

PROGRAM INFORMATION/REQUIREMENTS

BASIC DESIGN REQUIREMENTS

1. Responsibility for Compliance in Design: The A/E is responsible for producing a design that complies with applicable codes, ordinances, statutes, regulations and laws, and all of the standards and procedures for construction herein.

1.1. The applicable codes, ordinances, statutes, regulations and laws include, but are not limited to, the following:

- A. Americans with Disabilities Act - EEOC Accessibility Guidelines and MR 1341
- B. Environmental Protection Agency standards
- C. Metropolitan Council Environmental Services requirements
- D. Minnesota Department of Health regulations
- E. Minnesota Department of Labor - OSHA regulations
- F. Minnesota Department of Natural Resources
- G. Minnesota Food Code
- H. Minnesota Pollution Control Agency standards
- I. Minnesota State Energy Code
- J. Minnesota Well Code
- K. National Electric Code
- L. Scientific Equipment and Furniture Association (SEFA)
- M. State Building Code, including all referenced documents
- N. U.S. and Minnesota departments of labor rules and regulations - OSHA
- O. U.S. Nuclear Regulatory Commission
- P. Uniform Fire Code

1.2. Verify dates of applicable codes with the University Building Code Office.

1.3. It is understood that the basic minimum requirements described within these Standards and Procedures for Construction are in addition to the applicable codes, ordinances, statutes, regulations and laws. There has been no attempt to repeat the code requirements throughout the divisions.

2. Applicable Regulations

2.1. The A/E is responsible for compliance with the program requirements of the project. Projects estimated to cost more than \$100,000 typically have a pre-design phase that describes basic parameters. Refer to Appendix JJ - Predesign Outline for Capital Projects. In the event a pre-design phase does not exist, verify requirements with the owner's representative, and identify the project stakeholders.

2.2. There are some functional areas that have special requirements. For some of the most common special function areas, a more detailed description of their needs has been prepared. The special function areas, and the location of the detailed requirements are as follows:

A. Chemical Laboratories	Appendix L
B. Food Service	Appendix EE
C. General Purpose Classrooms	Appendix DD
D. Parking and Transportation Services	Appendix Q

2.3. The A/E shall notify the owner's representative if the specific requirements for one of the special function areas conflict with other requirements of the construction standards.

3. Permits

3.1. The university is responsible for securing and paying for all permits, with the exception of high-pressure steam. The contractor applies for and secures high-pressure steam permits, which are paid as part of the contractor's cost.

3.2. Air Permit Regulations: Air permit regulations are extremely complex and have different permit requirements depending on the specific project and facility. Therefore, the Department of Environmental Health and Safety (DEHS) requires evaluation of all air emission sources including, but not limited to, emergency generators, engine-powered fire pumps, combustion equipment, printing facilities, paint spray guns, building exhausts and/or air pollution control devices. For a complete list of air emission sources requiring evaluation, see Appendix HH - New Processes and Equipment that May Require Air Permits. Once an application has been submitted, the Minnesota Pollution Control Agency (MPCA) permitting process can take a minimum of six months and up to 14 months, depending on the complexity of the emission source. The MPCA requires that a permit be issued prior to starting construction. This process applies when modifying existing equipment and installing new equipment. The A/E shall notify the owner's representative and DEHS in writing if a project shall include any air emission equipment. The A/E shall allow adequate time in the project schedule for an air permit to be issued before starting construction. DEHS shall issue a letter of approval to the owner's representative, indicating that construction can start based upon the evaluation or issuance of a permit from MPCA. Refer to Division 15, Section 15320 - Firepumps, Division 15, Section 15750 - Thermal Energy Distribution and Transfer and Division 16, Section 16230 - Generator Assemblies. (LINK)

3.3. Storm Water Permits and Requirements

3.3.1. The A/E shall incorporate Minnesota Department of Transportation, City of Minneapolis, City of Duluth and Ramsey County Erosion and

Sediment Control requirements and guidance into the construction specifications as applicable. At a minimum, the A/E shall identify temporary and permanent erosion and sediment control measures that are site-specific.

3.3.2. Temporary controls include, but are not limited to, silt fences, storm inlet protection, entry/exit stabilization and site stabilization procedures for any exposed soil. Along with temporary controls, Environmental Protection Agency (EPA) Phase 2 Storm Water Rules require that all new development and redevelopment include permanent control measures to reduce storm water impact on receiving water to the maximum extent practicable (MEP).

3.3.3. Permanent controls are based on a goal of no net increase in storm water volume, rate or pollutant loads from new construction and redevelopment that add impervious surfaces. Permanent controls include, but are not limited to, vegetation swales, rain gardens, sediment ponds, retention areas, pervious surfaces and other alternatives to direct plumbing.

