- D. In meetings with Architect and Owner, present Project planning documents and review, adjust, and prepare final setup documents. Use final documents to set up system software.
- E. All Programming and access lists are submitted, reviewed, and accomplished before any devices are terminated and/or tested.

END OF SECTION 281300

## SECTION 282300 – VIDEO SURVEILLANCE

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. This Section includes video management system which consists of cameras, data transmission wiring, and a control station with its associated equipment.
- B. The video surveillance system shall be integrated with monitoring and control system specified in Division 28 Sections “Common Work Results for Electronic Security”, “Intrusion Detection”, and “Access Control” which specifies systems integration.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. The following are acceptable manufacturers of electronic security system products as specified in this specification section. Any proposed product from a different manufacturer is subject to the review procedures in Section 1.05 in this specification.
  - 1. Closed Circuit Television:
    - a. Mobotix
  - 2. Video Recording and Storage:
    - a. Network Attached Storage (NAS) appliance - Owner Provided, Owner Installed

#### 2.2 VIDEO SURVEILLANCE SYSTEM

- A. The Contractor shall configure the Color CCTV system as specified and shown on the Contract Documents and Drawings. All distances shown are approximate and shall be verified by the Contractor.
- B. The system shall include all interior and exterior housings, mounts, connectors, adapters, and terminations necessary for the interconnection of the video surveillance system. The Contractor shall also supply and install all cabling necessary to interconnect the video equipment installed in the Security Operations Center.
  - 1. The new video system shall consist of all (CMOS) Cameras, Network Attached Storage (Owner Provided, Contractor Installed), and network transmission devices, necessary to integrate with the Owner's existing Video Head-End Equipment.
  - 2. The Video System shall provide operator interface, interaction, control of cameras. The cameras shall continuously view selected locations and/or display operator selections.
- C. **Computer Software**
  - 1. Video management software is provided by Manufacturer at no additional charge.
  - 2. Contractor is responsible for installing and configuring video management software.

#### 2.3 360° CAMERAS

- A. The 360° Camera shall meet or exceed the following specifications:
  - 1. Lenses L11(hemispheric)
  - 2. Sensitivity Color: 1 lux (t-1/60s), 0.05 lux (t=1/1s) B/W: 0.1 lux (t-1/60s), 0.005 lux (t-1/1s)
  - 3. Sensor ½” CMOS, progressive scan
  - 4. Max. Image Resolution Color: 2048 x 1536 (3 MEGA) Black/White: 1280 x 960 (MEGA)
  - 5. Image Format Free image format selection (from 160 x 120 to 2040 x 1536); with L11: PTZ view, Quad view, panorama broad view image, double panorama view, panorama focus with 3 views
  - 6. Max Frame Rate VGA: 25 fps, TV-PAL: 18 fps, MEGA 8 fps, 3 (M-JPEG) (Live/Recording) MEGA: 4 fps
  - 7. Video Stream (MxPEG) VGA: 30 fps, TV-PAL: 30 fps, MEGA: 30 fps, 3 (Live/Recording) MEGA: 20 fps
  - 8. Image Compression MxPEG, M-JPEG, JPEG, H.263 (only Video-VoIP)

9. Internal DVR MicroSD slot (camera-internal video recording up to 32GB)
  10. External Storage Directly on NAS and PC/Server without additional recording software
  11. Software (Inclusive) Video management software MxEasy, Control room software MxControlCenter
  12. Image Processing Backlight compensation, automatic white balance, image distortion correction (panorama image correction included), video sensor (Motion Detection)
  13. Virtual PTZ Digital Pan/Tilt/Zoom, continuous 8x zoom
  14. Alarm/Events Triggering of events by integrated multiple-window motion detection, temperature sensor, notification over email, FTP, IP telephony (VoIP, SIP), visual/acoustic alarm, pre-and post alarm images
  15. Audio Integrated microphone and speaker, lip-synchronous audio, two-way speaker, audio recording
  16. Interfaces Ethernet 10/100, USB, MxBus
  17. Video Phone VoIP, SIP, two-way speaker, remote control via DTMF signaling, event notification
  18. Security User-/Group management, HTTPS/SSL, IP Address filter, IEEE 802.1x, intrusion detection, digital image signature
  19. Certificates EMC (EN50121-4, EN55022, EN55024, EN61000-6-2, FCC part 15B, AS.NZS3548)
  20. Power Supply Power over Ethernet (802.3af): PoE class variable depending on operating mode; power consumption; typ. 3W; with PoE switch/MOBOTIX PoE – Adapter COLLEGE PROVIDES POE ETHERNET SWITCH
  21. Operating Conditions IP65 (DIN EN 60529), -30 to +60 °C (-22 to +140 °F)
  22. Dimensions n x H: 16 x 5 cm, weight: ca. 450 g
  23. Standard Delivery Housing (high resistance composites – PBT-PC), white, incl. 360° lens, mounting parts, allen wrench patch cable – 50cm, manual, software, 4 GB Micro SD (except Basic)
- B.** 360° Camera shall be the Q24 Hemispheric camera by Mobotix, or Owner approved equal.
- C.** The Contractor shall provide camera mounts and mounting hardware as described in the Contract Documents.
- D.** Contractor shall coordinate all camera views with the Owner prior to procuring cameras and camera lenses. Contractor responsible for performing all calculations necessary to provide optimal camera images in accordance with Owner's guidance. All camera images must be verified by the Owner or Owner's representative prior to final adjustment.

#### 2.4 SINGLE VIEW FIXED DOME CAMERA

- A.** The Single View Fixed Dome Camera shall meet or exceed the following specifications:
1. Lenses 22 to 135 mm format, Horizontal angle 90° to 15°
  2. Sensitivity Color: 1 lux (t-1/60s), 0.05 lux (t=1/1s) B/W: 0.1 lux (t-1/60s), 0.005 lux (t-1/1s)
  3. Sensor ½" CMOS, progressive scan
  4. Max. Image Resolution Color: 2048 x 1536 (3 MEGA) Black/White: 1280 x 960 (MEGA)
  5. Image Format 2048 x 1536, 1280 x 960, 1024 x 768, 800 x 600, 768 x 576 (D1), 704 x 576 (TV-PAL), 640 x 480, 384 x 288, 352 x 288, 320 x 240, 160 x 120; free image format selection (e.g. 1000 x 200 for skyline)
  6. Max Frame Rate VGA: 25 fps, TV-PAL: 18 fps, MEGA 8 fps, (M-JPEG) (Live/Recording) 3MEGA: 4 fps
  7. Video Stream (MxPEG) VGA: 30 fps, TV-PAL: 30 fps, MEGA: 30 fps, (Live/Recording) 3MEGA: 20 fps
  8. Image Compression MxPEG, M-JPEG, JPEG, H.263 (only Video-VoIP)
  9. Internal DVR MicroSD slot (camera-internal video recording up to 32GB)
  10. External Storage Directly on NAS and PC/Server without additional recording software
  11. Software (Inclusive) Video management software MxEasy, Control room software MxControlCenter
  12. Image Processing Backlight compensation, automatic white balance, image distortion

- correction
13. Virtual PTZ Digital Pan/Tilt/Zoom, continuous 8x zoom Alarm/Events Triggering of events by integrated multiple-window motion detection, temperature sensor, notification over email, FTP, IP telephony (VoIP, SIP), visual/acoustic alarm, pre-and post alarm images
  14. Audio Optional via ExtI/O, lip-synchronous audio, two-way speaker, audio recording, video VoIP supported
  15. Interfaces Ethernet 10/100, USB, MxBus
  16. Video Phone VoIP, SIP, two-way speaker, remote control via DTMF signaling, event notification
  17. Security User-/Group management, HTTPS/SSL, IP address filter, IEEE 802.1x, intrusion detection, digital image signature
  18. Certificates EMC (EN50121-4, EN55022, EN55024, EN61000-6-2, FCC part 15B, AS.NZS3548)
  19. Power Supply Power over Ethernet (802.3af): PoE class variable depending on operating mode; power consumption; typ. 3W; with PoE switch/MOBOTIX PoE – Adapter.  
COLLEGE PROVIDES POE ETHERNET SWITCH
  20. Operating Conditions IP65 (DIN EN 60529), -30 to +60 °C (-22 to +140 °F)
  21. Dimensions n x H: 16 x 8.6 cm, weight: ca. 350 g
  22. Standard Delivery Housing (high-resistance composites – PBT), white, shockproof polycarbonate dome (transparent), free choice of lenses, mounting parts, allen wrench, patch cable – 50cm, manual, software, 4 GB Micro SD (except Basic)
- B.** Fixed Dome Camera shall be the D24 MonoDome by Mobotix, or Owner approved equal.
  - C.** The Contractor shall provide camera mounts and mounting hardware as described in the Contract Documents.
  - D.** Contractor shall coordinate all camera views with the Owner prior to procuring cameras and camera lenses. Contractor responsible for performing all calculations necessary to provide optimal camera images in accordance with Owner's guidance. All camera images must be verified by the Owner or Owner's representative prior to final adjustment.

## 2.5 DUAL VIEW FIXED DOME CAMERA

- A.** The Dual View Fixed Dome Camera shall meet or exceed the following specifications:
  1. Lenses 22 to 135mm format Horizontal angle 90° to 15 °
  2. Sensitivity Color: 1 lux (t-1/60s), 0.05 lux (t=1/1s) BW: 0.1 lux (t-1/60s), 0.005 lux (t-1/1s)
  3. Sensors 2 x 1/2" CMOS, progressive scan
  4. Max. Image Resolution Color: 2048 x 1536 (3 MEGA) Black/White: 1280 x 960 (MEGA)
  5. Image Format 2048 x 1536, 1280 x 960, 1024 x 768, 800 x 600, 768 x 576 (D1), 704 x 576 (TV-PAL), 640 x 480, 384 x 288, 352 x 288, 320 x 240, 160 x 120; free image format selection (e.g. 1000 x 200 for skyline)
  6. Max Frame Rate VGA: 16 fps, TV-PAL: 12 fps, MEGA 6 fps, (M-JPEG) (Live/Recording) 3MEGA: 4 fps
  7. Video Stream (MxPEG) VGA: 30 fps, TV-PAL: 24 fps, MEGA: 14 fps, (Live/Recording) 3MEGA: 10 fps
  8. Image Compression MxPEG, M-JPEG, JPEG, H.263 (only Video-VoIP)
  9. Internal DVR SD slot (up to 32GB), 16GB internal (Sec-R16)
  10. External Storage Directly on NAS and PC/Server without additional recording software
  11. Software (Inclusive) Video management software MxEasy, Control room software MxControlCenter
  12. Image Processing Backlight compensation, automatic white balance, image distortion correction, video sensor (motion detection)
  13. Virtual PTZ Digital Pan/Tilt/Zoom, continuous 8x zoom
  14. Alarm/Events Triggering of events by integrated multiple-window motion detection, temperature sensor, notification over email, FTP, IP telephony (VoIP, SIP), visual/acoustic alarm, pre-and post alarm images
  15. Audio Integrated microphone and speaker, Line-In/Line-Out, lip-synchronous audio, two-way speaker, audio recording

16. Interfaces Ethernet 10/100, ISDN, RS232, 3 x In, 1 x Out
  17. Video Phone VoIP, SIP, two-way speaker, remote control via DTMF signaling, event notification
  18. Security User-/Group management, HTTPS/SSL, IP address filter, IEEE 802.1x, intrusion detection, digital image signature
  19. Certificates EMC (EN55022, EN55024, EN61000-6-2, FCC part 15B, AS.NZS3548)
  20. Power Supply Power over Ethernet (802.3af; Class 0), Netpower- Adapter, typ. 4W.  
COLLEGE PROVIDES POE ETHERNET SWITCH
  21. Operating Conditions IP54/IP65 (without/with wall mount), -30 to +60 °C (-22 to +140 °F)
  22. Dimensions n x H: 20.1 x 11 cm, weight: ca. 650 g
  23. Standard Delivery Housing (high-resistance composites – PBT), white, shockproof polycarbonate dome (transparent), free choice of lenses, mounting parts, allen wrench, patch cable – 50cm, manual, software, 4 GB Micro SD (except Basic)
- B.** Dual View Fixed Dome Camera shall be the D12 DualDome by Mobotix, or Owner approved equal.
- C.** The Contractor shall provide camera mounts and mounting hardware as described in the Contract Documents.
- D.** Contractor shall coordinate all camera views with the Owner prior to procuring cameras and camera lenses. Contractor responsible for performing all calculations necessary to provide optimal camera images in accordance with Owner's guidance. All camera images must be verified by the Owner or Owner's representative prior to final adjustment.

## PART 3- EXECUTION

### 3.1 GENERAL

- A.** The Contractor shall install all system components and appurtenances in accordance with the manufacturer's instructions, ANSI C2, and shall furnish all necessary interconnections, services, and adjustments required for a complete and operable system as specified. Control signals, communications, and data transmission lines grounding shall be installed as necessary to preclude ground loops, noise, and surges from affecting system operation. Equipment, materials, installation, workmanship, inspection, and testing shall be in accordance with manufacturers' recommendations and as modified herein.
1. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation. Refer to the Riser/Connection diagram for all schematic system installation/termination/wiring data.
  2. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., sensors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.
- B. Current Site Conditions:** The Contractor shall visit the site and verify that site conditions are in agreement with the design package. The Contractor shall report all changes to the site or conditions that will affect performance of the system to the Owner in a report as defined in paragraph Group II Technical Data Package. The Contractor shall not take any corrective action without written permission from the Owner.
- C. Conduit and Wire:** Refer to 280513 – Conductors and Cables for Electronic Security

### 3.2 CLOSED CIRCUIT TELEVISION

- A. Installation:** The Contractor shall install all system components including Owner furnished equipment, and appurtenances in accordance with the manufacturer's instructions, ANSI C2, and shall furnish all necessary connectors, terminators, interconnections, services, adjustments and licenses required for a complete and operable video system.
- B. Interconnection Video Equipment:** The Contractor shall connect signal paths between video equipment of 250' or less with Cat 6 cable. Cat 6 cables shall be terminated to a Cat 6 RJ-45 Patch Panel (See OIT Cable Standards) Cables shall be as short as

practicable for each signal path without causing strain at the connectors. Rack mounted equipment on slide mounts shall have cables of sufficient length to allow full extension of the slide rails from the rack.

