

## **SECTION 2: GENERAL DESIGN STANDARDS**

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## **SECTION 2: GENERAL DESIGN STANDARDS**

### **1. SCOPE:**

- 1.1. This section outlines the general design standards for the design of new building structures and the renovation of existing buildings. New building structures shall include, but not be limited to, institutional quality buildings for general office, research, instruction clinics, support spaces, and parking garages.

### **2. LIST OF BUILDING CODES AND REVIEW AGENCIES:**

- 2.1. **Jurisdiction:** The design and construction of University-owned and funded facilities on State property is not reviewed by Baltimore City, nor are Baltimore City building or occupancy permits issued. It is intended that a consistent level of public health and safety will be maintained throughout the urban area by application of the same (or similar) health and safety standards as administered by the City, with professional review, inspection and maintenance by the University. However, close coordination with regulations of emergency response agencies and utility services furnished by others is necessary and must be reviewed by them as circumstances indicate. Therefore, all facility projects must conform, to the extent noted herein, with the most current editions of the codes, standards, and review agencies, as adopted by the State of Maryland Codes Administration, referred to in the following section and paragraph:

- a. The review of design and/or construction by agencies external to University shall be coordinated in consultation with the UM OFM Project Manager prior to contact of the agency by the A/E or contractor. These agencies include the Architectural Review Board(s), AAALAC, Maryland MDE/DOE, the State Fire Marshal, Baltimore City Department of Public Works/Traffic and Transit, and others as applicable.

- b. Baltimore City Codes are not in force on UM (State of Maryland) property.

- 2.2. **Codes and Standards:** Applicable building, codes, standards, and authorities having jurisdiction include:

- a. The Building Performance Code of the State of Maryland (COMAR 05.02.07), in the latest adopted edition of the following with all appendices, references and additions incorporated:

- (1) International Building Code (IBC)
- (2) International Mechanical Code (IMC)
- (3) NFPA 101 Life Safety Code
- (4) International Energy Conservation Code (IECC)

- b. Maryland State Fire Prevention Code (COMAR 29.06.01), incorporating the NFPA 101, Life Safety Code, and its referenced standards, as reviewed by:

- (1) The University Fire Marshal who is the Resident designee for the State Fire Marshal.
  - c. International Mechanical Code (IMC), latest edition as adopted by the State of Maryland.
  - d. National Standard Plumbing Code Illustrated (PHCC), and supplements, latest editions adapted by the State of Maryland.
  - e. The National Electrical Code, latest edition as adopted by the State of Maryland.
  - f. Maryland Occupational Safety & Health Administration (MOSHA).
  - g. Regulations Governing Elevators, Dumbwaiters, Escalators and Moving Walks, ANSI/ASME A17.1, (COMAR 09.12.81 through 09.12.83) both reviewed in construction by the:
    - (1) Maryland Department of Licensing and Regulation, and the Bureau of Labor and Industry.
  - h. Specifications for Making Buildings Accessible to and usable by Physically Handicapped People, ANSI A 117.1 (1986).
  - i. Americans with Disabilities Act (ADA), Public Law 101-336 US Dept. of Justice, 1991, and COMAR 05.02.02.
  - j. Annotated Code of Maryland, Sections 4-802 and 4-808, relative to "Procurement-Solar Power" requiring documented consideration of active and passive solar energy use in accordance with the DGS Life-cycle Costing Criteria, March 1991.
- 2.3.** Animal Facilities shall be designed in accordance with the following standards and shall be reviewed as directed by the UM OFM Project Manager, which will include coordination with the University Director of Veterinary Resources:
- a. American Association for the Accreditation of Laboratory Animal Care (AAALAC)  
5283 Corporate Drive, Suite 203  
Frederick, Maryland 21703-2879
- 2.4.** Excavation and/or Storm Water Management shall comply with requirements of the:
- a. Maryland Department of The Environment (MDE)  
1800 Washington Boulevard  
Baltimore, Maryland 21230
- 2.5.** For all Maryland State funded capital construction projects, submission for review of the design at the Schematic Design Phase is required to be made to the

following organizations, with additional submissions as directed by the UM OFM Project Manager:

- a. The State Architectural Review Board (State ARB) of the Department of General Services
- 2.6. All New Capital Improvement Projects which improve or face upon a public rights-of-way, shall comply with the requirements of:
  - a. The Design Advisory Panel (DAP)  
Department of Planning, Baltimore City
- 2.7. For projects within the Baltimore City Public rights-of-way, comply with the requirements of:
  - a. Department of Public Works “Book of Standards”, and the Department of Traffic and Utility Engineering  
Baltimore City  
Abel Wolman Municipal Building  
Baltimore, Maryland 21203
- 2.8. For projects which are located within the MIEMSS helicopter approach zone in accordance with FAA designated flight paths, comply with the requirements of:
  - a. Maryland State Police  
Aviation Division  
3023 Strawberry Point Road  
Baltimore, Maryland 21220
- 2.9. For projects that require electrical inspections, all coordination and fees are the responsibility of the contractor and one of the following shall apply:
  - a. For projects on the UM campus, specify that UM will utilize its internal inspection team for the all inspection services. In addition, capital projects may use an independent testing agency, as determined by the UM OFM Project Manager. Independent electrical testing agency shall be approved by the Maryland State Fire Marshal.
  - b. For projects on other University campuses, i.e. state owned facilities, all inspections shall be performed by University and/or an independent testing agency as determined by the UM OFM Project Manager.
  - c. For projects on other than state owned property, specify that electrical contractor shall obtain and pay for all permits required for all electrical work and associated inspections. An inspection by an independent electrical inspection agency, approved by the Maryland State Fire Marshal, may or may not be requested as determined by the UM OFM Project Manager.
- 2.10. For all projects requiring excavation, comply with the requirements of:

- a. Miss Utility  
Suite 100  
7223 Parkway Drive  
Hanover, Maryland 21076  
1-800-257-7777 / 410-712-0056
  
- 2.11. For all projects utilizing district steam service, comply with the requirements of:
  - a. Trigen - Baltimore Energy Corporation  
1400 Ridgely Street  
Baltimore, Maryland 21230
  
- 2.12. For all projects involving state historical landmarks, or buildings within designated historical districts, considered to be of historical interest as coordinated through the UM OFM Project Manager, comply with the requirements of:
  - a. The Maryland Historical Trust  
100 Community Place  
Crownsville, Maryland 21032
  
- 2.13. A Comprehensive Code Analysis, including any authorized variances and protected emergency evacuation routes, shall be documented in the drawings at the Schematic, Design Development and all Construction Document Phases of design. "Record Documents" shall update any changes made during construction.
  
- 2.14. Research Facilities shall be designed, in addition to the applicable aforementioned codes and standards, in accordance with the standards listed below and shall be reviewed as directed by the UM OFM Project Manager which will include coordination with the University Environmental Health and Safety Department (EHS). As a recipient of National Institute of Health (NIH) funding, University Research Facilities must comply with all applicable Federal statutes, regulations, and policies. Listed below are the primary regulations and consensus standards applicable. The consultants shall not consider this list to be all inclusive and shall understand that an omission of a regulation does not absolve their responsibility for complying with it. The most current version of a standard available at the time of design shall be used.
  - a. Current International Building Code (IBC)
  - b. Current Edition, Biological Safety in Microbiological and Biomedical Laboratories (BMBL), U.S. Department of Health and Human Services Centers for Disease Control and Prevention and National Institutes of Health.
  - c. Occupation Safety and Health Administration(OSHA), Occupational exposure to hazardous chemicals in laboratories, 29 CFR 1910.1450

- d. Occupation Safety and Health Administration (OSHA), Bloodborne pathogens, 29 CFR 1910.1030
- e. Occupation Safety and Health Administration (OSHA), Flammable and combustible liquids, 29 CFR 1910.106
- f. National Fire Protection Association (NFPA) 45, Standard on Fire Protection for Laboratories Using Chemicals
- g. American National Standard for Emergency Eyewash and Shower Equipment, Z358.1-2009
- h. American National Standard for Laboratory Ventilation,
- i. ANSI/AHIA Z9.5-2003
- j. National Sanitation Foundation (NSF) 49, Class II (Laminar Flow) Biosafety Cabinetry
- k. Method for Testing Performance of Laboratory Fume Hoods, ANSI/ASHREA 110-1995
- l. Industrial Ventilation: A Manual of Recommended Practice – 24th Edition. The American Conference of Governmental Industrial Hygienists, Inc.
- m. Consultants should also review the National Institutes of Health (NIH) Office of Research Facilities policy on the design of research laboratories. Although not mandatory, it provides prudent information on the design of research laboratories.

**2.15. Code and Standards Web Site Links:**

- a. Maryland Code Information:
  - (1) Maryland Code Administration (Code Lynx) is accessible at the following site: <http://mdcodes.umbc.edu>
  - (2) Maryland COMAR Codes are accessible at the following site: <http://www.dsd.state.md.us/comar/>
- b. National Institutes of Health (NIH) Design Policies and Guidelines can be accessed at the following site: <http://orf.od.nih.gov/PoliciesAndGuidelines/DesignPolicy/labtoc.html>
- c. The Maryland Historical Trust can be accessed at the following site: <http://www.marylandhistoricaltrust.net/mhtstaff.html>
- d. American Association for the Accreditation of Laboratory Animal Care (AAALCA) can be accessed at the following site: <http://aalac.org>

