

UMB A/E DESIGN STANDARDS – SECTION 1 – GOVERNANCE AND POLICY

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1. SCOPE:

1.1. This section outlines the campus organization, policies, purpose and implementation of these design standards as they relate to 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 offices, research, instruction, clinics, support spaces, and parking garages on the UMB campus.

2. UNIVERSITY OF MARYLAND, BALTIMORE CAMPUS:

2.1. The University of Maryland, Baltimore (UMB) located in Baltimore City, formerly known as the University of Maryland at Baltimore (UMB), is the State of Maryland's principal campus for professional education and research in human services. The campus occupies seventy six (76) acres composed of approximately sixteen (16) city blocks on the western edge of Baltimore City's central business district. A daily population; estimated as over twenty thousand (20,000) persons, engage in advanced research, professional education and health care services of a regional scope. Their combined annual operating budgets exceed \$2 billion.

2.2. The University consists of the University of Maryland, Baltimore professional schools of Dentistry, Nursing, Medicine, Pharmacy, Law, including the Thurgood Marshall Library, Social Work, the Graduate School, and the Health Sciences and Human Services Library. Central support functions are provided by the Department of Administration and Finance; which includes the Design and Construction Department (D&C), the Center for Information Services, Environmental Health and Safety (EHS), Public Safety, Procurement, Business and General Management, as well as others. The University enrolls approximately six thousand (6,000) students, employs nearly five thousand (5,000) faculty and staff, and operates physical assets of forty five (45) buildings, utility infrastructure and site improvements. The UMB buildings (on campus) total over four point eight (4.8) million gross square feet (GSF), and yield two point seven (2.7) million net assignable program space (NASF).

2.3. In addition to the University buildings, the area occupied by the campus also includes several other related, but independent, institutions: The University of Maryland Medical Center (UMMC), including the Cancer and Shock Trauma Centers; the Maryland Institute for Emergency Medical Services System (MIEMMS); the Walter P. Carter Center of the Maryland Department of Health and Mental Hygiene; the Medical Biotechnology Center of the University of Maryland Biotechnology Institute (MBC of UMBI); the US Veterans' Affairs Medical Center (VAMC); and allied organizations such as the University Physicians, Inc. (UPI), the Westminster Preservation Trust, the Maryland Pharmacists Association, and others.

3. PURPOSE OF THE DESIGN STANDARDS DOCUMENT:

3.1. **Authority:** The physical assets of the University of Maryland, Baltimore (UMB) are owned by the State of Maryland for the "sole use" of the University. Responsibility rests with the Design and Construction Department (D&C), for the design, construction, operations and maintenance of all components of the built environment on the campus under purview of the University, including buildings and equipment, open space, University-owned streets, and University-owned

infrastructure. This responsibility extends to other facilities leased by the University, and/or operated and maintained by D&C.

- 3.2. **Public Streets and Utilities:** Most public streets and utilities which traverse and service the University campus are owned by the City of Baltimore or public-service utility companies. D&C, in agreement with authorities having jurisdiction, is responsible for coordination of University activities and needs with improvements to these systems or within these rights-of-way.
- 3.3. **Applicability:** The Architectural and Engineering Design Standards (Design Standards) apply to the physical assets of The University. This Design Standards document has been compiled to establish general and, in some cases, specific design policies as a guide for University staff, consulting architects and engineers (A/E), and builders for the design and construction of University facilities.
- 3.4. The Design Standards supplement any project-specific Facility Program which may have been prepared for the purpose of defining the scope and particular requirements of any project to be designed and built by public, and by inference, University funds. The Design Standards document is intended to provide information about the design and construction of University facilities, and to indicate the level of quality expected in the completion of each building project. The specific requirements are not intended to negate the A/E's or builder's responsibility in exercising professional expertise and judgment in the completion of a facility of institutional quality capable of serving its intended purpose.
- 3.5. **Supersede:** Should the Design Standards conflict with other information or requirements of a project and/or site conditions, the UMB Project Manager will be responsible for obtaining resolution among the interested parties, and for directing the A/E or builder in accordance with the needs of the users, all within the parameters of the project budget and schedule. This edition, of the Design Standards supersedes all previously issued editions.

4. INSTITUTIONAL REQUIREMENTS FOR DESIGN AND CONSTRUCTION:

- 4.1. **Institutional Requirements Basis:** The State of Maryland's Administrative Action Plan for Higher Education of 1988 (SB459) directed the University of Maryland, Baltimore, comprised of the State's public human services professions schools and major public medical complex, to achieve national comparative rankings in accomplishment of its mission. Consequently, the University's strategic goals promise superiority in professional education, academic research and public service. As an instrument in the attainment of these strategic goals, the University Facilities must accommodate and promote the very best level of achievement and productivity in its occupants and operations. Thus, its buildings, infrastructure, and campus setting, both new and existing, must provide the best quality facilitation of the functional, aesthetic, environmental, and safety needs of the using-agency (usually, "the client"), all in accordance with the requirements of governing authorities, and with an appropriate balance of initial cost and life-cycle value as befits an institution serving the common wealth.
- 4.2. **University Health Care and Research:** The University's long-time dedication to health care and the integrity of scientific research has established a precedent of fail-safe, pragmatically-based design and construction that provides dependable, easily maintained facilities. Further, a service life of several decades is expected as, most often, university facilities built for a specific use must be altered at the