- C. **Cameras:** The Contractor shall install the cameras with the proper focal length lens as indicated for each zone; connect power and signal lines to the camera; set cameras with fixed iris lenses to the proper f-stop to give full video level; aim camera to give field of view as needed to cover the alarm zone; aim fixed mount cameras installed outdoors facing the rising or setting sun sufficiently below the horizon to preclude the camera looking directly at the sun; focus the lens to give a sharp picture over the entire field of view; and synchronize all cameras so the picture does not roll on the monitor when cameras are selected.
- D. **Video Recording Equipment:** The Contractor shall install the video recording equipment as shown and as specified by the manufacturer; connect video signal inputs and outputs as shown and specified; connect alarm signal inputs and outputs as shown and specified; and connect video recording equipment to AC power. **THIS IS COLLEGE PROVIDED EQUIPMENT. ALL CONNECTIONS ARE MADE VIA COLLEGE PROVIDED MCFNET NETWORK**
- E. **Video Signal Equipment:** The Contractor shall install the video signal equipment as specified by the manufacturer and as shown; connect video or signal inputs and outputs as shown and specified; terminate video inputs as required; connect alarm signal inputs and outputs as required; connect control signal inputs and outputs as required; and connect electrically powered equipment to AC power.
- F. **System Start Up:** The Contractor shall not apply power to the CCTV system until the following items have been completed:
  - 1. CCTV system equipment items and DTM have been set up in accordance with manufacturer's instructions.
  - 2. A visual inspection of the CCTV system has been conducted to ensure that defective equipment items have not been installed and that there are no loose connections.
  - 3. System wiring has been tested and verified PER OIT COLLEGE CABLE STANDARDS as correctly connected as indicated.
  - 4. All system grounding and transient protection systems have been verified as properly installed and connected as indicated.
  - 5. Power supplies to be connected to the system have been verified as the correct voltage, phasing, and frequency as indicated. There may be no power supply needed, as the cameras are POE devices.
  - 6. Satisfaction of the above requirements shall not relieve the Contractor of responsibility for incorrect installation, defective equipment items, or collateral damage as a result of Contractor work/equipment.

### 3.3 WIRELINE DATA TRANSMISSION (See Montgomery College OIT Cable Standards)

- A. **Installation:** The Contractor shall install all system components including Owner furnished equipment, and appurtenances in accordance with the manufacturer's instructions, ANSI C2 and as shown, and shall furnish all necessary connectors, terminators, interconnections, services, and adjustments required for a complete and operable data transmission system.
- B. **Identification and Labeling:** The Contractor shall supply permanent identification labels for each cable at each end that will appear on the as-built drawings. The labeling format shall be identified and a complete record shall be provided to the Owner with the final documentation. Each cable shall be identified by type or signal being carried and termination points. The labels shall be printed on letter size label sheets that are self laminated vinyl that can be printed from a computer data base or spread sheet. The labels shall be E-Z code WES12112 or equivalent.
  - 1. The Contractor shall provide all personnel, equipment, instrumentation, and supplies necessary to perform all testing.

- C. Transient Voltage Surge Suppressors (TVSS):** The Contractor shall mount TVSS within 3 m (118 in) of equipment to be protected inside terminal cabinets or suitable NEMA 1 enclosures. Terminate off Montgomery premise conductors on input side of device. Connect the output side of the device to the equipment to be protected. Connect ground lug to a low impedance earth ground (less than 10 ohms) via Number 12 AWG insulated, stranded copper conductor.
- D. Contractor's Field Test:** The Contractor shall verify the complete operation of the data transmission system during the Contractor's Field Testing. Field test shall include a bit error rate test. The Contractor shall perform the test by sending a minimum of 1,000,000 bits of data on each DTM circuit and measuring the bit error rate. The bit error rate shall not be greater than one (1) bit out of each 100,000 bits sent for each dial-up DTM circuit, and one (1) bit out of 1,000,000 bits sent for each leased or private DTM circuit. The Contractor shall submit a report containing results of the field test.
- E. Acceptance Test and Endurance Test:** The wire line data transmission system shall be tested as a part of the completed IDS and EECS during the Acceptance test and Endurance Test as specified.
- F. Identification and Labeling:** The Contractor shall supply identification tags or labels for each cable. Cable shall be labeled at both end points and at intermediate hand holes, manholes, and junction boxes. The labeling format shall be identified and a complete record shall be provided to the Owner with the final documentation. Each cable shall be identified with type of signal being carried and termination points.

### 3.4 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A.** Install cameras level and plumb.
- B.** Install tamper switches on components indicated to receive tamper switches, arranged to detect unauthorized entry into system component enclosures, and mounted in self-protected, inconspicuous positions.
- C.** Identify system components, wiring, cabling, and terminals according to Division 26 Section "Identification of Electrical Systems."

### 3.5 PROGRAMMING

- A.** *Coordinate with College OIT*

### 3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service:** Engage a factory-authorized service representative to inspect field assembled components and equipment installation and supervise pretesting, testing, and adjusting of video surveillance equipment.
- B. Inspection:** Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
- C. Pretesting:** Refer to 280500, Part V

### 3.7 ADJUSTING

- A. Occupancy Adjustments:** When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions and to optimize performance of the installed equipment. Tasks shall include, but are not limited to, the following:
  - 1. Check cable connections.
  - 2. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed.
  - 3. Adjust all preset positions; consult Owner's personnel.

4. Recommend changes to cameras, lenses, and associated equipment to improve Owner' utilization of video surveillance system.
5. Provide a written report of adjustments and recommendations.

**3.8 CLEANING**

- A. Clean installed items using methods and materials recommended in writing by manufacturer.
- B. Clean video surveillance system components, including camera-housing windows, lenses, and monitor screens.

END OF SECTION 282300

## **SECTION 283111 – ADDRESSABLE FIRE DETECTION AND ALARM SYSTEM**

### **PART 1 - GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.02 SUMMARY**

- A. This Section includes fire alarm systems. Provide all materials, labor, coordination, additional design, phasing, and all incidentals required to provide a complete and operable fire alarm and mass notification system as shown in the drawings and specifications and to the satisfaction of the owner and engineer.
- B. Provide system internal provision for future interface to the security system related to the release of egress door upon building evacuation alarms.
- C. Provide system provisions for interface to the Mass Notification System. Coordinate all interconnections and functions with the Mass Notification System.

#### **1.03 DEFINITIONS**

- A. FACP: Fire alarm control panel.
- B. LED: Light-emitting diode.
- C. NICET: National Institute for Certification in Engineering Technologies.
- D. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

#### **1.04 SYSTEM DESCRIPTION**

- A. Non-coded, addressable system; multiplexed signal transmission dedicated to fire alarm service only. All buildings shall be provided with new Simplex 4100 ES fire alarm control panels as shown on the drawings.

#### **1.05 PERFORMANCE REQUIREMENTS**

- A. Comply with NFPA 72.
- B. Fire alarm signal initiation shall be by one or more of the following devices:
  - 1. Manual stations.
  - 2. Smoke detectors.
  - 3. Verified automatic alarm operation of smoke detectors.
  - 4. Heat detectors.
  - 5. Automatic sprinkler system water flow.
  - 6. Smoke evacuation system initiated by smoke detector (where applicable).
  - 7. Hood fire suppression system (where applicable).

- C. Fire alarm signal shall initiate the following actions:
1. Alarm notification appliances shall operate continuously.
  2. Identify alarm at the FACP and remote annunciator(s).
  3. Transmit an alarm signal to the remote alarm receiving station.
  4. Transmit an alarm signal to the building management system via BACNet.
  5. Activate voice/alarm communication system.
  6. Initiate the digital alarm communicating transmitter (DACT).
  7. Switch heating, ventilating, and air-conditioning equipment controls to fire alarm mode (where applicable).
  8. Record events in the system memory.
  9. Record events by the system printer.
- D. Supervisory signal initiation shall be by one or more of the following devices or actions:
1. Operation of a fire-protection system valve tamper switch.
  2. Operation of a duct mounted smoke detector.
- E. System trouble signal initiation shall be by one or more of the following devices or actions:
1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
  2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
  3. Loss of primary power at the FACP.
  4. Ground or a single break in FACP internal circuits.
  5. Abnormal ac voltage at the FACP.
  6. A break in standby battery circuitry.
  7. Failure of battery charging.
  8. Abnormal position of any switch at the FACP or annunciator.
- F. System Trouble and Supervisory Signal Actions: Ring trouble bell and annunciate at the FACP and remote annunciator(s). Record the event on system printer.

#### 1.06 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings:
1. Shop Drawings shall be prepared by persons with the following qualifications:
    - a. Trained and certified by manufacturer in fire alarm system design.
    - b. Fire alarm certified by NICET, minimum Level III.
  2. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
  3. Device Address List: Coordinate with final system programming.

4. System riser diagram with device addresses, conduit sizes, and cable and wire types and sizes.
  5. Wiring Diagrams: Power, signal, and control wiring. Include diagrams for equipment and for system with all terminals and interconnections identified. Show wiring color code.
  6. Batteries: Size calculations.
  7. Duct Smoke Detectors: Performance parameters and installation details for each detector, verifying that each detector is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
  8. Ductwork Coordination Drawings: Plans, sections, and elevations of ducts, drawn to scale and coordinating the installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, the detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
  9. Voice/Alarm Signaling Service: Equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram. Include cut sheets and layout of microphone cabinet with selector switches being provided adjacent to the fire alarm annunciator panel.
  10. Floor Plans: Indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.
  11. Knox-Vault (Box): Provide cut sheets, installation instructions and monitoring module connection to fire alarm system.
- C. Qualification Data: For Installer.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72, Appendix A, recommendations for Owner's manual. Include abbreviated operating instructions for mounting at the FACP.
- F. Submittals to Authorities Having Jurisdiction: In addition to distribution requirements for submittals specified in Division 1 Section "Submittals," make an identical submittal to authorities having jurisdiction. To facilitate review, include copies of annotated Contract Drawings as needed to depict component locations. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Owner for review. Include proposed graphic annunciator panel within the submittal.
- G. Documentation:
1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, and authorities having jurisdiction.

#### 1.07 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having

jurisdiction, and marked for intended use.

### 1.08 WARRANTY

- A. Warranty Period and Coverage: Two years from date of Substantial Completion. Warranty shall cover manufacturer's standard form in which manufacturer and installer agree to repair or replace system devices and equipment that fail in materials or workmanship within specified warranty period. Warranty work shall include all labor on a 24 hour per day, 7 days per week basis.
- B. Provide complete system inspection and testing every 6 months, after the initial installation, testing, and inspection, for the duration of the warranty. Submit to the College a written report of the inspection. Correct all deficiencies found during the inspection and testing of the system.
- C. All warranty work shall be provided to the College at no additional cost.

### 1.09 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
  - 2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
  - 3. Smoke and Fire Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than 1 unit of each type.
  - 4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than 1 unit of each type.
  - 5. Keys and Tools: One extra set for access to locked and tamperproofed components.
  - 6. Audible and Visual Notification Appliances: One of each type installed.
  - 7. Fuses: Two of each type installed in the system.
- B. In addition to the items listed above, provide the following audible, visual, and combination audible/visual devices inclusive of labor and materials to install after final walk-through by the Fire Marshall:
  - 1. AR: 4 audible; 4 visual; 4 combination audible/visual.
  - 2. CS: 4 audible; 4 visual; 4 combination audible/visual.
  - 3. HU: 8 audible; 4 visual; 8 combination audible/visual.
  - 4. MU: 4 audible; 4 visual; 4 combination audible/visual.
  - 5. PE: 10 audible; 5 visual; 10 combination audible/visual.
  - 6. TC: 8 audible; 4 visual; 8 combination audible/visual.

Devices shall be installed in locations as directed by Fire Marshal and shall include all cutting, patching, and finishing of all walls and/or ceilings. All unused devices shall be turned over to the Owner for use as spares.

## PART 2 - PRODUCTS

## 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following, no substitution permitted:
1. Fire Alarm System Equipment:
    - a. SimplexGrinnell LP; a Tyco International Company. Contact Dave Lewis at 240-786-2894 ([davlewis@simplexgrinnell.com](mailto:davlewis@simplexgrinnell.com)) for all fire alarm system work at Montgomery College.
  2. Wire and Cable:
    - a. Comtran Corporation.
    - b. Helix/HiTemp Cables, Inc.; a Draka USA Company.
    - c. Rockbestos-Suprenant Cable Corporation; a Marmon Group Company.
    - d. West Penn Wire/CDT; a division of Cable Design Technologies.

## 2.02 FIRE ALARM CONTROL PANEL

- A. General Description:
1. Simplex Model: 4100 ES Series.
  2. Modular, power-limited design with electronic modules, UL 864 listed.
  3. Addressable microprocessor based fire alarm control panel.
  4. Addressable initiation devices that communicate device identity and status.
    - a. Smoke sensors shall additionally communicate sensitivity setting and allow for adjustment of sensitivity at the FACP.
    - b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.
  5. Addressable control circuits for operation of mechanical equipment.
  6. Addressable notification appliances.
- B. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, three lines of 80 characters, minimum.
  2. Keypad: Arranged to permit entry and execution of programming, display, and control commands; and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.
- C. Circuits:
1. Signaling Line Circuits: NFPA 72, Class B, Style 4.
    - a. System Layout: Install no more than 50 addressable devices on each signaling line circuit.
  2. Notification-Appliance Circuits: NFPA 72, Class B, Style Y.

3. Actuation of alarm notification appliances, emergency voice communications, annunciation, elevator recall, and activation of suppression system (where applicable) shall occur within 10 seconds after the activation of an initiating device.
- D. Smoke-Alarm Verification:
1. Initiate audible and visible indication of an "alarm verification" signal at the FACP.
  2. Activate a listed and approved "alarm verification" sequence at the FACP and the detector.
  3. Record events by the system printer.
  4. Sound general alarm if the alarm is verified.
  5. Cancel FACP indication and system reset if the alarm is not verified.
- E. Notification-Appliance Circuit: Operation shall sound in a temporal pattern, complying with ANSI S3.41.
- F. Power Supply for Supervision Equipment: Supply for audible and visual equipment for supervision of the ac power shall be from a dedicated dc power supply, and power for the dc component shall be from the ac supply.
- G. Alarm Silencing, Trouble, and Supervisory Alarm Reset: Manual reset at the FACP and remote annunciators, after initiating devices are restored to normal.
1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.
  2. Subsequent alarm signals from other devices or zones reactivate notification appliances until silencing switch is operated again.
  3. When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.
- H. Walk Test: A test mode to allow one person to test alarm and supervisory features of initiating devices. Enabling of this mode shall require the entry of a password. The FACP and annunciators shall display a test indication while the test is underway. If testing ceases while in walk-test mode, after a preset delay, the system shall automatically return to normal.
- I. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and control of changes in those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and make a print-out of the final adjusted values on the system printer.
- J. Transmission to Remote Alarm Receiving Station
1. Provide digital alarm communication transmitter (DACT) for supervisory and alarm signals via two telephonic lines. Transmitted information shall include alarm initiating device and location, similar to information listed on the control panel LCD display.
  2. Provide all network ports and RS 232 jacks.
  3. Provide BACNet remote annunciation provisions.