- e. The Maryland Department of the Environment can be accessed at the following site: <http://www.mde.maryland.gov>
- f. The Maryland Department of Licensing and Regulation can be accessed at the following site: <http://www.dllr.state.md.us>
- g. The Maryland State Aviation Division can be accessed at: <http://www.msaviation.org>
- h. Miss Utility can be accessed at the following site: <http://www.missutility.net/maryland/>
- i. UM Master Specifications, A/E Design Standards Manual, A/E Procedures Manual, CAD Standard Drawing Templates and CAD Detail Files can be accessed at the following site: <http://www.umbfm.umaryland.edu/>
- j. UM Environmental Health and Safety can be accessed at the following site: <http://www.ehs.umaryland.edu>

### 3. INCORPORATION OF UNIVERSITY CONTRACTS FOR CONSTRUCTION:

**3.1. Contract(s) for Construction:** All contracts for construction will be advertised, negotiated and executed by the University Office of Procurement and Supply (OPS) acting with the UM OFM Project Manager. OPS will furnish the A/E and builder(s) with the following information for incorporation into the construction documents and contract(s):

- a. Procurement regulations and attachments for construction contract(s);
- b. Sections 00700 University Standard General Conditions of the Construction Contract (University General Conditions) and 00800 Amendments to the General Conditions.
  - (1) All proposed amendments to the University General Conditions shall be reviewed by the A/E with OFM prior to inclusion in the Project Manual.
- c. Section 00830 Prevailing Wage Scales as determined by the Maryland Bureau of Labor and Industry for projects anticipated to cost over \$500,000.
- d. **Warranties:** The University General Conditions require that the entire project, materials and workmanship, be guaranteed for a minimum of two (2) years, beginning with the date of substantial completion. Extensions of the overall two-year period, such as required by partial occupancy, turn-over or early acceptance of particular operating systems, and longer required warrantee periods for specific material or equipment shall be noted in the applicable section of the technical specifications. Division 1 shall coordinate and list all warranties required in the trade and materials sections.



#### 4. DIVISION 1 OF THE TECHNICAL SPECIFICATIONS:

4.1. **Format:** Provide DIVISION 1 specifications based on the CSI MASTERSPEC, preferably in individual sections for projects valued over \$1 million, or in a combined or short language form for smaller projects, covering at minimum the Supplemental Conditions as noted below:

a. **Supplemental Conditions:** The contract documents shall address the following conditions, as applicable to each project:

(1) **Summary of the Work:** Describe the scope of the work covered by the construction documents in sufficient detail to provide a thorough and complete narrative of all relevant and significant aspects of the work covered in the construction documents. At a minimum, the description shall address the scope of work for every discipline, including civil, architectural, structural, mechanical, electrical, and specialty work. Related work under other contracts, owner-furnished equipment and products listed, the contractor's use of premises, occupancy requirements, and the necessary construction phasing requirements shall be included.

(2) **Allowances:** Identify and schedule cash and quantity allowance provisions; define contractor's costs included and administrative procedures involved. OFM recommends limited use of cash allowances or quantity allowances, and these shall be reviewed with the UM OFM Project Manager prior to incorporation into the project scope of work.

(3) **Unit Prices:** Unit prices may be utilized for portions of contracts where the nature of the work is defined but the extent of the work is not known or is likely to change (e.g., excavation and rock removal, temporary cold weather provisions for masonry or concrete installation, etc.). The University will establish a contingency fund to pay for the estimated value established. The A/E shall identify, schedule and coordinate unit prices, units of measurement, estimated quantities, and administrative procedures involved, and shall provide the UM OFM Project Manager with a description of all unit prices in sufficient time to be included on the Bid Price Form which is to be contained in the procurement documents. All unit prices shall be subject to review and approval by OFM.

(4) **Alternates:** Alternates may be employed to provide electives in the project scope to facilitate matching the construction cost to the available funds. The University recommends limited use of alternates and requires that they be arranged in the priority of acceptance, as directed by OFM. The A/E shall identify and coordinate provisions for alternates to the contract, and shall provide the UM OFM Project Manager with a description of all

alternates in sufficient time for inclusion on the Bid Price Form which is to be contained in the procurement documents. The construction documents shall reflect the full implications of selection of any or all alternates, either those which may add to or deduct from the scope of work. All alternates shall be subject to the review and approval of OFM.