completion of their initial “useful life” for a second “life time” to serve another use, as well as possibly for several more cycles of adaptive re-use. A similar performance is expected in the alteration of nearby buildings that the University acquires and converts to its purposes. It is the intent of the University to encourage and promote state-of-the art design techniques. The elements of building design and construction which comprise proven, low-maintenance, durable materials, and flexible and dependable systems must also provide facilities that incorporate the best high-technology systems and equipment, as well as provide a suitable environment for the workplace and forward-focused professional education and advanced research.

4.3. University Standards and Guidelines: In the discharge of its responsibilities, the Design and Construction Department (D&C) is committed to continual improvement in the campus facilities through well-grounded planning, design, and construction, as well as through the operational effectiveness and efficiency of its facilities. These Design Standards are intended to promote, to the highest degree possible, achievement of these goals by the project team in the design, construction and operation of the University’s facilities, not only for new capital projects and enhancement of the campus environment, but also for repair, renovations and alterations of the existing facilities. In addition, these Design Standards shall hereby incorporate other applicable mandates, policies and guidelines that address specific aspects of facilities design and/or construction of all projects, as follows:

- a. The Facility Program Manual, Maryland Department of Budget and Management as directed by the University, for space-use as the basis of the project program, for the program verification phase of design, and for specific project requirements.
- b. The Postsecondary Education Facilities Inventory and Classification Manual, November, 1992, US Department of Education is utilized to categorize and calculate program space-use in accordance with the Higher Education General Inventory Survey (“HEGIS codes”).
- c. The Latest Edition of the UMB Facilities Master Plan (Master Plan), for institutional goals and space-needs. The Master Plan also contains “Design Guidelines” for the design of building exteriors, campus urban design, and site improvements in support of its objectives.
- d. University of Maryland Sign Master Plan, Chermayeff & Geismar, November, 2002, for exterior signage in the public way, building identification and wayfinding.
- e. University Center Environmental Design Manual, September 1992, (University Center Manual) for site improvements in the public right-of-way as previously agreed upon with Baltimore City. These requirements are stated in these Design Standards.
- f. The University Historic Preservation Plan should be consulted for assessment of sites and/or buildings with recognized historical significance. Historic buildings listed in the National Register of Historic Places commonly have easements regulating the alteration of the exterior or other elements of the building as cited. Open sites to be included in a

new project shall be investigated for potential archeological or historic importance.

- g. The latest edition of the University Telecommunications Wiring Standards, as published jointly by D&C and the Center for Information Technology Services (CITS), is available through the Design & Construction Web Site.
- h. University General Conditions of the Construction Contract, latest edition, as provided by the University according to requirements of each Project.
- i. The UMB Procedure Manual for Professional Architectural and Engineering Services for UMB Construction Service Center Projects, latest edition at time of A/E design contract, unless otherwise specified.

5. BUILDING CODES AND REVIEW AGENCIES:

5.1. Jurisdiction: Except as indicated below, the design and construction of University-owned and funded facilities on State property are 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 UMB facilities 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 as furnished by Baltimore City, or others, is necessary. Therefore, all facility projects must conform, to the extent noted herein, with the most current editions of the building codes, standards, and review agencies, as adopted by the State of Maryland Codes Administration.

- a. All review of design and/or construction by agencies external to University shall be coordinated through the UMB Project Manager prior to contact of the agency by the A/E or builder. 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, Baltimore City Health Department, Trigen – Baltimore Energy Corporation, Baltimore Gas Electric, and others as applicable.

5.2. Applicable Building Codes: Building Codes and Authorities having jurisdiction are listed elsewhere in this document. At the time of procurement of the contract(s) for design and/or construction, the consulting A/E shall review the list with UMB and determine if updates and/or other changes have been made and are applicable. Subsequently, a similar review of applicable building codes shall be made at completion of the Design Development Phase prior to commencement of construction documents. The purpose of such updated review is to determine if any change has been made in the requirements of external authorities, and whether the University should elect to alter the design intent in response.

6. UNIVERSITY FACILITIES MASTER PLAN AND DESIGN GUIDELINES:

6.1. Basis and Terminology: In compliance with requirements of the Maryland Department of Budget and Management (DBM), and the Commission for Higher Education (MHEC), each campus of the University System of Maryland (USM) maintains a facilities master plan for capital development. The Department of General Services (DGS) reviews project cost estimates and certifies these for inclusion in the Maryland Capital Investment Plan (CIP) through a standardized

Cost Estimate Worksheet (CEW). The Master Plan is required to address ten (10) year capital needs, and is to be reviewed and updated every five (5) years.