- K. Voice/Alarm Signaling Service: A central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided as a special module that is part of the FACP.
1. Indicated number of alarm channels for automatic, simultaneous transmission of different announcements to different zones, or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall be UL 1711 listed.
    - a. Allow the application of and evacuation signal to indicated number of zones and, at the same time, allow voice paging to the other zones selectively or in any combination.
    - b. Programmable tone and message sequence selection.
    - c. Standard digitally recorded messages for "Evacuation" and "All Clear."
    - d. Generate tones to be sequenced with audio messages of the type recommended by NFPA 72 and that are compatible with tone patterns of the notification-appliance circuits of the FACP.
  2. Notification-Appliance Circuits: NFPA 72, Class B.
  3. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones.
  4. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.
  5. Amplifiers shall be adequately sized to power all speakers at 0.5 watt tap setting.
  6. Speaker zones shall include as a minimum the following: elevator cabs, egress stairways, building exterior, each floor and an "all call" zone.
- L. Ports: Ports shall be RS-232 for connection to external peripheral equipment. The port shall allow remote access to the FACP for programming changes and system diagnostic routines. Access by a remote terminal shall be by encrypted password algorithm.
- M. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble), and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including the same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.
- N. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signal and supervisory signal shall be powered by the 24-V dc source.
1. The alarm current draw of the entire fire alarm system shall not exceed 80 percent of the power-supply module rating.
- O. Secondary Power: 24-V dc supply system with batteries and automatic battery charger and an automatic transfer switch.
1. Batteries: Sealed lead calcium.
  2. Battery and Charger Capacity: Comply with NFPA 72.

P. Surge Protection:

1. Install surge protection on normal ac power for the FACP and its accessories. Surge protection shall be integral to the FACP.

Q. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

R. Security System Interface: Addressable relays for interface to the existing or future security system.

### 2.03 MANUAL FIRE ALARM BOXES

A. Description: UL 38 listed; finished in red with molded, raised-letter operating instructions in contrasting color. Station shall show visible indication of operation. Mounted on recessed outlet box; if indicated as surface mounted, provide manufacturer's surface back box.

1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
2. Station Reset: Key- or wrench-operated switch.

### 2.04 SYSTEM SMOKE DETECTORS

A. General Description:

1. UL 268 listed, operating at 24-V dc, nominal.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
3. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
4. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
5. Integral Visual-Indicating Light: LED type. Indicating detector has operated status.
6. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
7. Photoelectric Smoke Sensors shall have 7 selectable sensitivity levels programmed and monitored from the FACP.
8. Detectors shall combine photoelectric smoke sensing and heat sensing technologies. An alarm shall be determined by either smoke detection, with selectable sensitivity from 0.65 to 11.6 %/meter obscuration; or heat detection, selectable as fixed temperature or fixed with selectable rate-of-rise; or based on an analysis of the combination of smoke and heat activity.

B. Duct Smoke Detectors:

1. Photoelectric Smoke Detectors:
  - a. Sensor: LED or infrared light source with matching silicon-cell receiver.
  - b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot smoke obscuration when tested according to UL 268A.
2. UL 268A listed, operating at 24-V dc, nominal.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated status.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP. Provide with remote test switch and indicator light when indicated on the drawings.
8. Each sensor shall have multiple levels of detection sensitivity.
9. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
10. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

## 2.05 HEAT DETECTORS

- A. General: UL 521 listed.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 degree F or rate-of-rise of temperature that exceeds 15 degree F per minute, unless otherwise indicated.
  1. Mounting: Plug-in base, interchangeable with smoke-detector bases.
  2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

## 2.06 NOTIFICATION APPLIANCES

- A. Description: Equipped for mounting as indicated and with screw terminals for system connections.
  1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.
  2. All notification appliances shall be addressable.
- B. Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "ALERT" is engraved in minimum 1-inch-high letters on the lens.

1. Rated Light Output: 15 candela minimum unless otherwise indicated.
2. Adjustable Candela Output: Field adjustable at the device or programmable from the FACP when the device dip switch is set to "Auto".
3. Strobe Leads: Factory connected to screw terminals.

C. Voice/Tone Speakers:

1. UL 1480 listed.
2. Low-Range Units: Rated 1 to 2 W.
3. Mounting: Flush, semi-recessed, or surface mounted; bidirectional as indicated.
4. Matching Transformers: Tap range matched to the acoustical environment of the speaker location.

## 2.07 REMOTE FIREFIGHTERS' COMMUNICATION SERVICE

- A. Dedicated, supervised, push-to-talk microphone voice communication links located at the FACP and remote annunciator panel(s) as shown on drawings. Supervised telephone lines shall be connected to talk circuits. Activation of either microphone activates each individual zone or all speakers for announcements, depending on which zone activation buttons have been selected. Microphone shall have higher priority than evacuation message. Provide the microphone in a factory red finish glass door cabinet mounted adjacent to the remote annunciator.

## 2.08 REMOTE ANNUNCIATOR

- A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, resetting, and testing.
1. Mounting: Surface cabinet, NEMA 250, Class 1 at the Main Lobby (locations identified on the floor plans).
- B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LEDs permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.
- C. Annunciator panel shall be smoked Plexiglas, back lighted with appropriate LEDs. Provide floor plan graphics using photo emulsion material to duplicate floor plans.
- D. Submit annunciator panel shop drawing to Fire Marshal for their review and approval, and obtain their final approval, prior to manufacturing annunciator panel.

## 2.09 ADDRESSABLE INTERFACE DEVICE

- A. Description: Microelectronic monitor module listed for use in providing a system address for listed alarm-initiating devices for wired applications with normally open contacts.
- B. Integral Relay: Capable of providing a direct signal to the elevator controller to initiate elevator recall and to a circuit-breaker shunt trip for power shutdown.

## 2.10 SYSTEM PRINTER

- A. UL Listed to Standard 864 system printer. Remote printer, high resolution, 24-pin, dot matrix bi-directional printing, Model 4190-9013 with stand. Provide printer stand for printer and paper supply.

### **2.11 WIRE AND CABLE**

- A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.
- B. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG and size as recommended by system manufacturer.
  - 1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70 Article 760, Classification CI, for power-limited fire alarm signal service. UL listed as Type FPL, and complying with requirements in UL 1424 and in UL 2196 for a 2-hour rating.
- C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
  - 1. Low-Voltage Circuits: No. 16 AWG, minimum.
  - 2. Line-Voltage Circuits: No. 12 AWG, minimum.
  - 3. Multi-conductor Armored Cable: NFPA 70 Type MC, copper conductors, TFN/THHN conductor insulation, copper drain wire, galvanized steel armor, red striped, UL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

## **PART 3 - EXECUTION**

### **3.01 PHASING OF THE WORK**

- A. For each building, the new fire alarm and mass notification system shall be completely installed, tested, commissioned, and accepted by the college and the Authority having Jurisdiction (AHJ) prior to removal of the existing fire alarm system. Provide required reprogramming of all other campus building fire alarm control panels each time a new building fire alarm control panel is added to or removed from the main campus system.
- B. Remove all existing fire alarm system components only after each new building fire alarm system is fully operational in accordance with the above section.
- C. Provide project specific phasing plan for review to the college for approval prior to start of work.
- D. Work can be performed simultaneously on multiple buildings. However, all commissioning and main campus system programming shall be performed on only 1 building at a time.
- E. Initiate a fire watch whenever existing system is not operational. Contractor shall include staff as required for fire watch and shall coordinate exact requirements with AHJ and College. Remove existing fire alarm system components complete after replacement components are installed, tested, approved and fully operational. Reuse existing outlets for the installation of new fire alarm system devices such as manual striking stations where possible (coordinate with College which device locations can be reused – if any). Reuse existing concealed raceways in wall to these outlets for the provision of new system wiring. This process will avoid use of exposed wiring on existing finished surfaces.
- F. At the completion of the work, inspect and test system.

### **3.02 PERMIT DRAWINGS**

- A. Prepare and submit all required drawings and associated documentation and

calculations to the City of Rockville as required for their permitting procedure.

### 3.03 EQUIPMENT INSTALLATION

- A. Smoke or Heat Detector Spacing:
  - 1. Smooth ceiling spacing shall not exceed the rating of the detector.
  - 2. Spacing of heat detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas, shall be determined according to Appendix A in NFPA 72.
  - 3. Spacing of heat detectors shall be determined based on guidelines and recommendations in NFPA 72.
- B. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
- C. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of the duct. Provide remote test station with indicator light where indicated on the drawings.
- D. Remote Status and Alarm Indicators: Install near each smoke detector, duct smoke detector controlling smoke dampers, and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.
- E. Audible Alarm-Indicating Devices: Install as indicated on the drawings.
- F. Visible Alarm-Indicating Devices: Install as indicated on the drawings.
- G. Device Location-Indicating Lights: Locate in public space near the device they monitor.
- H. FACP: Surface mount with tops of cabinets not more than 72 inches above the finished floor.
- I. Annunciator: Install with top of panel not more than 72 inches above the finished floor. Surface mount the cabinet at the Second Floor and fabricate a chase above the cabinet to conceal all wiring to the annunciator panel and simulate the installation of a flush cabinet. Coordinate final arrangement with the College.
- J. Install the system printer on stand adjacent to the fire alarm control panel.

### 3.04 WIRING INSTALLATION

- A. Install wiring according to the following:
  - 1. NECA 1.
  - 2. TIA/EIA 568-A.
- B. Wiring Method: Install wiring in metal raceway according to Division 26 Section "Raceways". Provide raceways and cables in accordance with the following:
  - 1. Major system distribution and Risers: Provide conductor in red painted metal raceway (IMC) for all system wiring between the FACP, voice evacuation control panel (VACP), all Fire Alarm Terminal Cabinets (FATC) and Fire Alarm Extender Panels (FAEP) as indicated on the drawings. Terminate all system conductors on terminal strips in each FATC. Provide a minimum of 50 percent spare conductors for alarm initiating circuits, alarm notification circuits and other control wiring associated with the fire alarm system. Terminate spare conductors on terminal strips in each FATC. Label each system conductors terminating in the FACT and provide a typed legend in the cover of the FATC identifying all active and spare conductors. These conductors will be considered and labeled on the drawing as the back bone of the system and are intended to meet future system wiring needs.
  - 2. Lateral distribution system: Provide red painted MC Cable from the FATC to the system alarm initiating devices, alarm notification appliances and control wiring associated with the fire alarm system.

- Conceal cables in finished spaces. Provide conductors in metal raceway for exposed wiring.
3. Annunciator Panel: Provide system conductors in red painted metal raceway (IMC) from the FACP to the remote annunciator panel. Provide a minimum of 50 percent spare conductors in the raceway and terminate spare conductors on terminal strips.
  4. Firefighter's communication station: Provide system conductors in metal raceway from the FACP to the remote station located adjacent to the graphic annunciator panel(s).
  5. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.
- C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
  - D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
  - E. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.
  - F. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the FACP and the remote equipment. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

### 3.05 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals according to Division 26 Section "Basic Electrical Materials and Methods."
- B. Install instructions frame in a location visible from the FACP.
- C. Paint existing power-supply disconnect switch or circuit breaker red and label "FIRE ALARM."

### 3.06 GROUNDING

- A. Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to FACP.

### 3.07 QUALIFICATIONS

- A. The existing fire alarm system is maintained by Simplex Grinnell (a Tyco International Company). The performance of all additional fire alarm system design, shop drawing submittals, calculations, programming, commissioning, and demonstration shall be performed by Simplex Grinnell (a Tyco International Company), contact is Dave Lewis at 240-786-2894 ([davlewis@simplexgrinnell.com](mailto:davlewis@simplexgrinnell.com)). No substitutions are allowed. It is the contractor's responsibility to contact this organization and to include all associated cost in the bid price.

**3.08 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:
  - 1. Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72.
  - 2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.
  - 3. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
  - 4. Testing: Follow procedure and record results complying with requirements in NFPA 72.
  - 5. Test and Inspection Records: Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix-style form in Appendix A in NFPA 70.
- C. Provide entire system demonstration after successful testing to include, but not be limited to, the following:
  - 1. For the Owner after completion of each building.
  - 2. For the Authority having Jurisdiction after completion of each building.
  - 3. For the Owner after completion of all buildings.
  - 4. For the Authority having Jurisdiction after completion of all buildings.
  - 5. Demonstrations shall include fire alarm and mass notification systems.

**3.09 ADJUSTING**

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.
- B. Follow-Up Tests and Inspections: After date of Substantial Completion, test the fire alarm system complying with testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for three monthly, and one quarterly, periods.
- C. Annual Test and Inspection: One year after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, semiannual, and annual periods. Use forms developed for initial tests and inspections.

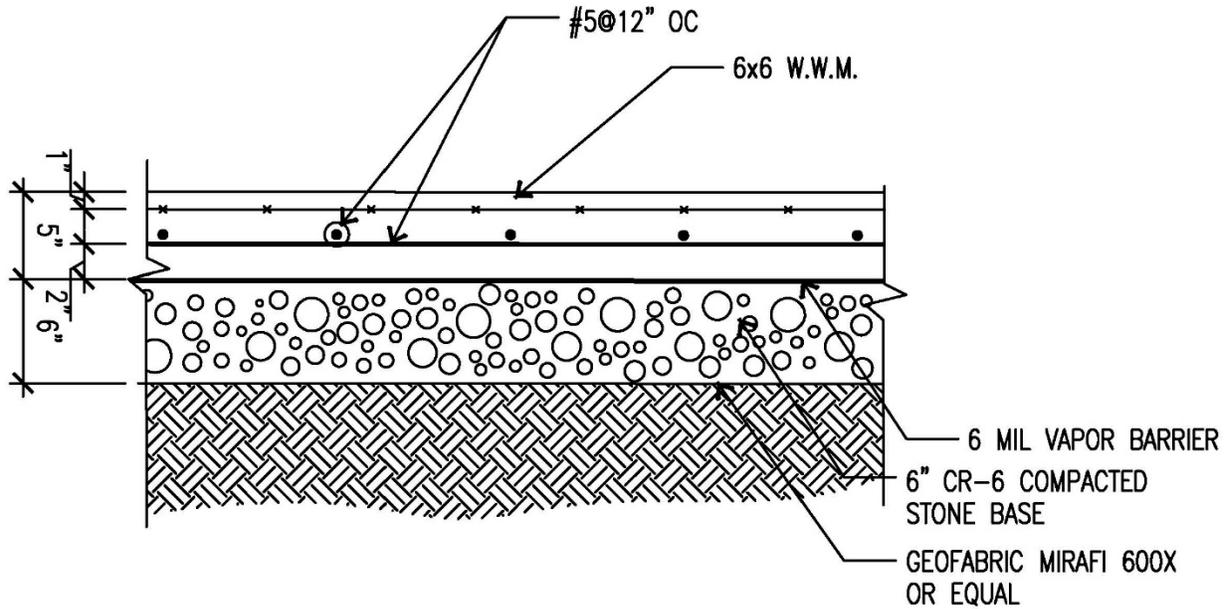
**3.10 DEMONSTRATION AND TRAINING**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices. Refer to Section "Closeout Procedures."