- (5) **Project Coordination:** Specify administrative requirements for coordination of various parts of the project, including civil, architectural, structural, mechanical, electrical, and specialty disciplines. Examples include, but are not be limited to:

    - a) Coordination of door hardware with UM security systems, the UM lock shop, etc.
    - b) Assignment of ductbank space by UM.
    - c) Assignment of room numbers consistent with the UM Space Inventory System.
  - (6) **Cutting and Patching:** Describe special procedures for cutting and patching one portion of work to accommodate another, as the project scope of work necessitates. Each description shall require that patching and/or replacement work be done by the first installer where possible, or by workmen skilled in the trade(s) involved.
  - (7) **Field Engineering:** Specify the contractor's responsibilities for field engineering and survey work, including erosion control, traffic management plans, structural lay out, profile staking, etc.
  - (8) **References:** Provide definitions, terminology, and names, addresses, acronyms of trade/code organizations, and a list of reference standards used.
  - (9) **Progress Meetings:** Documents shall identify requirements and responsibilities for the administration of preconstruction conference(s), regularly scheduled progress meetings, recording and distribution of minutes, and other related administrative procedures involved. Require that minutes be distributed within 3 working days of every Progress Meeting.
- 4.2. **Submittals:** Provide and include in the specifications a complete submittal log for use by the CM or contractor. The submittal log shall include all submittals, samples, and shop drawings required for the project. Specify general procedures and requirements for items to be submitted to the A/E, the University and others for review and approval. Coordinate with the university general conditions, and require that current logs be maintained for shop drawings, product and equipment submittals, and sample review submittals, and for requests for information. Refer to requirements for Submittals in specific sections of these Design Standards.

- 4.3. Quality Control:** Identify requirements for Contractor's quality control of products and workmanship, inspection and testing laboratories, mock-ups and field samples at site for review for compliance with applicable quality standards. Specific warranty requirements shall be indicated in relevant sections of the specifications.
- 4.4. Construction and Temporary Facilities:** Establish parameters for field offices, staging areas, toilet facilities, meeting places, temporary utilities, controls, security, facilities, construction aids, job mobilization, and requirements for installation, maintenance and removal of same.
- 4.5. Contract Closeout:** List specific administrative end-of-project procedures, closeout submittals, and forms for substantial completion and final completion. Address the punch list procedures, including early acceptance and/or occupancy of parts of the building. Identify all requirements for training of UM O&M personnel for specific equipment and systems installed.
- a.** List specific requirements for contract closeout required in specific sections of the specifications.
- 4.6. Special Operational Conditions:** The design approach and construction documents shall adequately identify all special conditions pertinent to the project and provide for their satisfactory resolution, including but not limited to:
- a.** Construction in restricted urban sites requiring access from the city streets and staging of materials during construction, temporary offices, potential crane sites, etc.
- b.** Work in occupied buildings requiring the design of all necessary safety for building occupants, protection of existing conditions to remain, temporary services, provisions for phased construction, continuation of building systems service, temporary enclosures and partitions, etc. as needed to facilitate the successful completion of the project, all without interruption of services or undue inconvenience to the adjacent occupants.
- c.** Requirements for construction materials handling and storage, and location(s) for the staging area, temporary offices, potential crane sites, and other facilities, as required.
- d.** Note any special working conditions such as limited hours of construction operations; and,

- e. Limitations on construction operations, particularly the use of a crane(s), within the MIEMSS helicopter approach zone to the Shock Trauma Center.

## 5. PROGRAM SPACE USE AND BUILDING SERVICE SPACES:

- 5.1. **Program Space Use:** Space assigned to program use is governed by the space-use guidelines published in the Facility Program Manual, Maryland Department of Budget and Management (DBM), as current at the time of approval of each project program or as directed by the UM OFM Project Manager. Program space shall be calculated and categorized according to the Higher Education Facilities Inventory Survey and Classification Manual (HEGIS) or as directed by the UM OFM Project Manager. Program space shall be described as “Net Assignable Square Footage” (NASF). The A/E shall tabulate NASF by HEGIS category for review by the University prior to submittal to the Department of Budget and Management (DBM) at the conclusion of the Schematic, Design Development and Construction Documents Phases of design. Building total “Gross Square Footage” (GSF) also is reported to the DBM for review.
- 5.2. **Building Service Space:** In addition to the program space required by the project program, the design of each project shall include necessary general use and service spaces. Quantification of general use space shall be determined by building code requirements, such as toilet rooms, emergency egress stairs, elevators, etc., and/or by functional necessity, such as equipment rooms, loading areas, etc. General use space (sometimes categorized as “non-assignable area”) is included in the total GSF. The following functions shall be accommodated:
  - a. **General Use Space:** The design shall include general use spaces such as common circulation corridors, including the building entrance and service lobbies, floor elevator lobbies, egress routes and stairs, but not space required to access cubicles or otherwise subdivided rooms. “Ghost corridors” in suites, communicating stairs within departments, etc. are included in NASF.
  - b. **Toilet Rooms:** The design shall include toilet rooms for general use in accordance with applicable building codes that specify fixture counts based on occupancy, or as otherwise required by function or by direction from OFM. Other toilet rooms assigned to a specific departmental use, such as athletic center showers, clinical diagnostic suites, and leased operations, shall be included in the calculation of the NASF.
  - c. **Storage and Shipping Rooms:** The design shall include rooms to accommodate trash collection or delivery of goods (but not uses specific to departmental use such as solvent or radiological waste, gas cylinder storage, etc.) such rooms shall be provided on grade-level floors. In addition, the design shall include a room for storage of attic stock and excess equipment and materials generated from constructing and furnishing the building. The size and location of this room shall be determined through coordination with the UM OFM Project Manager.