3.3.4. For regulatory permits, the Minnesota Pollution Control Agency (MPCA) requires a separate National Pollutant Discharge Elimination System (NPDES) construction permit for any construction site or common project that disturbs more than one acre. Like the EPA, this MPCA permit requires site-specific temporary and permanent erosion and sediment control plans to be incorporated into the project design. After confirming that the final construction specifications comply with MPCA temporary and permanent control requirements, the A/E shall complete a MPCA permit to be forwarded to DEHS for submittal to MPCA. For more information, contact DEHS, Air and Water Compliance, W140 Boynton, 410 Church St. SE, Minneapolis, MN 55455, www.dehs.umn.edu/ Guidance on storm water best management practices (BMP) can be found at www.pca.state.mn.us/water/pubs/sw-bmpmanual.html and at www.metrocouncil.org/environment/watershed/bmp/manual.htm

4. Building Design Service Life Expectancy: University facilities shall be designed with either a 20-year or 50-year life expectancy. The life expectancy for any facility shall equal the life expectancy for the following items: designed life of building; inaccessible or structural components; expensive or difficult to replace components, including below ground drainage; major, replaceable components; and service, installation and external work. Exception: Buildings with a 50-year life expectancy shall have a life expectancy for major, replaceable components; and service, installation and external work of 25 years.

5. Preservation of Architecturally Significant Elements

5.1. The Board of Regent's Historic Preservation Policy acknowledges that the university has a responsibility to protect the physical features and historic character of properties designated as state or national historic sites, which includes those properties that are considered eligible for such designation.

5.2. Before carrying out any undertaking, including renewal and new construction, which will affect designated or listed properties, the university is required in cooperation with the Minnesota Historical Society to determine appropriate treatments and to seek ways to avoid and mitigate any adverse effects on designated or listed properties.

5.3. The University Architect's Office provides analysis, interpretation and advisory input on all historic buildings, objects, landscapes, and archeological sites affected by renewal, new construction, restoration, rehabilitation, renovation and maintenance projects throughout the university system. Contact the Office of the University Architect in Facilities Management through the owner's representative early in the planning of all projects associated with designated or listed historic university buildings, object landscapes and archeological sites. A current listing of university historic properties is maintained in Appendix B of the University Historic Preservation Plan.

5.4. The University Historic Preservation Plan is available for viewing, downloading and printing in Adobe .pdf format from the Facilities Management Web site at www.facm.umn.edu/links/preservation%20plan.pdf. (LINK)

6. Site Planning

6.1. The A/E shall request a site survey plan through the owner's representative for the project. The university shall engage a registered land surveyor to prepare a site survey plan.

6.2. The Site Survey Plan

6.2.1. The plan shall show and include, but not be limited to, the following minimum requirements: adjacent property lines, topographical data, existing building lines, grades, pavements, soil borings, a hydro-geological study, trees, adjacent conditions, existing structures and existing utilities (above and below grade). To establish the expectations at the university for re-use or disposal or existing topsoil, provide gradation curve analysis of topsoil. Submit the test results of the analysis to the owner's representative and University Landcare. The findings from these requirements shall be used to prepare a construction site plan coordinated with existing conditions. Refer to Division 2 - Site Work, Section 2900, 1. Topsoil for more information.

6.2.2. The plan shall incorporate the appropriate campus coordinate grid system, elevation datum and data such as manhole numbers. Include a key or legend on the topographical plan that clearly identifies points of interest. Make certain that markings on the key or legend are uniquely identifiable. The plan shall be sent to Engineering Records both electronically and as a reproducible drawing at 1 inch equals 20 feet scale in accordance with Appendix AA - Electronic Submittal Standards.

6.3. The A/E shall review the site survey plan and report any inconsistencies and/or incomplete information to the owner's representative. Include the site survey plan in construction documents.

6.4. Define contract and construction limits and outside staging areas on the site survey plan prior to the start of construction. Coordinate staging areas with University Landcare prior to the end of the Schematic Design Phase (subject to approval from the owner's representative and University Landcare). Make adequate provisions to include dumpsters for recycling and reuse purposes.

6.5. Site planning shall provide for access, service and utility routes that interface with adjacent areas and structures.