END OF SECTION 283111

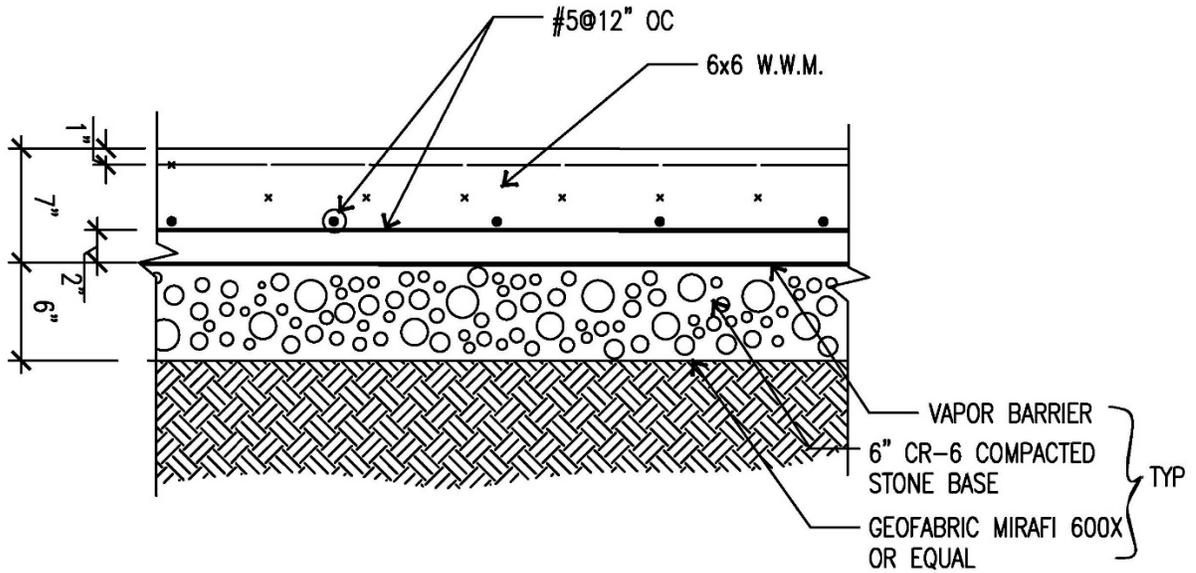
**PART 7: TECHNICAL DETAILS****CIVIL DETAILS**

- C.1 *Typical Concrete Sidewalk Paving Detail*
- C.2 *Typical Concrete Sidewalk Paving – 7" Thick*
- C.3 *Slab on Grade Control Joint*
- C.4 *Concrete Expansion Joint*
- C.5 *Typical Slab on Grade Construction Joint*
- C.6 *Detectable Warning Service Pavers*
- C.7 *Concrete Slab Edge at Grade*
- C.8 *Concrete Slab – Grade at Both Sides*
- C.9 *Paver & Concrete Slab Connection*
- C.10 *Paver & Firelane Connection*
- C.11 *Paver & Concrete Retaining Wall*
- C.12 *Concrete Pavement & Trench Cover*
- C.13 *Paver & Trench Connection*
- C.14 *Concrete Paving & Concrete Wall*
- C.15 *Concrete Site Stair*
- C.16 *Concrete Site Stair with Cheek Wall*
- C.17 *Curb with Catch Gutter*
- C.18 *Curb with Spill Gutter*
- C.19 *Mountable Curb with Spill Gutter*
- C.20 *Depressed Curb and Gutter*
- C.21 *Typical Direct Buried Ductbank Section*
- C.22 *Typical Ductbank Section Below Sidewalk*
- C.23 *IT Manhole Section*
- C.24 *Pedestrian Lightpole Foundation*



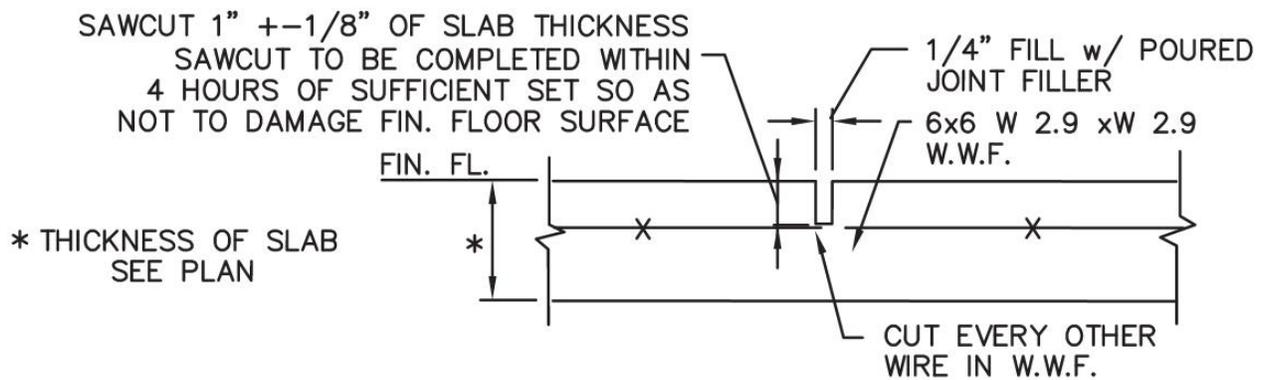
C.1 TYPICAL CONCRETE SIDEWALK PAVING DETAIL

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



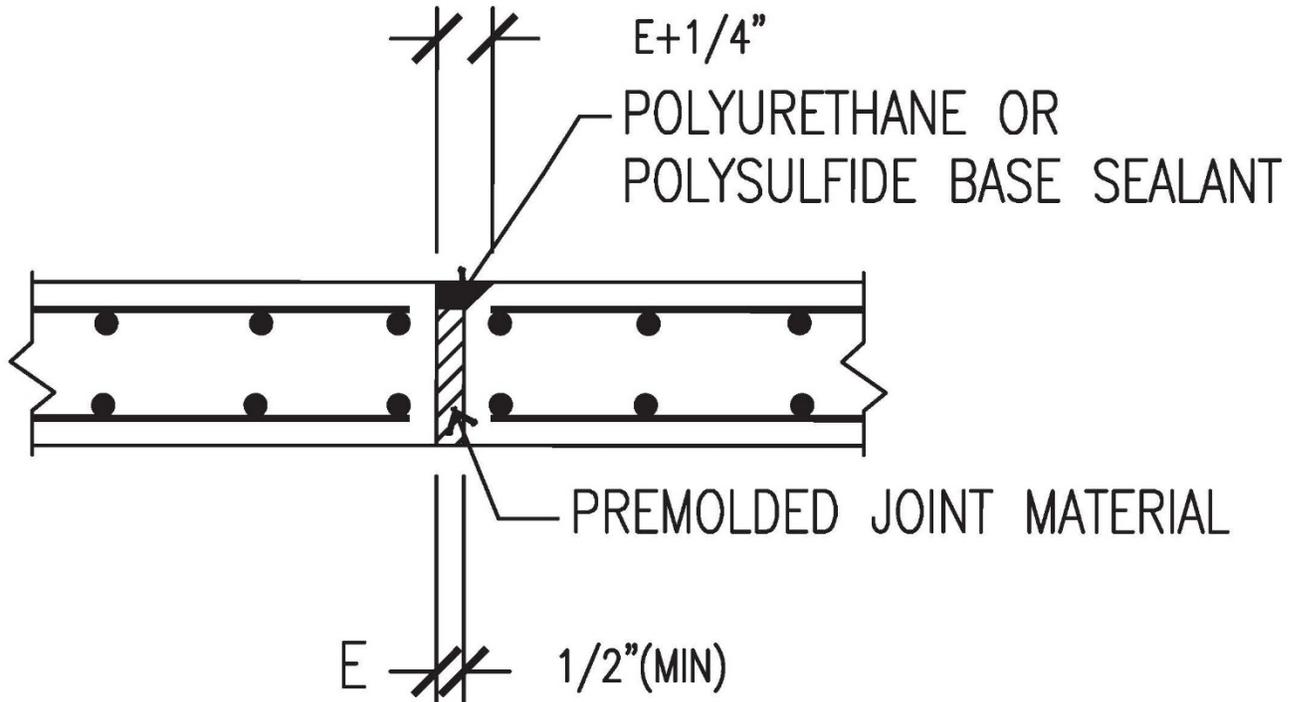
C.2 TYPICAL CONCRETE VEHICLE BEARING SIDEWALK - 7" THICK

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



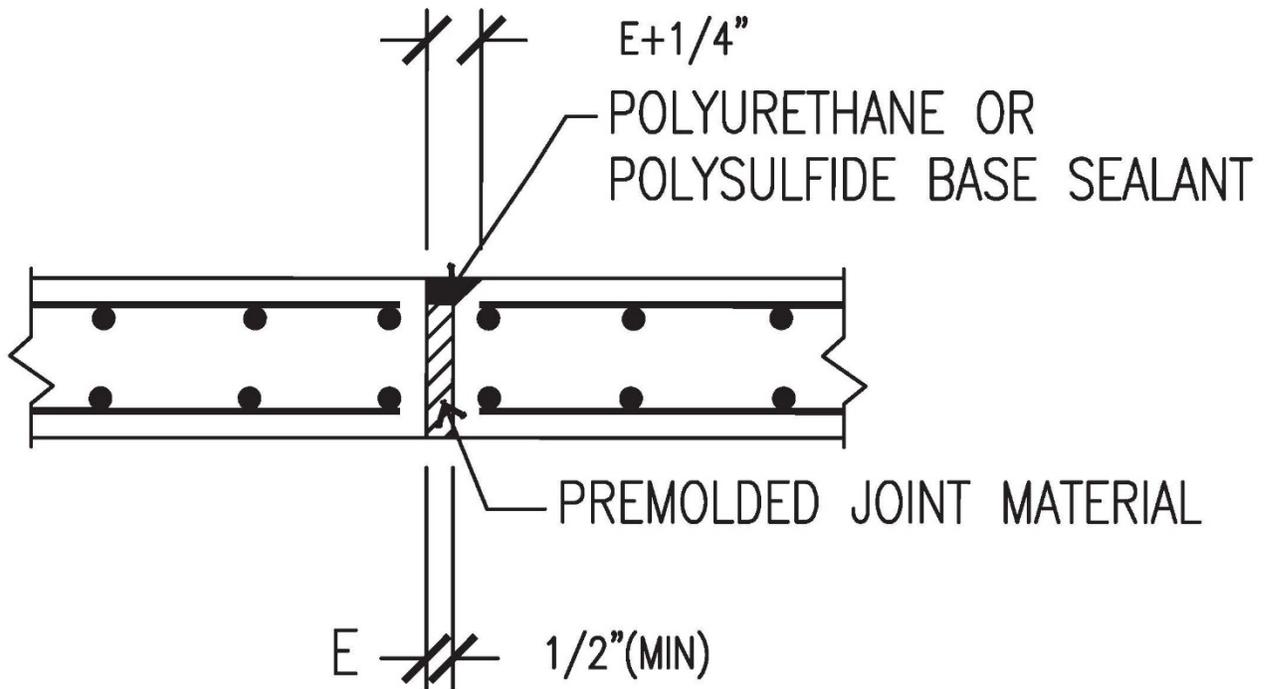
### C.3 SLAB ON GRADE CONTROL JOINT – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