- d. **Maintenance and Custodial Rooms:** The design shall include a janitors' closet on each floor for each twenty thousand (20,000) NASF, and a central cleaning equipment and supply storage room. Service rooms shall not be used for other purposes, such as emergency egress or for roof hatches. Provide space for two locker rooms, one (1) male and one (1) female, for the custodial staff. Coordinate the room size and number of lockers with UM OFM Project Manager.
  - e. **Mechanical Equipment Rooms:** The design shall include mechanical equipment rooms of adequate size for the installation and maintenance of all specified equipment, and located to minimize the transmission of noise and vibration to the surrounding occupied spaces. The mechanical rooms shall be located to provide direct accessibility from the building service entrance or loading dock to minimize travel through occupied spaces.
  - f. **Electrical Equipment Rooms:** The design shall include electrical equipment rooms of adequate size for the installation and maintenance of all specified equipment, and located to minimize the transmission of noise and vibration to the surrounding occupied spaces. The electrical rooms shall be located to provide direct accessibility from the building service entrance or loading dock to minimize travel through occupied spaces.. Provide electrical distribution closets on every floor as necessary;
  - g. **Voice, Computer, Data, and IT Rooms:** As indicated in the project program or as directed by UM the design shall include voice, computer, data, and IT rooms of adequate size for the installation and maintenance of all specified and/or owner furnished equipment. Consideration shall be given to locating these spaces on each floor adjacent to each other to minimize the number of supplemental HVAC systems serving these spaces. Where IT closets are required on multiple floors these closets shall be stacked vertically to consolidate interconnections between floors. All room locations shall be located to prevent compromising the program space requirements.
  - h. **Water Service Entry Room:** For fire service and domestic water service, provide a water service entry room.
  - i. **Fire Command Center:** The design shall include a fire command center located adjacent to the primary building entrance.
- 5.3. **Grossing Factor and Building Efficiency Ratio:** DBM establishes guidelines for efficient building design of facilities built with public funds. The ratios are expressed as a "grossing factor" (GSF/NASF), and/or as a "building efficiency ratio" (NASF/GSF).The project program and/or OFM shall establish an acceptable goal for each project based upon its recent experience or that of its peer institutions.
- a. Building designs that exceed the GSF indicated in the project program by 5% must be approved by DBM, and at the discretion of DBM may be reviewed by the appropriate Legislative subcommittee.

## 6. SPACE PLANNING:

- 6.1. Centralized Spaces:** The A/E team shall investigate the consolidation of programmatic requirements by providing centralized spaces for server rooms, sterilizer equipment, glass and cage washers, chemical storage, and other services to minimize the requirements for special mechanical and electrical systems. The investigation should include an analysis of the potential impact of these centralized spaces on the program requirements.
- 6.2. Loading Dock:** The A/E team shall include in the design a loading dock, including an elevated platform, for the management of pickup and delivery of materials.
- 6.3. Area of Refuge:** The A/E team shall include in the design a designated area of refuge on each floor above the building exit level. The area of refuge shall include provisions for a campus phone, two automatic defibrillators, and appropriate signage.
- 6.4. Access To Elevator Machine Rooms And Roof Areas:**
- a. Access to elevator machine rooms and primary roof areas shall be provided by means of a stairway with a landing at the top. Vertical ladders and alternating tread stairways shall not be used unless approved by UM.
  - b. To access different secondary roof levels with no equipment installed on them, provide exterior roof access ladders with safety treads and a full height safety cage assembly.
  - c. Consideration should be given to including in the design a service elevator stop at the roof level for large equipment removal from the roof area.

## 7. EXTERIOR BUILDING DESIGN AND SITE IMPROVEMENTS:

- 7.1.** Exterior building and site improvement design shall comply with the current "Design Guidelines" defined in the UM Facilities Master Plan and as described in these Design Standards. The strategic goal of campus design is to consistently improve an evolving environment that is based in an architecture associated with the culture of Maryland, and to provide a setting, both on campus and within the buildings, that can attract and foster the best quality of academic and scientific endeavor. The use of predominantly regional materials and design strategies to enhance the immediate physical context of the campus is expected to produce a cohesive and appropriate campus environment that may be favorably compared with the best mature institutions of professional education across the country.
- 7.2.** The UM Facilities Master Plan intends to use existing materials and compositional strategies to weave together familial characteristics in response to the campus having not adopted a single, unifying, iconic style that many universities employ as an identity. Although the seminal Davidge Hall was clearly designed in the classical roman revival style, it was built in the ideological expression of its era using local materials and construction practices.