- 6.2. Basis of Campus Development and the Current Master Plan:** In 1988, at the inception of the Legislature’s reorganization of higher education and mandate for national standards, the preceding half-century of unilateral and project-specific development had resulted in a less than appropriate setting for the University to attract and promote first-quality endeavor. Consequently, a new facilities master plan was adopted by the Board of Regents and is updated on a five (5) year cycle. The current Facilities Master Plan and Appendices (Facilities Master Plan) includes a broad spectrum of recommendations for uniform exterior materials and design strategies intended to change the environmental quality and image of the campus.
- 6.3. Exterior Building and Site Development Design:** The project design shall comply with the current “Design Guidelines” as defined in the Facilities Master Plan. The “Design Guidelines” shall apply to all buildings that are to be associated with the University. Applicability includes those erected remote from the core campus, buildings with a programmatic requirement as “signature” or otherwise unique, and privately-funded buildings built under the auspices of the University.
- 6.4.** It is anticipated that these Design Standards may evolve over time in response to new technologies and changing practices within the design and construction industry, as well as to the changing needs of the University as defined in future facility master plans. It is intended that the evolutionary nature of campus development, and response to the existing context, will continue those characteristics of the campus identity that are associated with Maryland regional architecture and mature institutions of higher education, as initialized on campus by the iconic Davidge Hall and iterated in most major buildings constructed by the University.
- 6.5.** Existing buildings that are acquired by the University shall be evaluated for their architectural design merit and compatibility with the character of the campus. In as much as it is anticipated that sound, well-designed facades will not be rebuilt or substantially altered, the buildings shall be modified as practicable and compatible with University Standards. Consistency with University standards of quality and appearance shall be introduced in structural additions, signage, paint colors, as well as interior alterations. It is thought that the older commercial buildings now occupied by the University are of a substantial quality of material and design that contributes an historical patina to the campus that is older than most of its buildings.

7. UNIVERSITY INFRASTRUCTURE MASTER PLAN:

- 7.1. University Infrastructure Master Plan:** The University Infrastructure Master Plan provides an outline of the campus utility systems and the policies concerning management of their development. Project design and construction shall be consistent with the goals of the Infrastructure Master Plan and support its implementation. Refer to system requirements elsewhere in these Design Standards.
- 7.2. Overview:** “Infrastructure”, as defined for this purpose, includes the supporting utility systems that enable the campus enterprise and its facilities to function. Infrastructure systems must be adequate, reliable, and efficient. Because the

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University is located within a major city with municipal utilities, the campus has not developed many of the central systems common to most university campuses. But rather, the infrastructure is composed of twenty four (24) separate systems that serve the campus. Many of the campus infrastructure systems are interrelated and co-dependent, such as the group providing campus security which includes the CCTV, card access and fire alarm systems. These are located in both City and University data ductbank. The infrastructure systems include:

Electrical Distribution	Ductbanks	Voice and Data Cabling
Water Distribution	Storm Sewers	Sanitary Sewers
Steam Distribution	Chilled Water Distr.	Natural Gas
Compressed Air	RO/DI Water	Vacuum
Fire Alarm	Security	CCTV
Energy Management	Parking Control	Pedestrian Lighting (UMB)
Sidewalks	Streets	Street Lighting (City grid)
Operational Signs	Landscaping	Bridges and Tunnels

7.3. Infrastructure Systems: All systems are necessary for the operation of the campus, but certain key systems, because of their criticality, cost or size, have a much greater impact on the campus infrastructure. These key systems include electrical distribution, steam distribution, water and sewer connections, and chilled water distribution. Interruptions in any one of these systems can disrupt the function of the campus and buildings, and can cause potential risk to personnel, on-going research, or property. Other systems are essential to the function of the campus as well, and require high reliability.

7.4. University and Municipal Utilities: Certain systems are owned by the University, and others are provided by outside vendors. The chilled water systems are University owned, but steam piping and natural gas are provided by outside vendors. Water distribution and sewers are municipal utilities. Streets and general street lighting are city services. Some systems have split ownership, such as voice and ductbank, which are owned by the University in some areas, leased from the city in others, and provided by the telephone company in other locations. System ownership is important primarily for reliability and cost control. The University has little or no interest in owning and being responsible for infrastructure maintenance and upgrades if the service is not critical or if there are no significant cost penalties

7.5. Critical Systems: Critical systems such as water distribution, sanitary and storm sewers are owned by others, provide a high level of reliability, are relatively low cost, and provide adequate growth capability. For systems that meet this criteria, UMB should continue to outsource the service. Systems that meet this criteria are:

Water Distribution	Sanitary Sewers	Storm Sewers
Natural Gas	Streets*	Street Lighting (city grid)

*Certain streets are owned and maintained by the University.