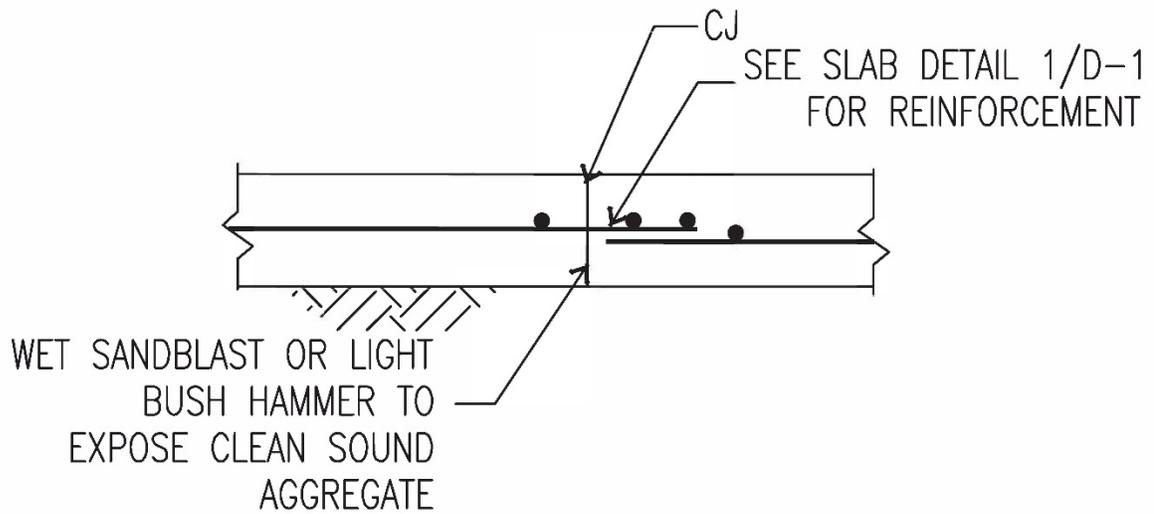
CONCRETE EXPANSION JOINT

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



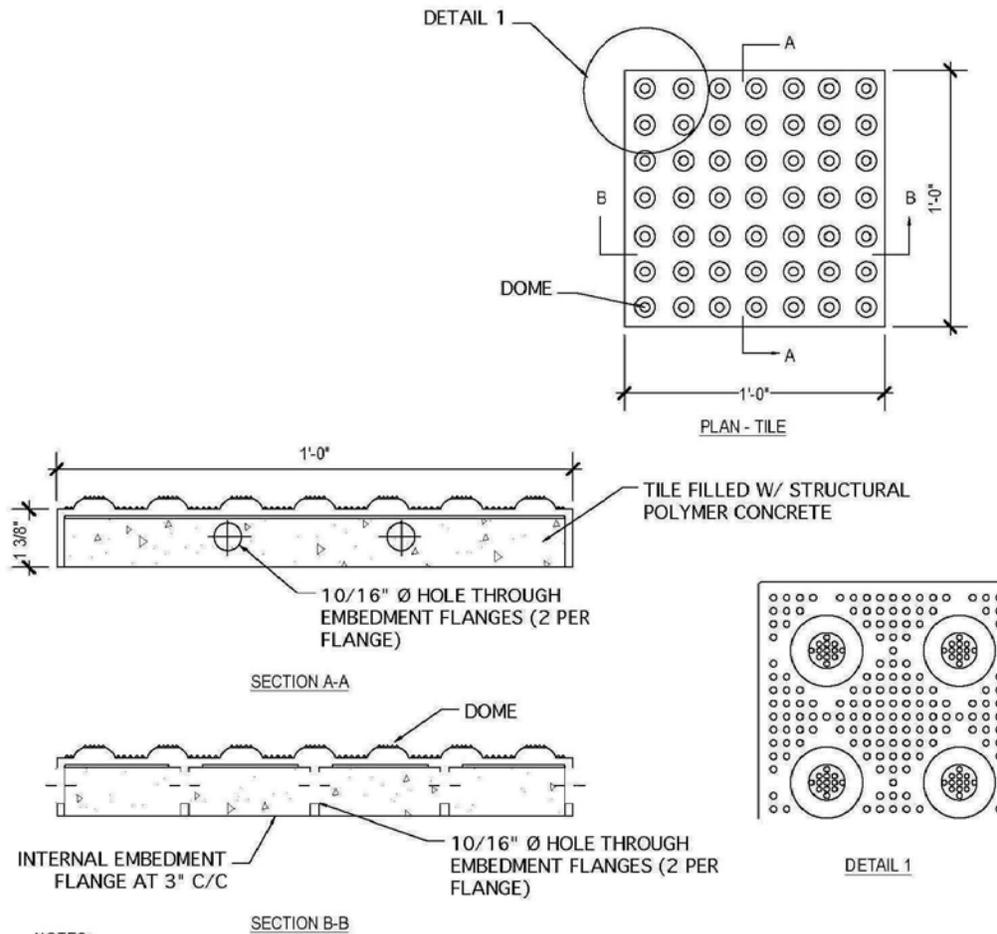
C.4 TYPICAL CONCRETE EXPANSION JOINT

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



C.5 TYPICAL SLAB ON GRADE CONSTRUCTION JOINT

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED

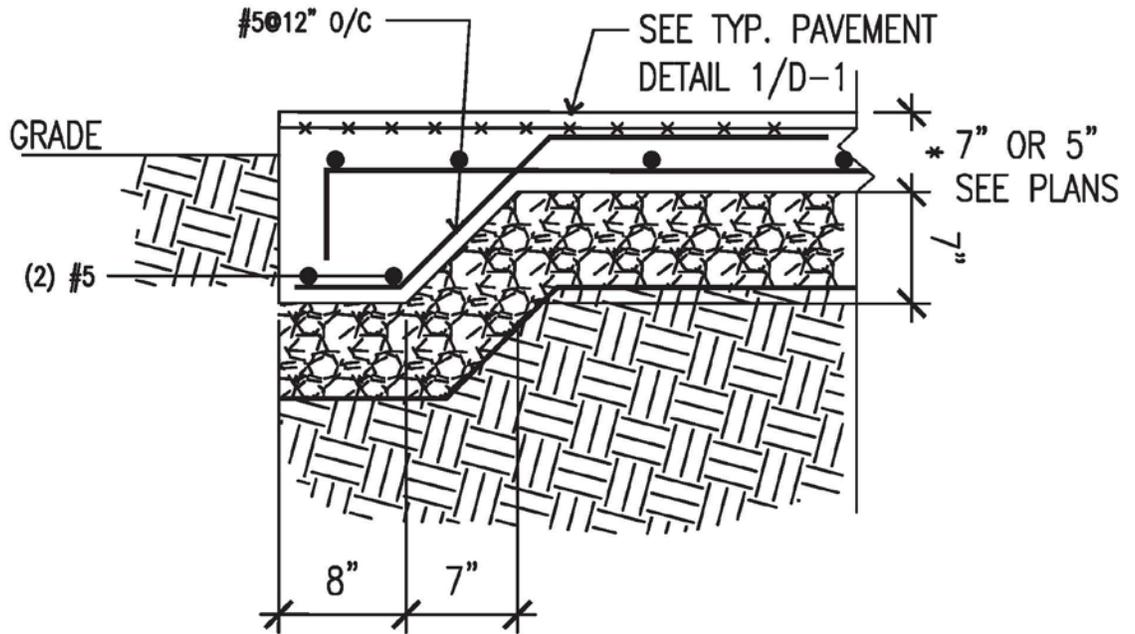


NOTES:

1. TACKTILE SYSTEM BY 'ARMOR-TILE' - 1 (800) 682-2525; COLOR: OCEAN BLUE; WET SET IN GROUT
2. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. DO NOT SCALE DRAWINGS.
4. FOR CUSTOM SIZING CONTACT MANUFACTURER.
5. CONTRACTORS NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT [www.CADdetails.com/info](http://www.CADdetails.com/info) REFERENCE NUMBER 681-003A.

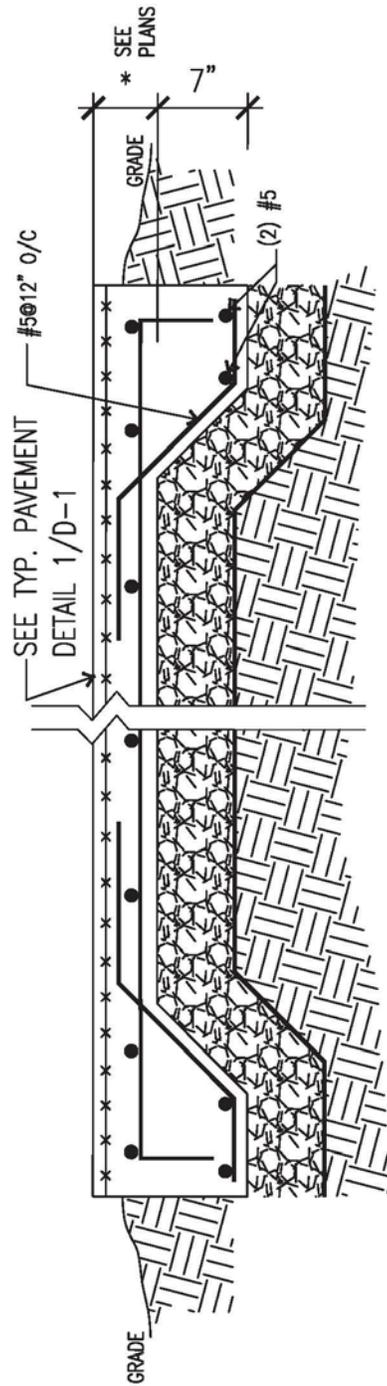
C.6 DETECTABLE WARNING SURFACE GUTTER – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



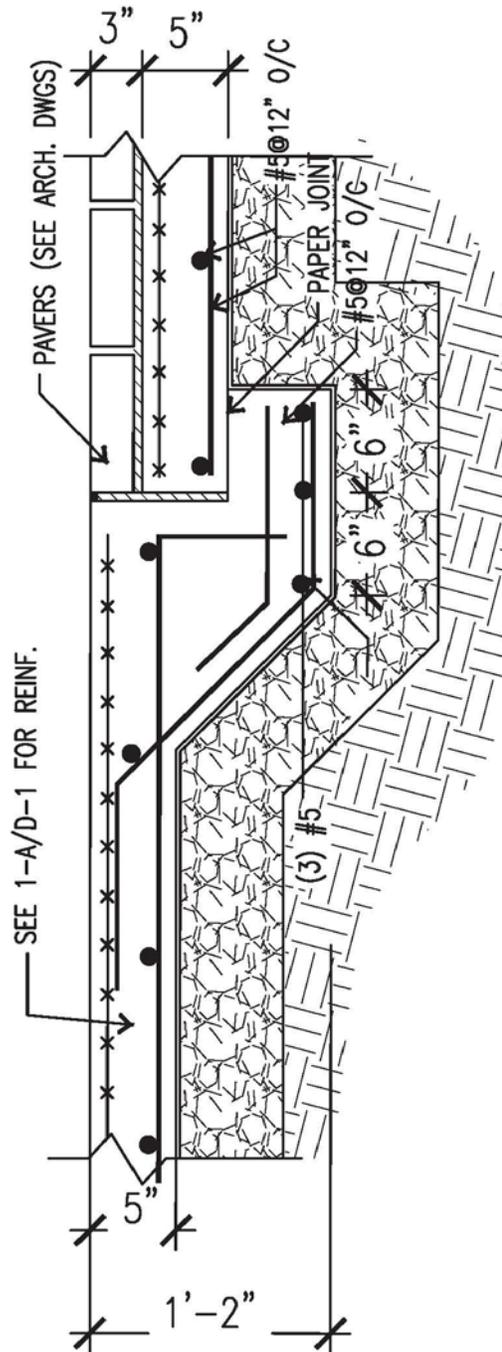
C.7 CONCRETE PAVEMENT EDGE AT GRADE – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



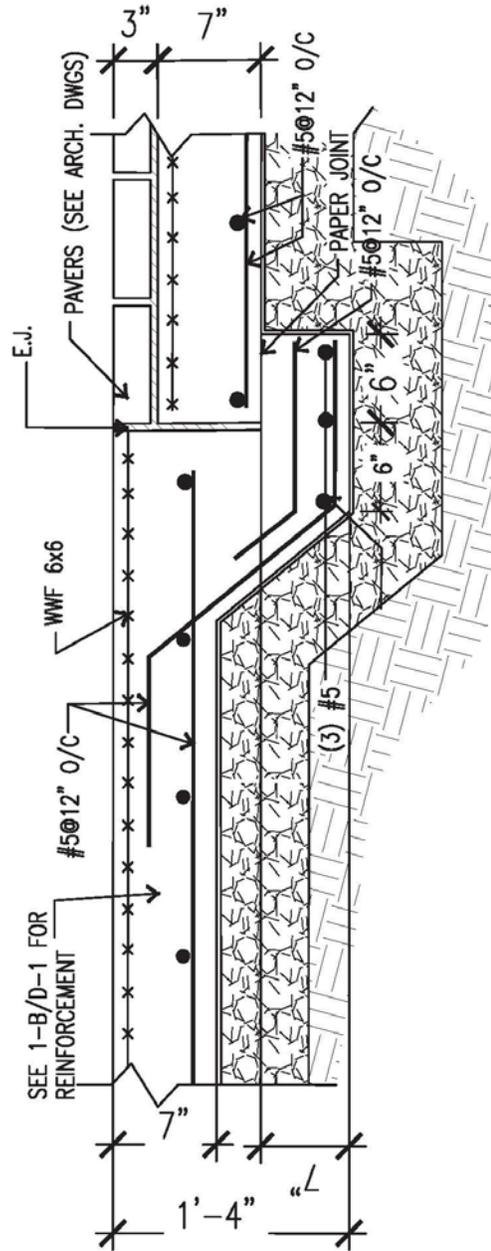
C.8 CONCRETE SLAB WITH GRADE BOTH SIDES – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



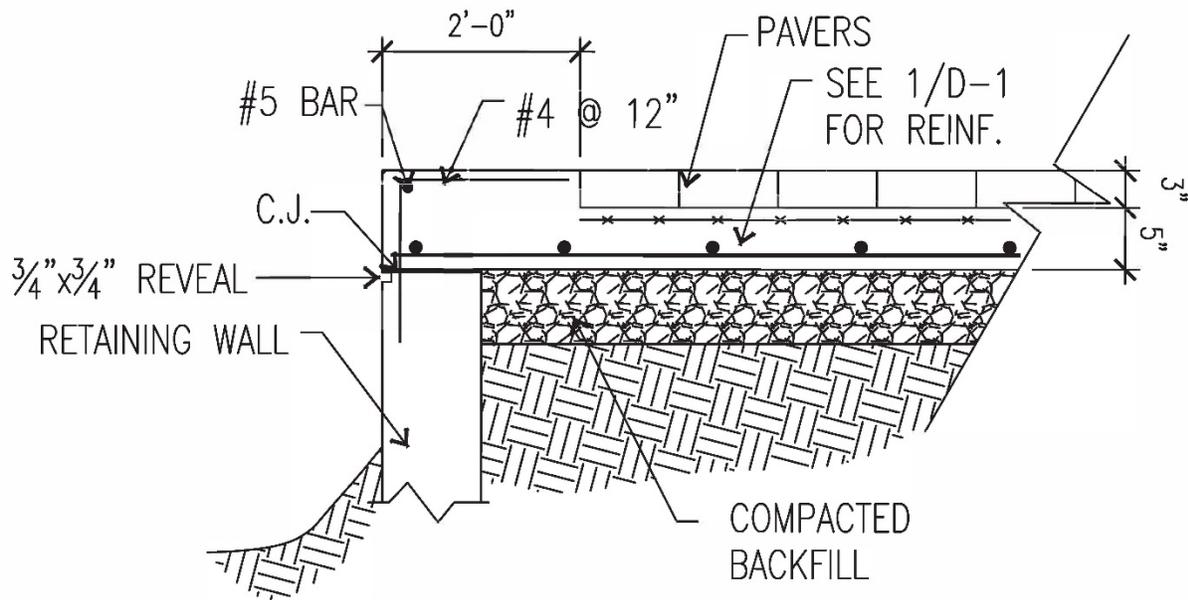
C.9 PAVER & CONCRETE SLAB CONNECTION – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