Subsequent designs built by the campus have reflected the conservative contemporary vocabulary of each period using local materials and technology. Similar characteristics can be found in nearby structures built for others and later occupied by the University. Thus, with the lack of an endemic style as an identifying “mark”, the University must rely upon established common elements among its buildings to define its architectural character and “make its place.” These elements are identified as:

- a. Volumetric massing, façade organization and plan layout based in the use of rationally-derived geometric composition that is consistent with the nature of a science-based institutional culture, rather than on the use of freeform or referential composition based in the expression of personal or romantic ideologies, or technical feasibility.
- b. A “load-bearing masonry character” established by a minimum two-thirds of the façade area being surfaced by brick and stone. Masonry expressed as non-load-bearing, or as “in-fill panelized” elements, is to be avoided in defining character and mass. Since 1991, in response to earlier buildings, design guidelines have recommended articulation of the facades as a base, middle, and top.
- c. Predominant use of standard-sized red/pink brick, with a moderate range, indigenous to Maryland and Baltimore (but not necessarily manufactured in Maryland).
- d. Use of smooth surfaced buff-colored stone for trim and design detailing, or as a “base” for composition of the facades. Traditionally, buff-colored Indiana limestone has been employed, but recently a matching “detailed” architectural precast concrete has been used satisfactorily, although lacking the variation found in natural stone. The use of manufactured stone should continue to be expressed as large pieces similar to those of limestone, rather than as smaller “unit masonry “sizes, and also should endeavor to simulate the variety in color found in natural stone.
- e. Windows and entrances are commonly oriented vertically (or articulated as such by frame and mullion design) with brick or stone (not metal) heads and sills. A single color for frames and windows has not been established, but within local areas of the campus window frames are predominantly of the same color. The color and/or material of new or replacement window frames, louvers, and trim shall match existing for renovation projects. Glazing shall be clear. Except as may be required by function or as part of integrated sustainable design features, interior day light control shall utilize horizontal blinds.
- f. Generally, large expanses of a single material in the façade composition should be mitigated by elements that provide “scale” in the pedestrian context. Metal curtain wall and/or glass spandrels should be composed of multiple elements and contained within a predominately masonry context. Curtain window wall construction has not been typically utilized as a dominant façade treatment, and shall be limited to feature panels when included in the design. Similarly, large expanses of masonry without

windows should be avoided or should be subdivided by masonry trim or other device.

- g.** Buildings shall have a single main entrance in so much as functionally feasible. The main entrance should be apparent, and emphasized in major buildings according to the design of the facade. Entrance lobbies should be transparent to the street or building approach so as to “inhabit” the immediate outdoor space. Weather vestibules are recommended and a security station is to be located immediately inside the interior door. The main entrance shall be accessible to the physically impaired and shall be equipped with ADA-compliant mechanical operators. Positive storm water drainage shall be provided away from all entrances and exits. Doors used for emergency “exit-only” customarily do not have exterior hardware and should not be emphasized as an entrance in the façade composition. Non-public service areas and/or equipment should be screened or otherwise not emphasized.
- h.** Building name and address signage shall be accommodated clearly in the building design in accordance with the University signage standards defined in these Design Standards. Schematic Design Phase and Design Development Phase elevations shall indicate the proposed building identification signage.
- i.** Details of site improvement design shall be as defined in these Design Standards.

**7.3. Roofscapes:** When the design includes the location of equipment on the roof level, an enclosed penthouse shall be given priority over roof-mounted weatherized equipment screened from view. Roof-mounted equipment, not enclosed in a penthouse, shall be screened by substantial material consistent with the design of the building, and shall be effective in concealing the equipment from major campus view corridors. The location and placement of roof-mounted equipment shall be consolidated and organized for an orderly appearance and for maintenance of both the equipment and the roof.

**7.4.** In accordance with the OFM Green Building Policy, the potential for “green roof” installations shall be analyzed for the benefits of insulation, mitigation of the urban heat sink effect, and storm water run-off control.

## **8. INTERIOR DESIGN:**

**8.1.** The University has not established formal standards for the design of interior spaces and their finishes, except as defined in these Design Standards. Generally, a common level of finish is prevalent across campus, nuanced by the practices within each School and in central administration. A consistency that is familiar among the schools and units, and one that can be commonly maintained, is encouraged and appears to have been adopted by consensus. These materials are thought to be appropriate to the institution’s image and means as a public institution for professional education, and as defined in this document.