7.6. Non-Critical Systems: Non-critical systems are installed to improve functional reliability or provide service for the campus. Currently, few vendors are interested in providing these services and the University installs and maintains the systems to minimize maintenance costs. Systems which meet these criteria are:

Compressed Air	RO/DI Water	Vacuum
Sidewalks	Operational Signs	Landscaping

Bridges

Tunnels

Pedestrian Lighting (UMB)

- 7.7. **Signal Systems:** Signal systems essential to the function of the campus have varied ownership and issues due to the use of buried ductbank. Ductbank is typically owned by the City and leased on a “first-come, first-served” basis, and the use of this system is preferred if the present cost is reasonable. However, city ductbank space is difficult to inventory and is old and has less capacity than modern segments recently installed by the University. Although ductbank is expensive to install and routing is hampered by previously placed utilities, the limited capacity of City ductbank often necessitates University construction and ownership of ductbank, primarily for data and voice cable, to meet an ever-increasing demand. Essential cabling systems included in this category are:

Voice and Data Cabling Fire Alarm

Energy

Management

Security

- 7.8. **Energy Systems:** Energy systems must be reliable to support critical functions basic to the campus mission, and must have capacity for flexibility in meeting future campus needs and growth. Because these systems are typically associated with significant operating costs, potential savings would be realized by University ownership and cost control. Because central energy systems have the potential of providing the reliability and flexibility required, and typically offer lower operating costs than decentralized systems, capital projects should address centralization of these systems. Alternatively, if an outside vendor can match or closely approach the cost of University ownership, outsourcing should be considered. Systems that meet these criteria are:

Steam Distribution

Chilled Water Distribution

Electrical Distribution

- 7.9. **Descriptions of Critical Campus Utilities:** Because of the critical nature and expense associated with steam distribution, chilled water distribution, electrical distribution, voice and data cabling, more detailed descriptions of these systems follows:

- a. **Steam Distribution:** The University purchases steam from a district heating provider, Trigen, Inc., which delivers 125 psi steam directly to most buildings through its proprietary piping system primarily located in street right-of-ways as well as in easements on University property. Condensate is not recovered and is typically discharged to storm sewers after heat recovery and cooling. Steam is used primarily for heating buildings and domestic water, but approximately 10% is utilized for processes such as sterilization and humidification. The current vendor has provided adequate and dependable service. In August 1999, the University commenced a contract with Trigen, Inc. for fifteen (15) years, with one additional five (5) year renewal possible. The contract requires the vendor to pay for all new connection charges within a specified area that includes most of the campus, but connections to buildings outside this area will be installed at University cost. The same negotiated rate for service is paid in and outside of the specified area. Because the University is receiving a credit for the absence of a condensate return system, all condensate is cooled and discharged to the storm system. Steam is the preferred source of heat in all buildings if the connection charge for buildings located outside the specified service area can be justified.

- b. Chilled Water Distribution:** Currently, the University owns three sub grade chilled water distribution loops, as well as several inter-building connections, which are comprised of interconnected chillers within the buildings serviced by each loop. These are “modified central systems” which utilize design redundancy to operate chillers at maximum efficiency to feed the loop during reduced demand periods and to provide redundancy/reliability with other chillers on standby. Operational flexibility and reliability, as well as some reduction in capital investment, are the benefits. New project design and construction should include interconnections wherever possible with the loop systems and/or existing building chiller plants in operation.
- (1) **South Loop:** Located in Lemmon Alley between HSHSL and Penn Streets, the south loop interconnects chilled water plants in the Health Sciences/Human Services Library, School of Nursing, and the Campus Center.
 - (2) **East Loop:** The east loop interconnects chilled water plants in the School of Social Work, Museum of Dentistry, Davidge Hall and George Gray Hall.
 - (3) **North Loop:** Located in the vicinity of Baltimore and Pine Streets, the north loop interconnects the chilled water plants in the seven largest campus buildings: Dental School, Pharmacy School, Medical School Teaching Facility, the Health Sciences Facility Phases I, 2 and 3, Howard Hall and Bressler Research Building. UMB is considering extending the north loop to interconnect chilled water plants in buildings in the northeast corner of the campus and the Institute of Human Virology and Allied Health Research Buildings located in the southwest end of the campus.
- c. Electrical Distribution:** Electrical power is essential for operation of the campus and is embedded in almost every function, and it represents the single highest utility cost. Because of the critical nature of this utility, redundant systems with adequate capacity ensure flexibility in use and reliability. Primary power at 13.2 kV is purchased from a supplier and distributed to the campus by BGE in the Greene Street switching station adjacent to the South Hospital. (UMMC has been supplied through a switch located in the UMMC Gudelsky Building since 1998) The University owns the distribution system from the switching stations to individual buildings. Some of the distribution cabling is run through ductbank leased from the City. Ownership of the distribution cabling and purchase at 13.2 kV obtains a rate lower than if electricity were purchased at each building, and if BGE owned and maintained the distribution systems.
- (1) As a result of growing demand and limited capacity, UMMS and UMB entered into an agreement with BGE to increase electrical capacity from 40 MW to 67 MW, estimated as the campus total need until 2010. Improvements were financed by BGE upon agreement to purchase a specified amount of electricity exclusively from BGE for a period of time estimated as ten years. Inherent in the agreement was the understanding that UMMS and UMB are considered to be one customer by BGE.