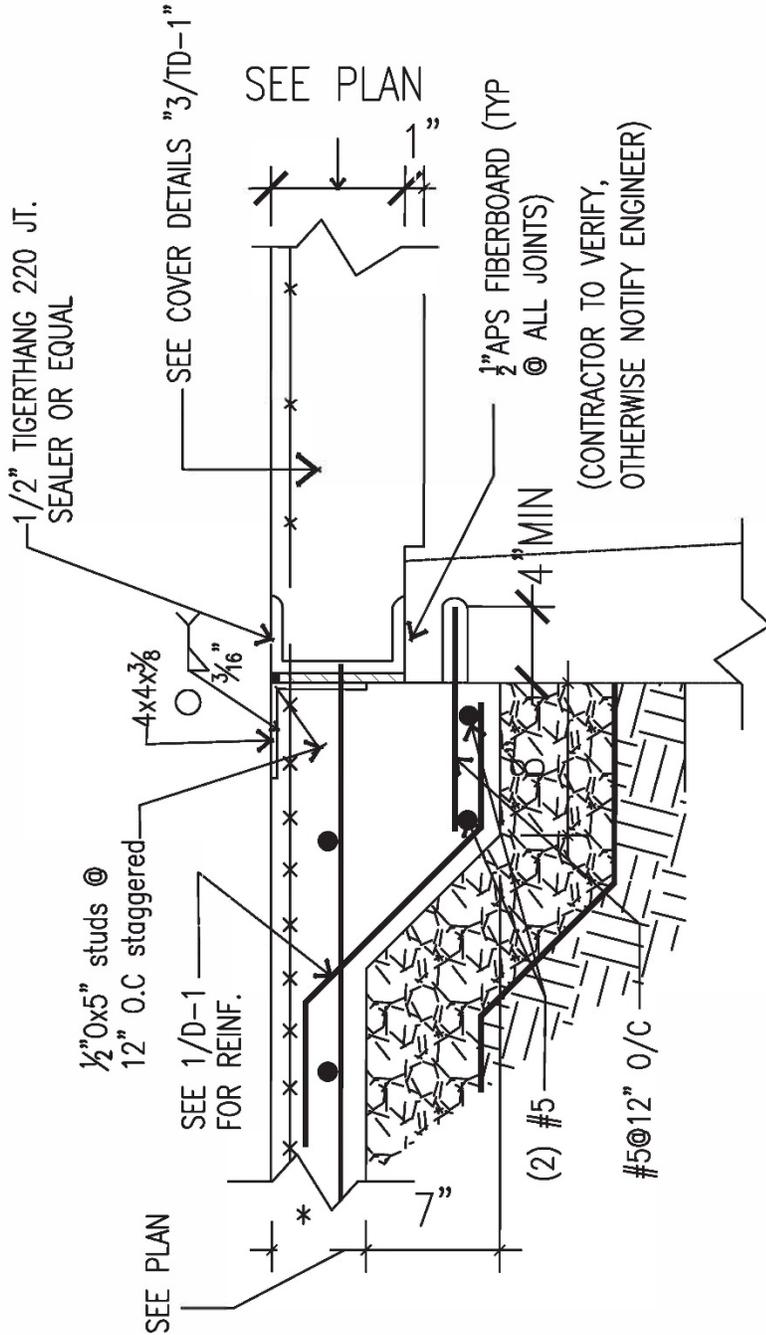
C.10 PAVER & FIRELANE CONNECTION DETAIL – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



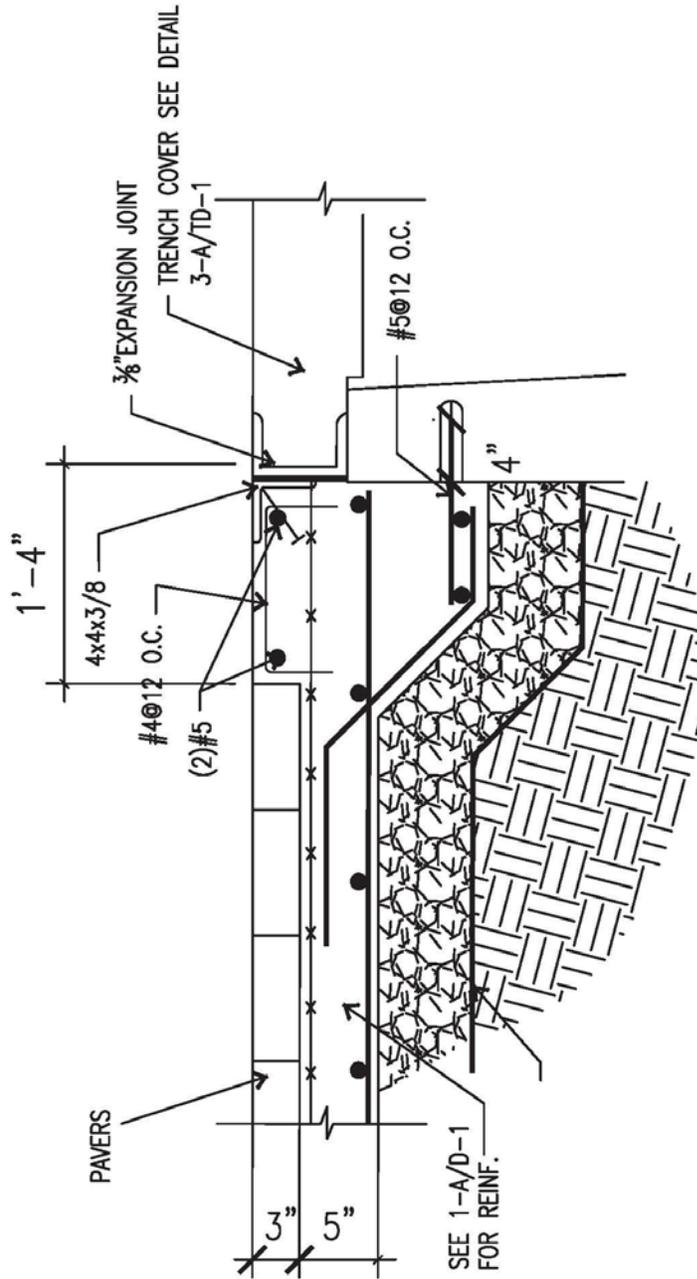
C.11 PAVER & CONCRETE RETAINING WALL - NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



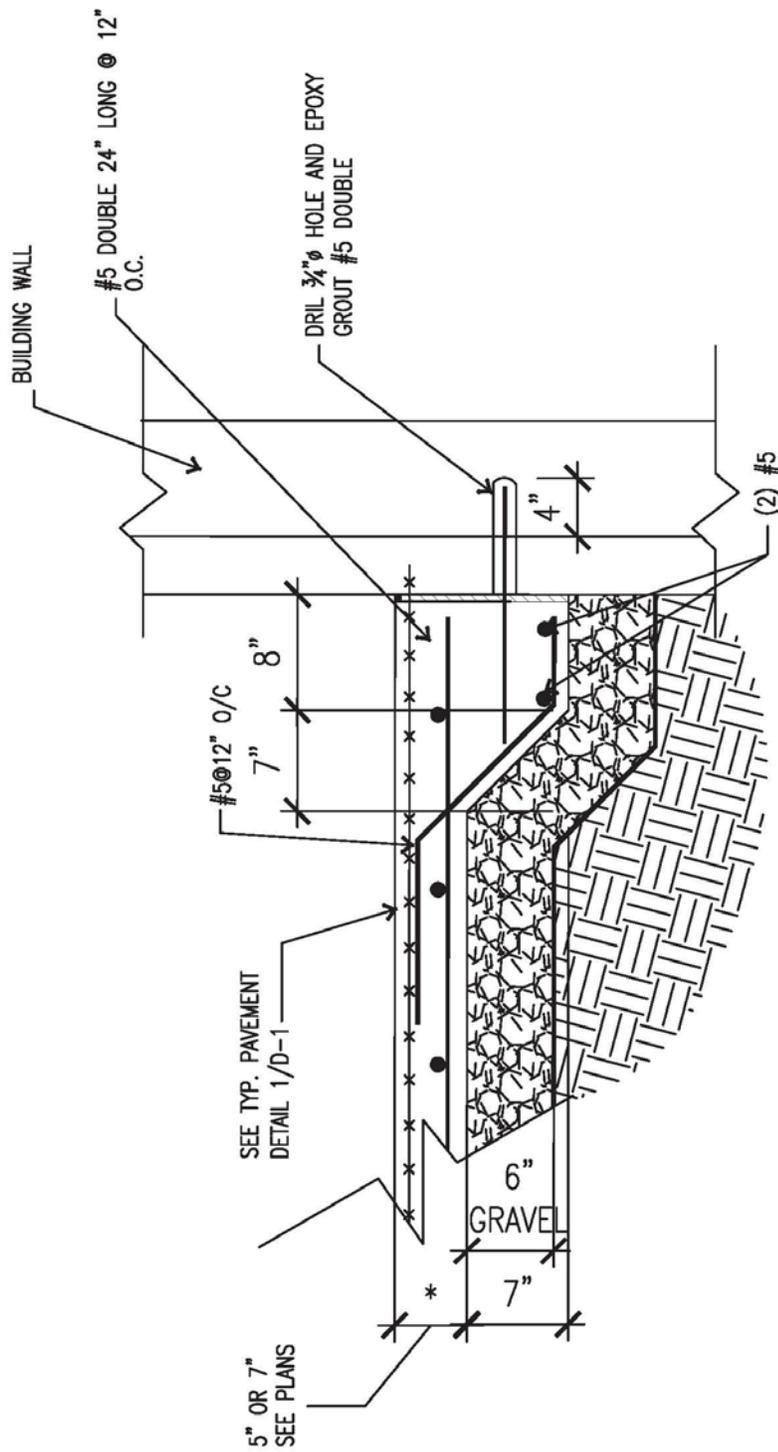
C.12 CONCRETE PAVEMENT & TRENCH COVER - NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



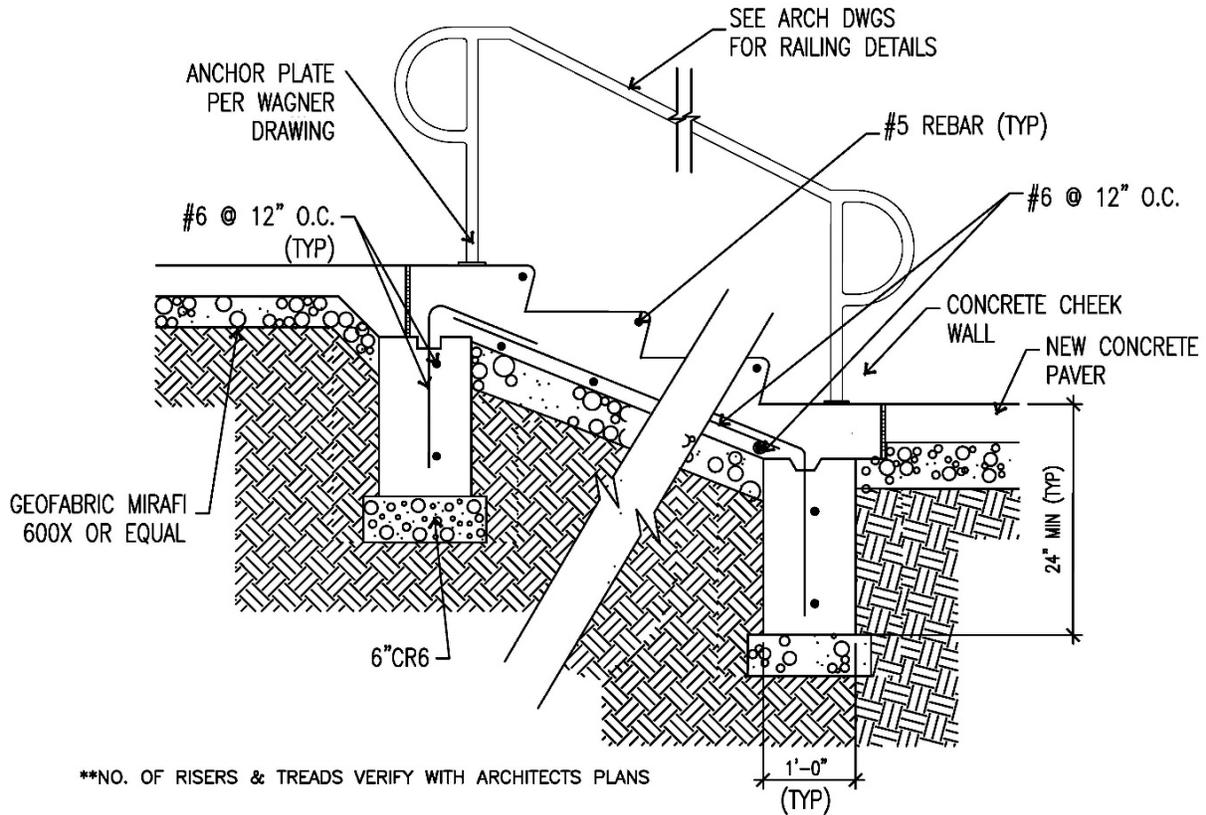
C.13 PAVER & TRENCH CONNECTION DETAIL - NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



C.14 CONCRETE PAVING & CONCRETE WALL – NOT TO SCALE

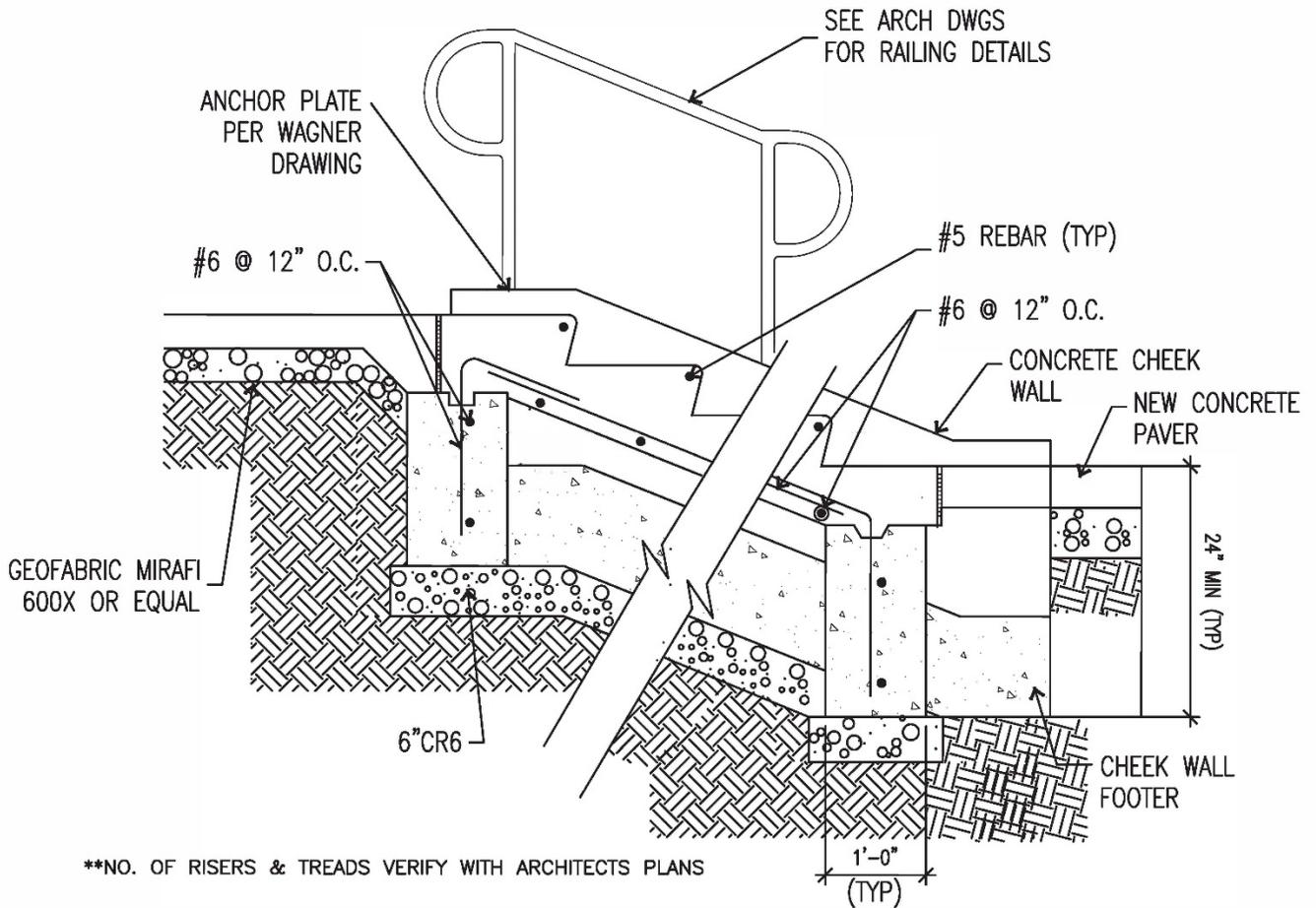
NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