- 8.2. Because the University employs design consultants with acknowledged functional expertise, as well as knowledge of the practices among its peers and industry trends, it is anticipated that A/E's will provide interior designs that are neither complicated, elaborate, insubstantial, nor inadequate.
- 8.3. Current University policy requires the use of furnishings manufactured or assembled by Maryland Correctional Enterprises (MCE) if the furnishings are available. Exceptions must be approved by the UM Office of Procurement and Supply. Generally, MCE provides office workstations and furniture, including filing and seating. They do not provide laboratory casework, chalk or marker boards, or other operating equipment.
- 8.4. Standard signage shall be designed in accordance with these Design Standards.

## 9. **ACCOUSTICAL STANDARDS:**

- 9.1. **Basis of Standard:** The building design shall provide for well-controlled acoustical environments as appropriate for professional education, advanced research, personal consultation and health care facilities. The design shall utilize buffer spaces, such as storage rooms, corridors, and toilet rooms, to provide acoustic and vibration separation between sources of noise and occupied spaces. Walls surrounding mechanical equipment rooms shall be masonry to assist in sound attenuation.
- 9.2. In addition to the common activities within the University, special functions as indicated in the project program may require detailed analysis by a professional acoustical engineer or as may result from particulars of the building design. The A/E shall advise the University concerning application of HIPAA standards of confidentiality and the ANSI Standard for classroom performance as guidelines. The University customarily has tolerated sound intrusion from external sources such as rotor impulse along the Medivac helicopter flight paths, emergency vehicle sirens and vibration from city busses. However, changing expectations of building performance may require reduction of these intrusions as directed by the UM OFM Project Manager.
- 9.3. The following requirements for acoustical design are primarily based on the control of airborne sound, but attention should be given to the control of structure-borne transmission as well:
  - a. **Noise Coefficient:** The Noise Coefficient (NC) rating of ambient, or background, sound within an area shall not exceed an NC 30 - 35 in the range of 63 to 8,000 Hz with a reverberation time of approximately 0.5 seconds.
  - b. **Sound Transmission:** Sound Transmission Coefficient (STC) ratings for reduction of sound transmission in party walls, floors and ceilings between spaces generally shall be in the range of 40 -55 dB. The lower rating is applicable to separation of classrooms and corridors; the upper rating is applicable for isolating offices requiring confidentiality. A rating of 35 dB may be acceptable for separation between faculty and administration offices or for amplified sound in a lecture hall to a common

lobby. A rating of 60 db may be required for isolation of patient treatment areas or other requirements related to HIPAA. Movable partitions between office cubicles should be rated as STC 24 if sixty (60) inches high.

- c. **Noise Reduction Coefficient:** Materials for sound absorption and attenuation shall achieve an NRC of .70 and CAC of 35 - 40 in the mid frequencies of 750 - 4000 Hz. Generally, the University relies upon the performance of lay-in acoustical tiles in this range, supplemented by carpet where practical for increased reduction. Special conditions may indicate the use of acoustical batts above partitions or hard ceilings. Wall-mounted soft absorptive panels should be utilized only in special conditions approved by the UM OFM Project Manager.

## 10. HAZARDOUS MATERIALS:

- 10.1. Renovations and/or demolition to receive new construction may encounter quantities of exposed, encapsulated, or otherwise concealed hazardous materials such as asbestos, polychlorinated biphenyls (PCB) lighting ballasts and lead paint. Usually, the cost of abatement will be funded from the project construction budget. However due to consultant liability issues, abatement design will not be included in the scope of design work. The University will contract separately for removal and disposal.

## 11. SUSTAINABLE, "GREEN", DESIGN:

- 11.1. **Basis of Standard:** The UM Office of Facilities Management Green Building Policy as stated in Section I defines the University's commitment to the tenets of ecologically sustainable construction and the benefits of reduced operating costs realized by employing the principles of green design. The University's location in a city served by mass transportation and public utilities, and its internal practices of collection and recycling of materials, provides a base qualification for favorable LEED<sup>TM</sup> ratings. All UM designs for new buildings are required to be LEED<sup>TM</sup> Certified at the Silver Level.