- (2) Ownership of the distribution system should provide a good negotiating position with alternate vendors in the power supply industry. Ownership of the distribution system also facilitates managing load with either load-shedding generators or cogeneration tied into either cooling or heating systems. However, ownership of the distribution system, which has been installed in phases over the past thirty (30) years, will necessitate replacement of some wiring along with an upgrade of switch gear and protection circuits to maintain a reliable system. One of the problems confronting the University is the limited space available in the City ductbanks. Thus, the University, possibly through new capital projects, must invest in the electrical distribution system to maintain its reliability and to bring adequate power to new buildings.
 - (3) Energy conservation and efficient operation shall be inherent in the design of all construction and renovation projects to minimize operating costs, and to defer the time when adding capacity is necessary.
- d. **Voice Communication:** Voice communication is managed by the Center for Information Technology Services (CITS). Telephone service currently is provided by copper cables owned by either UMB or Verizon. UMB owned cable originates on the main telephone frame located in Howard Hall and runs through UMB communication duct bank to individual campus buildings. Verizon cable may originate either at the UMB main frame (local cable) or from the Verizon Central Office cable (CO cable). CO cable is typically installed in telephone company ductbank. Cable ownership is desirable to achieve the greatest flexibility and advantage in negotiations with potential telephone service providers, as well as to offer the potential of installing a local switching system. A significant portion of the UMB voice service is supported by fiber optic cable. CITS has begun a campus-wide conversion to Voice over Internet Protocol (VOIP). All new buildings and major renovations will be served with VOIP capability. As schedules allow CITS will be converting existing analog phones lines to the new Direct Inward Dialing (DID) lines needed for VOIP.
- e. **Data Communication:** Data Communication is managed by CITS. Data communication is accomplished over a mixture of single mode and multimode fiber optic cabling primarily installed in UMB owned duct bank. Cable ownership is desirable to avoid leased line charges from the telephone service provider and more importantly, to achieve the high data transfer speeds essential for modern research. Cables originate in the data hub in Howard Hall and extend to UMB, UMMS and UPI buildings as well as the Veterans Administration Medical Center and Walter P. Carter Center. Although fiber optic cable is permitted in Baltimore City power ductbank, and this ductbank has been used to serve smaller and peripheral facilities, it is not always available or desirable. Fiber optic cable in City ductbank is susceptible to damage from high energy power faults occurring in 13.2 kV cables sharing the same manholes. A fault in a critical manhole could cause an extended outage to a large portion of campus. Cables damaged in this manner typically cannot be repaired, but must be replaced. Consideration for running more fiber to campus buildings shall be

addressed for every major construction or renovation project. Additional fiber infrastructure will enable the campus to manage future voice, data and video demands. The campus wiring standard shall be adhered to for all projects. A copy of the UMB Telecommunications Wiring Standard is included in the appendix of these Design Standards.

- f. **Ductbanks:** The two citywide ductbank systems are owned by Baltimore City and Verizon. In addition to these antiquated systems, UMB has built segments of underground raceway for its sole use. UMB have no rights of access to Verizon duct banks. Entry into those ducts would require a franchise ordinance to be passed by Baltimore City and it is doubtful that Verizon would support such a measure. UMB leases Baltimore City duct bank, which also is used extensively by BGE. The majority of UMB power cables and some of the fiber optic and signal (fire alarm, card access, energy management) cables are in this system. These ducts may not be used for voice services since conductive (copper) communications cables are not permitted in the same manhole with power cables without a concrete or masonry barrier, and it is not feasible to provide barriers in the existing city manholes.

(1) Signal cables have been installed in Baltimore City duct bank since the 1970's, before any University duct bank was constructed. The varied and evolving nature of the signaling systems and the lack of UMB control over deteriorating conditions within the municipal ducts and manholes make it difficult to ensure that the systems continue to meet the complex requirements of the National Electrical Code, including both the controlling requirements from the time of installation and subsequent code revisions. For instance, most of the circuits as originally installed would have been considered power limited Class 1, Class 2 or fire alarm signal circuits. Changes in the equipment on the ends of the cables means that most of these systems could be considered communications systems. It is highly desirable, and mandatory in some circumstances, that these circuits are placed in a duct system free of power cables. Although non-conductive fiber optic cables may be installed in the city duct system, space is limited. The entire section in Greene Street between Baltimore and Lombard Streets is full, and Baltimore City has no plans to construct more. To relieve the congestion in the duct bank system UMB installed a twelve (12) way, five (5) inch duct bank from the master switching station north to the intersection of Fayette Street and S. Greene Street as part of the capital construction project to build the new Dental School in 2005.

(2) To meet the University's needs for voice and signaling system cables, and to provide reliable pathways for fiber optic cables, UMB has constructed a proprietary communications ductbank system. This has the added benefit of maximizing the capacity of the city system for power cabling. In cases where city ducts are not available, limited runs of UMB power ducts have been constructed. The need for power ducts will certainly grow in the future,

particularly in the critical section in Greene Street in front of the Master Switching Station.

- g. Design and Construction in the Public Rights-of-Way:** Since the early 1990's, the University has held franchise agreements with Baltimore City to install and maintain utility lines in the city-owned rights-of way. Designs shall be reviewed and approved by the city and are usually subject to inspection by the city. Similarly, the city, as well as private utility companies, holds a number of utilities easements in University-owned properties. Work in and around these easements is subject to Baltimore City review and approval.