C.15 CONCRETE SITE STAIR DETAIL - NOT TO SCALE

NOTE 1: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED

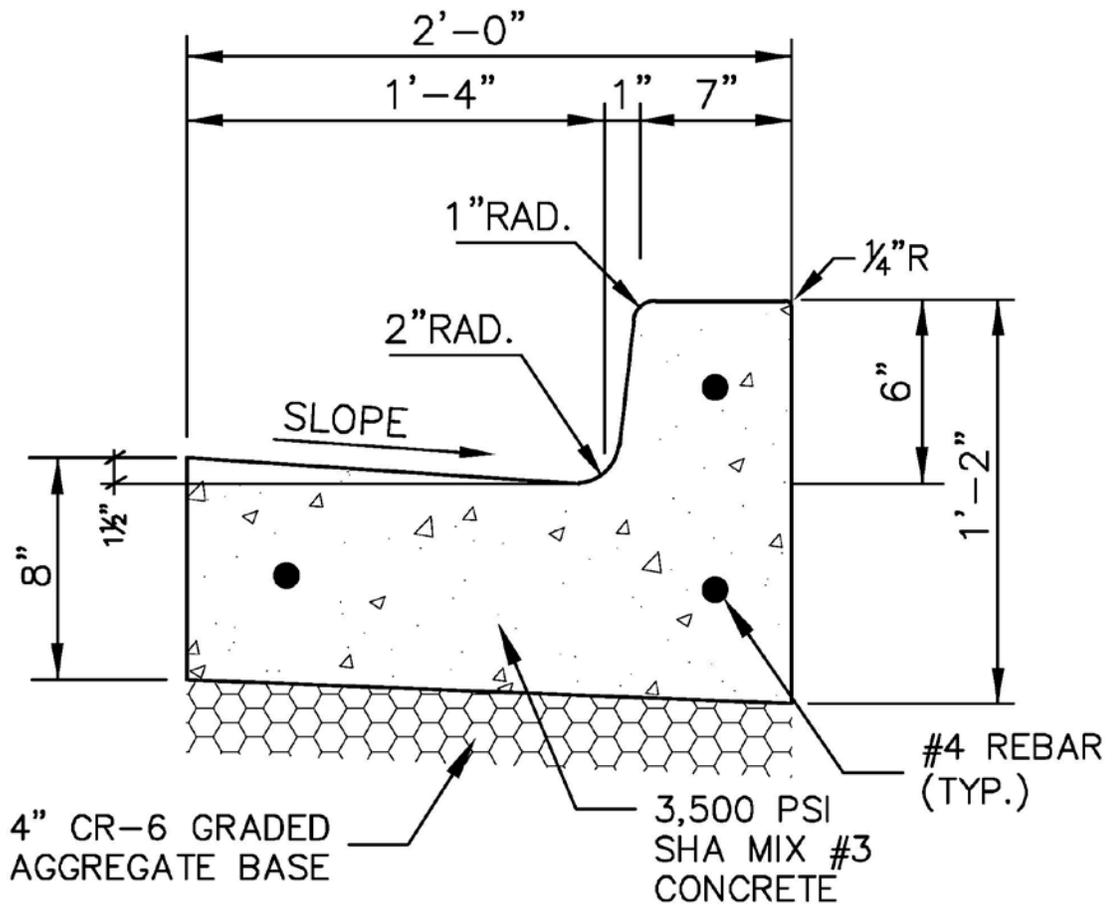
NOTE 2: COORDINATE WITH COLLEGE FOR RAILING CONFIGURATION AND PRODUCT INFORMATION



C.16 CONCRETE SITE STAIR WITH CHEEK WALL – NOT TO SCALE

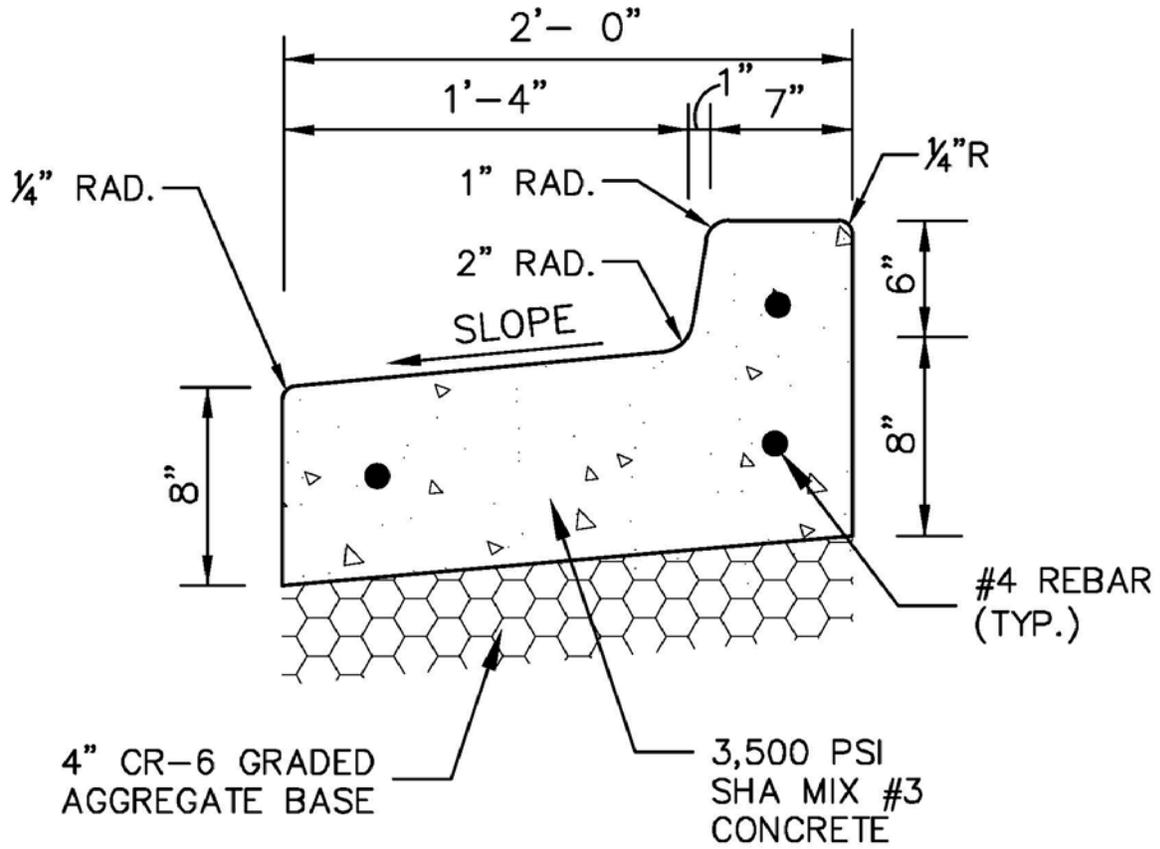
NOTE 1: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED

NOTE 2: COORDINATE WITH COLLEGE FOR RAILING CONFIGURATION AND PRODUCT INFORMATION



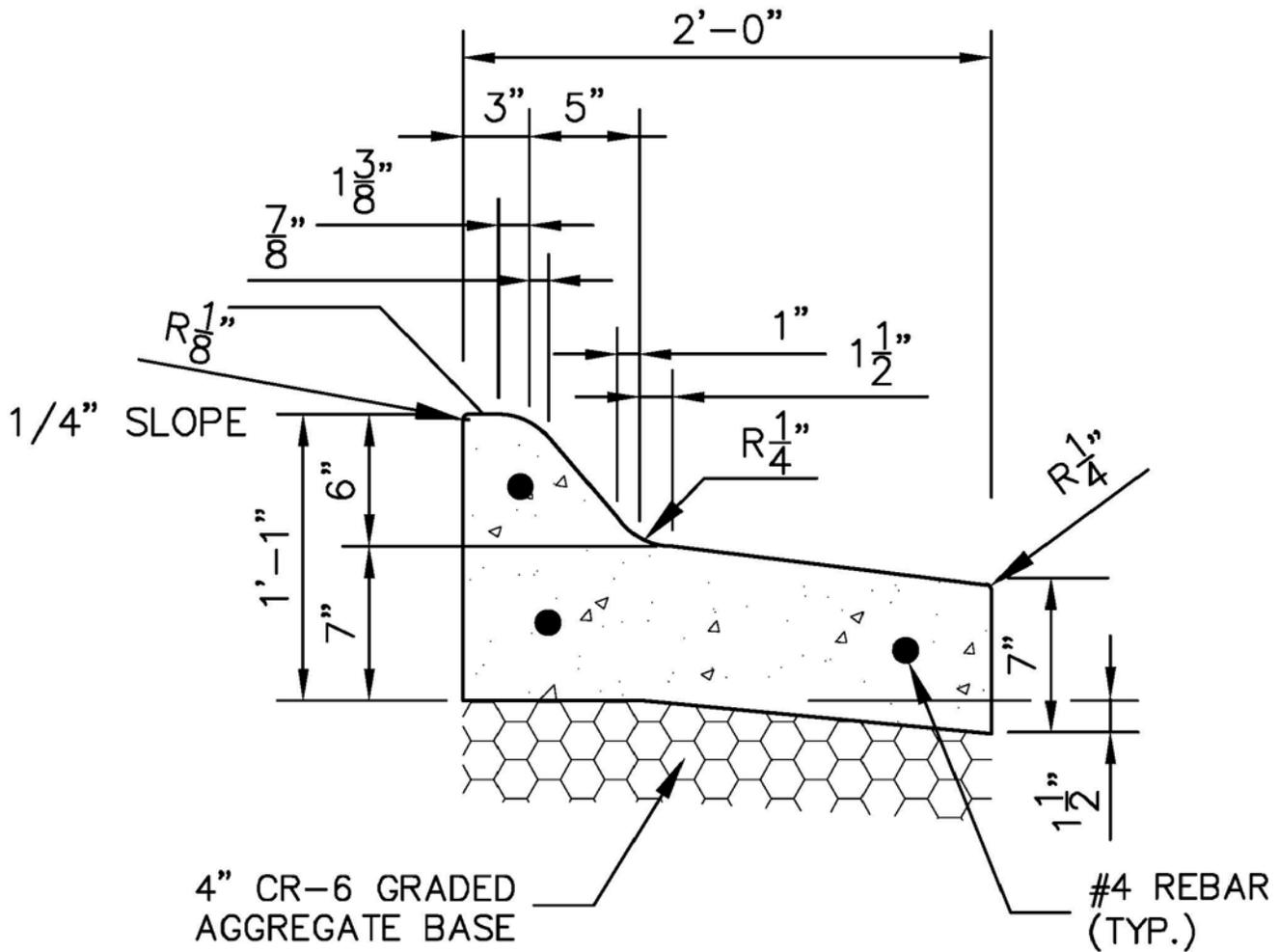
C.17 CURB WITH CATCH GUTTER – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



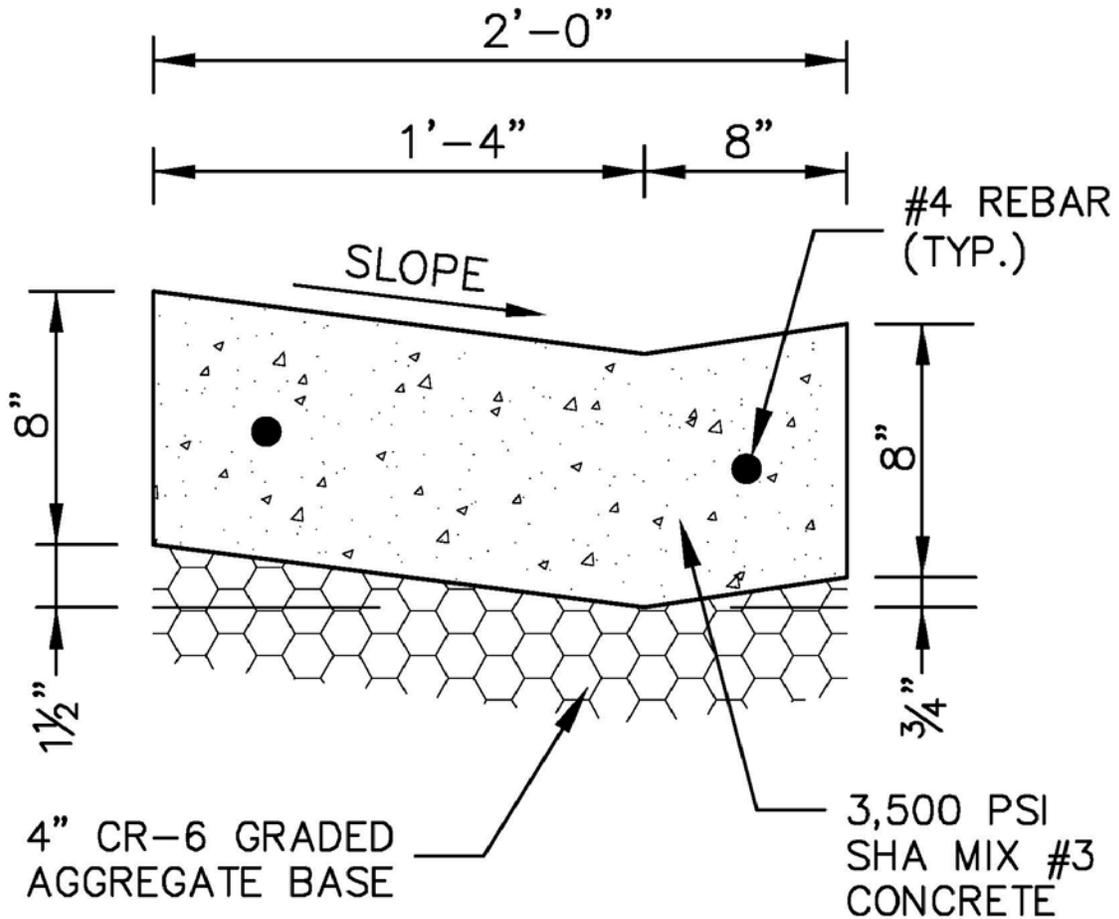
C.18 CURB WITH SPILL GUTTER - NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