## 12. OPERATION AND MAINTENANCE PROJECT MANUAL REQUIREMENTS:

- 12.1. **General:** Operation and maintenance project manuals are required to be submitted for every UM project that includes materials and equipment provided and installed as part of the project that will require the attention of university personnel for services such as cleaning, normal maintenance, and the repair or replacement of the materials and equipment.
- 12.2. **Submission Requirements:** Specify that as part of the project closeout documentation, the Construction Manager/General Contractor shall submit two hard copies and one scanned electronic file of the Operation and Maintenance Project Manual in pdf form on a CD-R to UM.
- 12.3. **Contents:** The Operation and Maintenance Project Manual shall include one copy of each approved submittal for the materials and equipment for each of the

design disciplines inserted in three-ring binders with a tab section for each submittal. The following are examples of discipline specific information:

- a. **Architectural Submittals:** Architectural submittals should include but not be limited to exterior windows and doors, interior doors, carpet, ceiling tile, floor tile, environmental control rooms, fume hoods and conveying systems.
- b. **Mechanical Submittals:** Mechanical submittals should include but not be limited to plumbing fixtures, floor and roof drains, plumbing equipment, HVAC equipment, pumps, valves, fire protection, automatic temperature controls, and testing and balancing (TAB) report.
- c. **Electrical Submittals:** Electrical submittals should include but not be limited to main building switch gear, distribution panels, motor control centers, lighting fixtures, wiring devices, emergency generator, fire alarm systems, security systems, and A/V systems.

**12.4. Scanned Files:** The required scanned files shall be arranged in the same order as the hard copies, except that each tab section shall be an individual file stored in a file folder by discipline (see example below). The cover sheet, table of contents, and manufacturer's contact list should also be scanned as individual files stored in file folders by the same name. Example: exterior window submittal would be scanned and stored in a file folder "Architecture" as a sub folder "Exterior Windows".

**12.5. Multiple Volumes:** When the Operation and Maintenance Project Manual for the project requires multiple volumes, due to the volume of material included, the material shall be inserted in three-ring binders for each volume. The table of contents (TOC) must be all inclusive, and identical for each volume, with sequentially numbered tabs for each submittal. If the first binder has twelve (12) tabs, for instance, then the first tab in the second binder would begin with tab thirteen (13) to pick up where the first binder left off. The table of contents (TOC) in each binder would indicate the contents of the entire set of binders that make up the complete Operation and Maintenance Project Manual, and would indicate which binder or volume each tab is in.

### **13. COORDINATION OF DRAWING INFORMATION:**

**13.1.** The prime consultant shall be responsible for the coordination of all drawing information between all disciplines as part of each design phase.

**13.2.** For work indicated below grade the coordination effort shall ensure that there are no conflicts between underground utilities for the various services to the building, with each other, with the connections to the city, state, or county infrastructure and/or the locations of the buildings structural footings.

**13.3.** For work indicated above grade the coordination effort shall ensure that there are no conflicts between the building structural components, ductwork, equipment, terminal units, service space requirements, piping systems, light fixtures, finished ceilings, and equipment shafts adjacent to finished areas. The coordination

efforts shall confirm that there is sufficient space above the ceilings in all locations to permit proper installation of all equipment, utilities, gravity drainage piping, services, and systems, considering the locations and depths of structural elements and slabs, and providing the proper space for access and service of all equipment, and for the easy removal of accessible ceiling panels. The coordination efforts shall include the specification and location of all needed ceiling, wall, and floor access panels, shown in the required locations to provide complete and unobstructed access to all valves, balancing dampers, fire dampers, smoke dampers, clean outs, ATC devices, safety switches, duct smoke detectors, equipment, terminal devices, and all other devices requiring periodic access for maintenance and service.

- 13.4. The coordination of drawing information shall also ensure that the designed finished elevations of ceilings and accent features in finished areas such as occupied and public spaces are maintained at the construction site.

#### **14. CONSTRUCTION PROJECT SIGN:**

- 14.1. For new construction projects on the UM Campus the architect shall include in the construction documents a detail for a non illuminated free-standing construction project sign. The sign shall include the name of the University, University Logo, Project Title, Project Administration, Architect/Consultants, Construction Manager, Board of Public Works, and Maryland General Assembly Titles with appropriate names below each title and a color illustration of the building. A sample of a construction project sign is included in Section V of these Design Standards.

#### **15. UNIVERSITY CAMPUS DISPLAY MODEL:**

- 15.1. The University has a scaled display model of the campus including all campus buildings, and public streets passing through the campus. Campus buildings over twenty ((20) years old are represented by white blocks which indicate the general outline and height of the structure. Campus buildings less than twenty (20) years old are represented by detailed color models which include brick, stone and glazing on the exterior and landscaping along the street.
- 15.2. For new construction and/or major building additions on the UM Campus the architect's scope shall include updating the campus model with a model of the new construction. The new construction model shall indicate the building footprint and exterior facades, including brick, stone and glazing, with color finishes representing the finishes used. The model scale shall match the scale of the existing models. If street scaping is part of the project, include lights, trees, and paving around the new building. The existing University Campus display model is located in the Saratoga Building on the 14<sup>th</sup> floor.

**END OF SECTION 2**