8. DIVISION OF FACILITIES MANAGEMENT “GREEN BUILDING POLICY”:

- 8.1.** The Design and Construction Department (D&C) recognizes the University's responsibility for careful and considered stewardship of the built environment, and it is committed to preservation of the Earth's natural resources through sustainable design. Further, D&C supports the University's mission of education and its position of public leadership in promoting progressive ideals in the areas of energy conservation, resource management and principles of sustainable “green” design.
- 8.2.** The integration of these initiatives into the mission of D&C encompasses the “Green Building Policy” that is applied to all functions within D&C, including campus master planning, building design and construction, building and grounds operations and maintenance, building housekeeping, utility infrastructure planning, and campus site improvements. The obligation of UMB shall be to establish and maintain an appropriate balance in the efficient use of renewable natural resources within available fiscal resources.
- 8.3.** The Green Building Policy incorporates the following concepts into a sustainable, measurable framework:
 - a.** Use natural and renewable resources efficiently;
 - b.** Consider the impact of buildings on the local, regional and global environment;
 - c.** Conserve and reuse water;
 - d.** Treat storm water on-site;
 - e.** Maximize the use of local materials;
 - f.** Optimize energy performance by use of energy efficient equipment and systems;
 - g.** Take advantage of climatic conditions through site orientation and design;
 - h.** Integrate natural day lighting and ventilation;
 - i.** Minimize the use of mined rare metals and persistent synthetic compounds;
 - j.** Minimize construction waste by reducing, reusing and recycling materials during all phases of construction and deconstruction;
 - k.** Encourage and accommodate the use of alternative transportation.
- 8.4.** D&C will track and measure the progress and success of the implementation of the Green Building Policy through comparison of specific initiatives to established

criteria. The criteria include designing all new buildings to meet, at a minimum, the Silver Level of the LEED™ Rating System, and other performance standards as these are developed. Additional intangible benefits brought about by the Green Building Policy will manifest through improved physical and mental health of the campus population. Through the consistent application of the Green Building Policy to all operational areas of facilities management, the environment of the campus will demonstrate the commitment of the University to environmental stewardship, and serve as a model of environmental sustainability to students, faculty, and staff, as well as to the greater regional community.

- 8.5.** The primary design A/E consultant shall designate an individual to serve as the Green Building Coordinator (GBC) for the project. The GBC may be a member of the primary firm, a consulting individual, or a firm licensed to practice architecture or engineering in the State of Maryland. The GBC shall be responsible for facilitating and coordinating all related high performance green building activities and shall have either performed previous LEED™ System certifications or shall adequately demonstrate the knowledge necessary to perform the work necessary to obtain a LEED™ Certification. The GBC must be approved by the State during the Architectural and Engineering (A/E) services selection process.
- 8.6.** The design of all projects required to be LEED™ Silver or higher certified shall employ an integrated design approach. The design consultant's GBC shall conduct a green building pre-design meeting with all consultant team members, the University project manager, and members of the using Agency team to establish the direction and scope of green building principles, including construction and maintenance procedures, to be employed in this project to attain the LEED™ certification. These principles shall be recorded in writing as the "Green Building Plan" (GBP). The GBP shall be updated and submitted for review at each design phase to track any changes, modifications, or additions. The A/E shall provide four copies of the GBP at the conclusion of the project. The GBP shall follow the format of the LEED™ Green Building Rating System and the plan may be used as the framework for the official submission to the USGBC for certification. All official LEED™ interpretations shall be included in this section.
- 8.7.** The A/E shall develop and provide a "Green Building Operations and Maintenance Manual" outlining operation and maintenance procedures and schedules for all materials and systems that contribute to the LEED™ Silver rating. This manual shall be provided in addition to the usual submission of operating and maintenance manuals and shall focus on system maintenance required to keep green features operating as intended. The intent is to provide system maintenance guidelines as opposed to procedures for maintaining individual pieces of equipment as provided in the equipment operating and maintenance manuals. The manual shall be submitted at 50% Construction Documents (CD) phase for review, at the 100% CD submission, and after project completion. The design consultant shall identify and provide the University project manager with a written account of any conflicts between program requirements and other requirements of the State or the project program. Schedule items shall be organized in a one (1) year calendar format. This information can be collected as the project progresses with the hope of simplifying the effort at the end of the project. The manual shall be prepared in a three-ring binder format to allow for convenient reproduction. Examples of the types of information to be provided include, but are not limited to, the following:

- a. Recommendations on periodic duct inspection or cleaning as well as HVAC filter changes to maintain indoor air quality (IAQ)
 - b. Recommended “green” cleaning products and materials and cleaning schedules for finishes (especially for “green materials”) considering IAQ and extending the life of the material
 - c. Information on minimum paint reflectance for repainting interior area using reflected day lighting
 - d. A list of the low VOC paint, sealant and other products and the colors used including specific manufacturer’s name and product description
 - e. Schedule recommendations for cleaning of glass and light shelves to maintain reflectance and light transmission for daily lighting systems
 - f. Operation recommendations for HVAC systems as described in the construction documents, approved ATC submittal, and confirmed in the commissioning report
 - g. A schedule for inspecting and cleaning walk-off mat recesses to maintain IAQ
 - h. Recommendations for eco-friendly pest control
 - i. Maintenance recommendations for green roof vegetation
 - j. Provide a list of local sources for recycling used material such as carpet, ceiling panels, and drywall
 - k. Provide a list of the recyclable materials used in the building
 - l. Provide a list of the manufacturers and suppliers of all “green” materials used in the building
 - m. Provide a list of sources of recycled paper products (toilet paper and paper towels) and eco-friendly cleaning products
 - n. Provide a simple list of instructions for building occupants emphasizing the use of the building’s green features such as the purpose of walk-off mats and how to use composting toilets, as well as simple instructions for turning out lights, locations of recycling stations, use of individual HVAC controls, water use reduction methods and other green practices.
- 8.8.** The design consultant’s GBC shall develop and submit all documentation necessary to the U.S. Green Building Council’s LEED™ Program for certification of the project for the LEED™ Silver or higher rating. Typically, the project shall be registered with LEED™ at the start of the design. The final LEED™ certification shall be submitted after completion of construction. The cost of registering the project with LEED™ as well as a reasonable cost for LEED™ interpretations and consultation shall be included in the consultant’s price proposal. All projects shall be registered under the University of Maryland’s U.S. Green Building Council membership. A copy of the complete LEED™ submission package shall be submitted to the University. In addition, a complete copy of the energy modeling software program shall be submitted to UMB, with all data used to model the final building design and systems, for UMB use. The data shall be submitted in

electronic format on a CD that will allow UMB to run simulations on the building and to conduct what-if scenarios with the building systems.

- 8.9. The design consultant shall provide a separate specification section, which calls attention to special construction issues related to high performance green buildings and the LEED™ rating such as construction materials, construction recycling, special demolition considerations, and potential special construction sequencing issues. This section is in addition to the standard specification sections and is intended to clearly call these special issues to the attention of the contractor during the bidding phase.
- 8.10. For projects that are required to be LEED™ certified, the A/E shall submit three (3) final copies of the LEED™ Certification Submission, stamped and signed with A/E's license stamp, the official LEED™ Certificate, the final Green Building Plan and three (3) copies of the Green Building Operations and Maintenance Manual. For projects that are not required to be LEED™ Silver Certified, when requested by the University, the A/E shall submit a narrative report describing the high performance green elements of the projects. Using the LEED™ score sheet, the A/E shall provide a brief description for each available credit describing how that credit was addressed or an explanation of why it was not addressed. The narrative shall be submitted to the UMB Project Manager.

9. ARCHIVE DOCUMENTATION AND UNIVERSITY CAD STANDARDS:

- 9.1. Since the late-1980's, the policy of the Design and Construction Department has been to create and archive all drawings in Autodesk AutoCAD in the version current at the time of commencement of design. A/E's working in other drawing programs are required to convert the file for archive purposes prior to final payment. Archive copies of "as built" configuration shall be submitted to the UMB Project Manager in electronic format by thumb drive, drop box, or compact disk. The AutoCAD protocols and standards required by the University are defined in these Design Standards. In addition, the current trend in construction documentation is to model projects using Building Information Modeling (BIM) systems. All future projects shall be modeled using BIM processes, including the use of Revit software for architectural and structural disciplines and auto cad MEP for MEP disciplines. UMB will develop standards and protocols for using BIM and will amend these design standards to include those requirements as they are finalized and adopted.
- 9.2. Drawings prepared and archived prior to approximately 1990 have not been scanned and digitized. Consequently, the archive of drawings exists in a range of media including linen, paper sepia, mylar transparencies, and in various electronic storage formats current over the past fifteen (15) years. Because university buildings are expected to serve for decades and to be altered for various uses different than intended in original construction, it is imperative that drawing records be maintained in universally accessible form.
- 9.3. The importance of land record and site improvement drawings, accurate at the date of the drawing, extends beyond archive purposes only. All plat drawings shall be related to the Baltimore City Coordinate (100') Grid system and globally positioned. Conventions for unit and angle designations shall be in conformance with standard practices employed by registered Maryland Land Surveyors. Grade elevations shall be stated as conventional Baltimore City mean low tide datum.