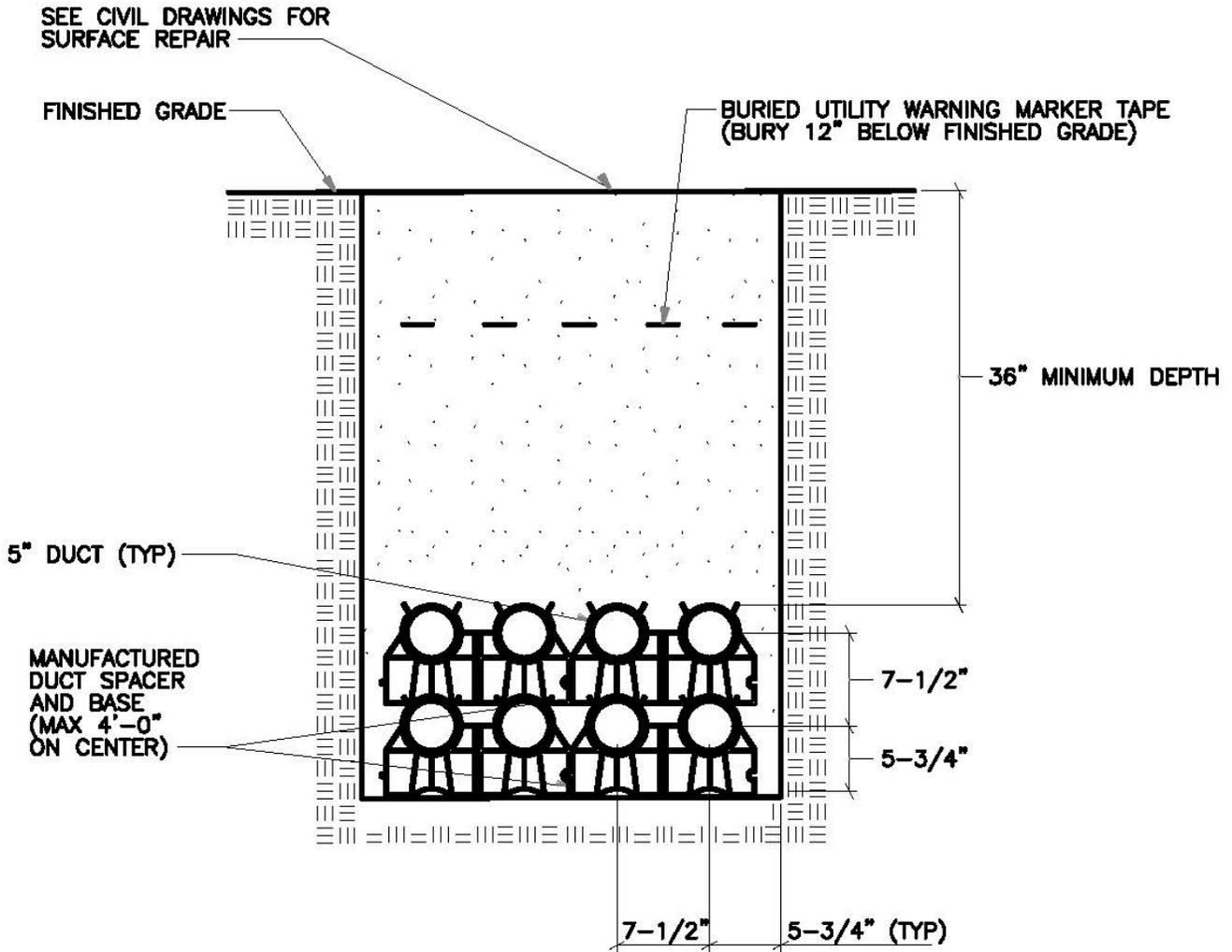
C.19 MOUNTABLE CURB WITH SPILL GUTTER – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



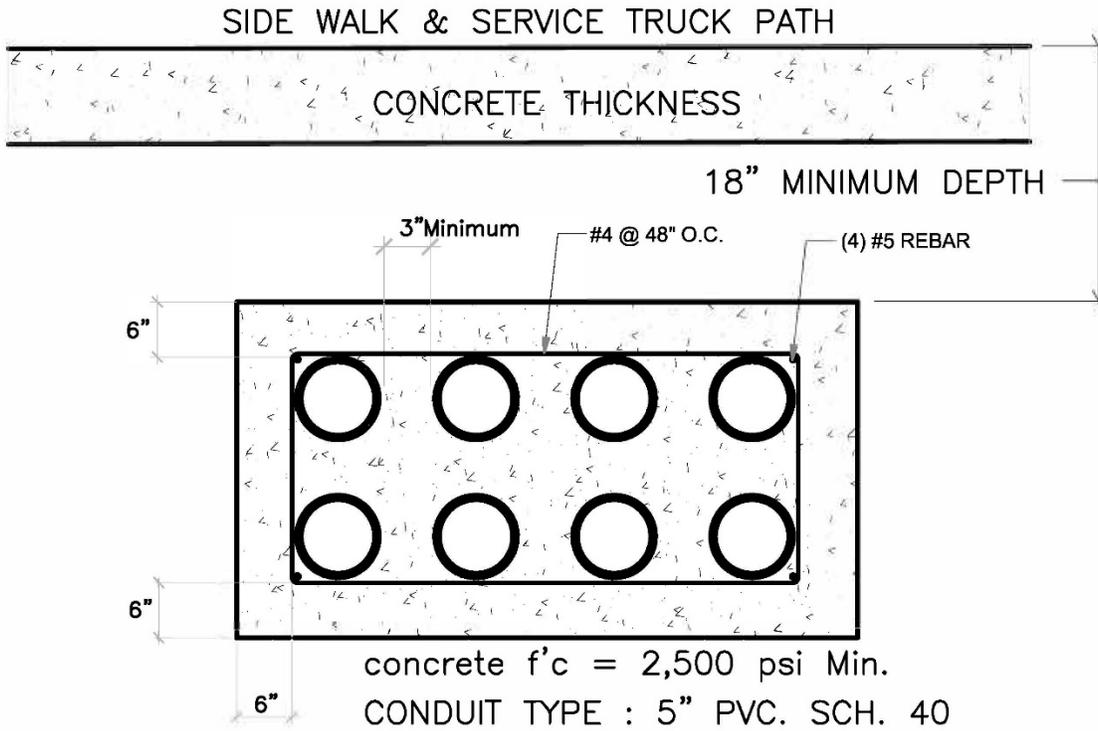
C.20 DEPRESSED CURB AND GUTTER – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



8-WAY DUCTBANK SHOWN – COORDINATE NUMBER AND CONFIGURATION OF DUCTS WITH PLANS AND SECTIONS. FOR ADDITIONAL DUCT ROWS OR COLUMNS, THE DISTANCE BETWEEN ADJACENT DUCTS SHALL BE 7-1/2\".

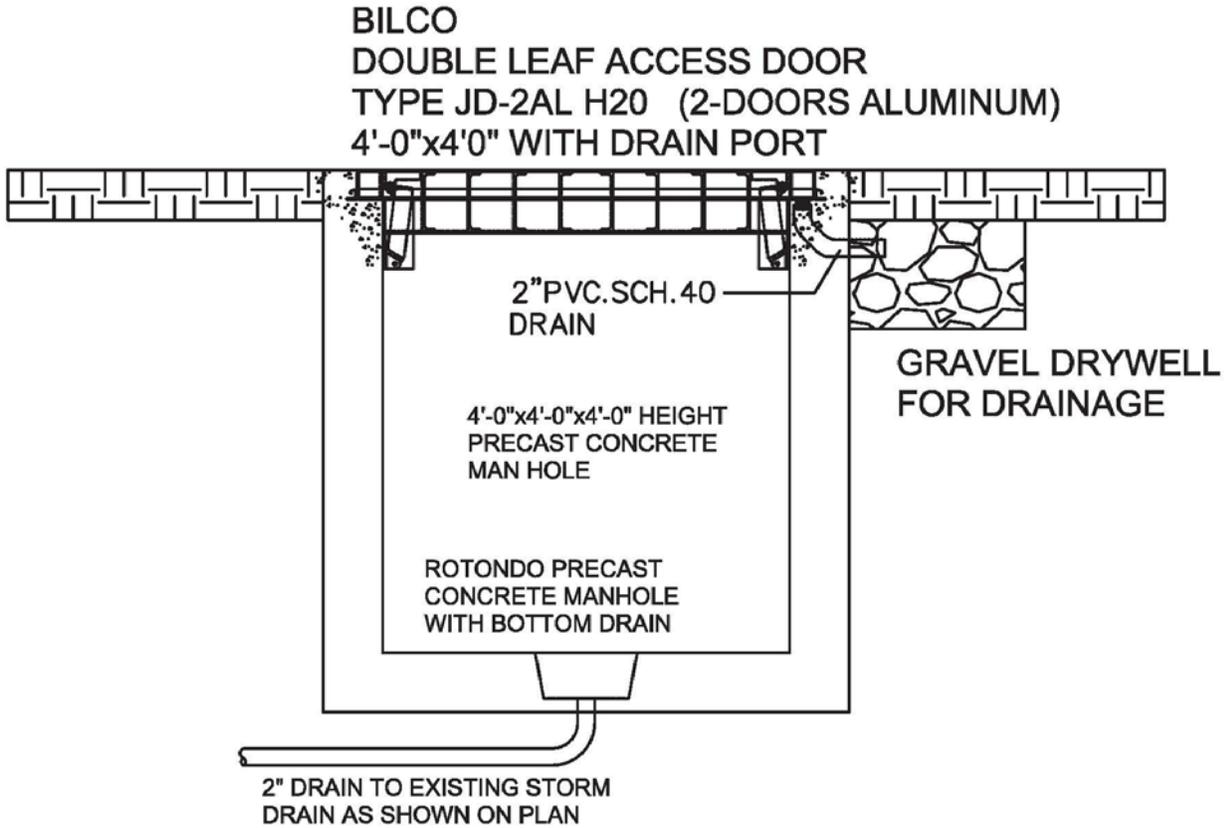
C.21 TYPICAL DIRECT BURIED DUCTBANK – NOT TO SCALE



8 WAY DUCTBANK WHERE RUN UNDER EXISTING TRENCH SHALL BE RUN INSIDE 6"Ø PVC. SCH.40 PIPE SLEEVE. MINIMUM OF 6" BELOW BOTTOM OF EXISTING TRENCH WHERE CROSSING. ENCASED IN CONCRETE IS NOT REQUIRED WHERE CROSSING UNDER EXISTING TRENCH.

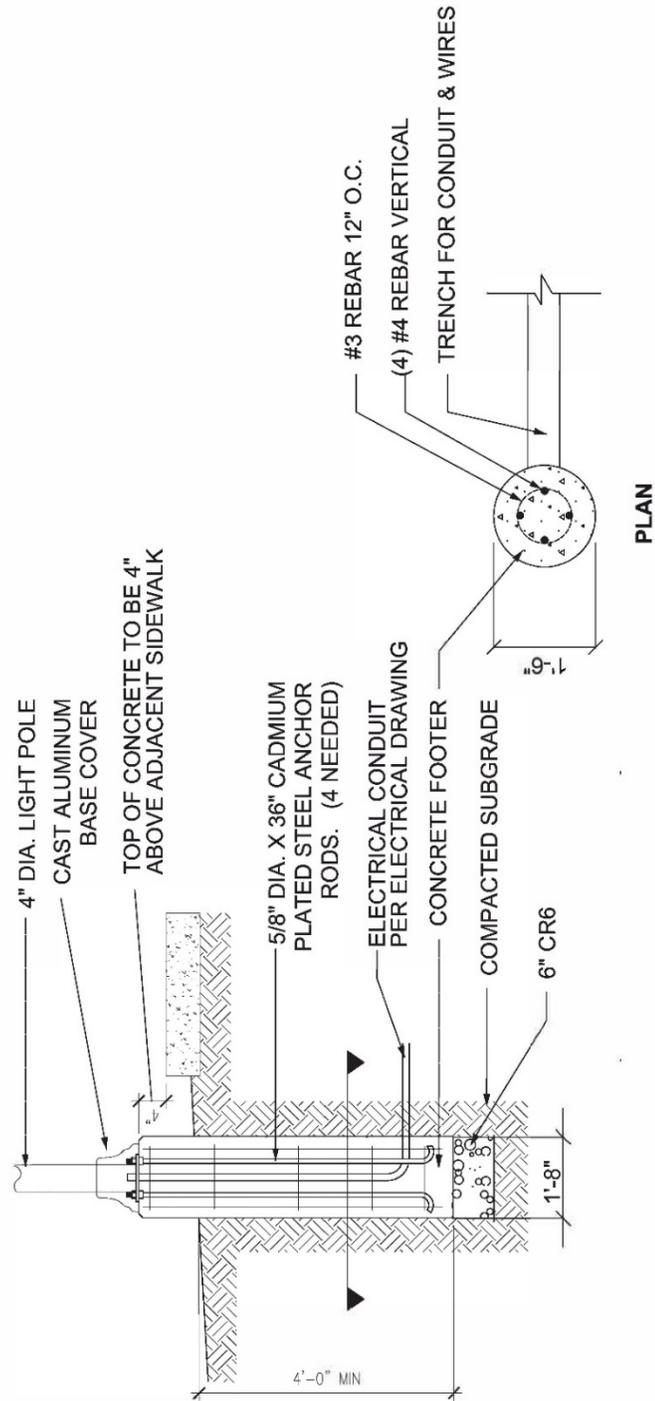
C.22 TYP. DUCTBANK SECTION BELOW SIDEWALK – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



C.23 IT MANHOLE SECTION – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED



PEDESTRIAN LIGHT POLE FOUNDATION – NOT TO SCALE

NOTE: ALL W.W.M. AT CONCRETE SITE WORK IS TO BE EPOXY COATED