10. INFORMATION FURNISHED TO CONSULTANTS AND VENDORS:

- 10.1. **Documents Furnished:** UMB documents relative to the project are available through the UMB D&C web site and the UMB FTP site. The UMB Project Manager will provide directions to the consultants and vendors to access the files through each site. The consultants and vendors are expected to possess copies of, and be familiar with, the building codes and other regulations external to the University that are relevant to each project.
- 10.2. **Existing Building Records:** The UMB Design and Construction (D&C) Archives will make available, for review, any existing utility plans, topographic plats, and record drawings of construction documents (drawings and specifications) on file. If available, an electronic file of the building at time of original construction (and/or at the time of conversion to a digitized format), and at the time of any significant renovation or alteration, may be furnished upon request. The A/E shall make arrangements through the UMB Project Manager to visit the archives and review all existing documentation related to the project. After review the A/E shall provide a list to the UMB Project Manager for all requested documents. D&C will provide copies of all requested documents to the A/E by hard copy or by electronic file(s) as requested, and as available.
- 10.3. **Campus and Utility Plans:** The A/E shall use the campus site and utility plan(s) for general reference to supplement any specific land survey prepared by the A/E for the project base drawing file. At completion of the 100% CD phase, the drawings of the completed site work shall be submitted to University on a thumb drive, compact disk (CD-R) or through a drop box and shall be included in the Record Document submission as well. UMB campus and utility plans are available through the UMB FTP Site. D&C will provide the log on data to the A/E.
- 10.4. University CAD standards and conventions have evolved over the past thirty four (34) years so that older files may not be consistent with current standards defined in the Section 4 of these Design Standards. Further, no assurances are given that such record documents are complete or accurate in the current conditions. It shall be the responsibility of the A/E team to verify existing conditions as necessary for accurate design of construction and/or use of the facility. The cost of printing and delivery of building record documents is to be paid by the consultant.
- 10.5. The project program, whether it is a facilities program document as approved by the Maryland Department of Budget and Management (DBM)) for capital improvement projects, or the written "scope of work" from the A/E as part of their fee proposal, or from D&C or any other administrative unit or academic department, is intended to define the requirements of a facility project for a broad range of interests, including space inventories, budget and funding, programmatic justification, etc., as well as for the design and construction of the facility. Adjustment or refinement of these requirements and criteria by the A/E during the verification process will require approval by the responsible representative of the user and verified by the UMB Project Manager prior to commencement of design. Compliance with funded capital improvements as defined in the program are reviewed and approved by the University through submittal of the design documents at the specific phases of the design. Revisions that result in changes of more than 5%, (in space use, project size and budget), are mandated for review and approval by DBM, the responsible legislative staff.

10.6. UMB Project Manager and Project Team: The sole responsible point of contact with the University, for the project A/E Consultants is the UMB Project Manager. The University will identify a project team of representatives from the user group, as well as technical review personnel from D&C, Operations and Maintenance, Environmental Health and Safety, the Capital Budget Office, Public Safety and the Office of Procurement and Supply (OPS), as needed to advise and ensure that the various requirements and operations of the completed facility are met. Projects funded by the State Capital Improvements Program normally are reviewed by a campus-wide Project Overview Committee including the President and Deans and other officials. Contract issues are addressed by the University Department of Procurement.

11. DESIGN AND CONSTRUCTION CONTRACT ADMINISTRATION:

11.1. In addition to the requirements as defined in these Design Standards, the A/E Consultant and the Construction Manager (Builder) shall refer to and comply with the latest edition of the UMB Procedure Manual for Professional Architectural/ Engineering Services for UMB design and construction and UMB Service Center projects.

12. IMPLEMENTATION OF THE DESIGN STANDARDS:

12.1. The Design Standards document is intended to define the minimum requirements for the design and construction of new and renovated facilities of an institutional quality in accordance with the needs and practices of the University. The design and construction documents shall contain all of the appropriate specific information and requirements to achieve implementation of these standards. A general citation of the Design Standards shall not be sufficient contractual direction or obligation. All project design and documentation shall include the requirements as set forth in these Design Standards,

12.2. Deviation from These Design Standards: These Design Standards reflect the functional needs and operational practices which the University has developed through long-term experience in ownership and operation of institutional facilities. However, these requirements are not intended to preclude improvement based on the satisfactory experiences of the A/E and/or builder, or to provide for the needs of a using department.

- a. Deviations from these Design Standards may be proposed to introduce proven alternative practices or to utilize materials, systems and/or procedures which respond to project goals for quality, schedule, and budget. However, the use of newly developed, untried materials and/or systems is generally discouraged. Proposed deviations or modifications will be considered on an item-by-item basis for each project. Approved modifications for a particular project shall not be construed to be a modification of these Design Standards as a precedent for subsequent projects. Any proposed deviation from these Design Standards by the A/E shall be submitted as a request using the UMB Standard Request for Deviation Form. For reference a sample of this form is provided in the Appendices of these Design Standards. The electronic version of this form is available on the UMB Design and Construction Web Site under Documents. UMB will review the request and notify the A/E team of their decision in writing.

- 12.3. Substitutions:** Substitution of Approved Materials and/or manufacturers during construction, particularly in the construction shop drawing submittal process, which do not comply with these Design Standards, shall be reviewed and acted upon in the same process as modifications proposed during the design phases defined above.
- 12.4. Coordination:** Coordination among the requirements of all the divisions is expected of all technical disciplines involved in the design and construction of a project. Consequently, it is expected that each design discipline and construction trade will seek out related information in all parts of these Design Standards that may affect their work. Although an attempt has been made to cross reference related subjects, each section may contain requirements for coordination and/or documentation. Quality control review of the contract documents by both the A/E and builder shall ensure that all aspects of the work are included and complete.

END OF SECTION 1