6.6. Considerations for site planning shall include, but not be limited to:

- A. Pedestrian traffic patterns
- B. Service vehicle access
- C. Fire and emergency equipment access
- D. Program parking
- E. General university parking
- F. Vehicle storage
- G. Bicycle storage
- H. Terrain
- I. Preserved or removed vegetation
- J. Storm and sanitary management plan
- K. Water or soil contamination
- L. Existing utility capacities and locations
- M. Accessibility for people with disabilities
- N. Egress patterns and lighting

6.7. Exterior building components such as mechanical or electrical equipment, dumpsters, emergency generators and specific program support equipment shall be screened and secured from public view/access. The A/E shall address placement and screening and the university architect shall approve.

6.8. Review site and landscape plans with University Landcare prior to completion of the Schematic Design Phase.

6.9. Review site and landscape plans with DEHS during the predesign phase to discuss environmental concerns. If there is a change in A/E following predesign, the A/E responsible for further development of the project shall review site and landscape plans with DEHS during schematic design.

6.10. Duluth Campus

6.10.1. Site Drawing Survey Layout

6.10.1.1. All site drawings shall contain the Duluth X-Y 100-foot grid lines and numbers.

6.10.1.2. Building, parking lot and street corners shall have their X-Y corners called out on the site drawing.

6.10.1.3. Elevations shall be on the University of Minnesota-Duluth datum.

6.10.1.4. Plat information shall be shown on a plat plan, including all existing and proposed easements when necessary. The university property line shall be shown if the project is taking place in an area where UMD does not own all adjacent property. Some property, plat and easement information can be obtained from Erik Larson, 241 DAdB, 1049 University Dr., Duluth, MN 55812; or by e-mail at elarson@d.umn.edu.

6.10.2. Survey

6.10.2.1. Survey information (monument data) can be obtained by written request from Facilities Management Engineering Support Services. Include the project name, the project number and contact information. Submit to Erik Larson, 241 DAdB, 1049 University Drive, Duluth, MN 55812; or by e-mail at elarson@d.umn.edu.

6.10.2.2. Sightlines for joint UMD/MNDOT monuments on campus must not be infringed upon. If a project will block one of the sightlines, additional second order points and NGS registration to complete the circuit will be required as part of the project.

6.10.2.3. Damage to a university survey point shall be replaced in kind.

6.10.2.4. Surveys shall be done in accordance to UMD X-Y-Z coordinates.

6.10.2.5. Projects on the periphery of the campus shall include a property survey as part of the planning processes. University X-Y coordinates shall be determined for any property corner found or set during these surveys. This information shall be related to Erik Larson, 241 DAdB, 1049 University Dr., Duluth, MN 55812; or by e-mail at elarson@d.umn.edu.

7. Sustainable Design Requirements

7.1. Sustainable Design: Per the American Institute of Architects Handbook: "Sustainable refers to the ability of a society, ecosystem or any such ongoing system to continue functioning into the indefinite future; for architecture, this means design that delivers buildings and communities with lower environmental impacts while enhancing health, productivity, community, and quality of life."

7.2. Sustainable design shall be a high priority for the design of university facilities. The university directs the A/E to include sustainable design features to the greatest extent possible within the budget and other design restraints.

7.3. Essential features of a project shall include:

7.3.1. Planning for Conservation: This includes reducing the need for space if possible, reusing existing buildings and designing for adaptability.

7.3.2. Sustainable Sites: This includes development in environmentally appropriate areas, reduced site disturbance, proper stormwater management and sustainable landscape design.

7.3.3. Water Efficiency: This includes water-efficient landscaping and water use reduction within a building.

7.3.4. Energy Efficiency: This includes optimizing energy performance so the building uses at least 30 percent less energy than the state energy code stipulates. It also includes using renewable energy sources and commissioning building systems.

7.3.5. Indoor Environmental Quality: This includes controlling indoor pollutant sources, using low-emitting materials, providing effective ventilation and thermal comfort, as well as daylight and views where appropriate.

7.3.6. Materials: This includes reducing material use and selecting materials with a low environmental impact. Examples include materials that are recycled, salvaged, local, rapidly renewable and durable.

7.3.7. Waste: This includes reducing and recycling construction waste, and designing elements within the building to aid in the efficient managing of waste/recycling during building operations.

8. Service and Loading Dock Entrances

8.1. Include a service entrance that is protected from the weather and accessible from a separate service drive in the design of new buildings.

8.2. Locate the service entrance adjacent to storerooms, a waste compactor, waste and recycling collection rooms, a service elevator and a loading dock.

8.3. Include two parking spaces, with signage for service vehicles at the service entrance. Service driveways must accommodate one 30-foot tandem axle vehicle. Coordinate with the owner's representative on axle loading.

8.4. Establish an area where snow and ice can be drained and removed at the service entrance.

8.5. Unless the program requires an elevated receiving bay, provide for grade level loading and unloading. In an effort to prevent personal injuries, provide a 5,000-pound capacity weatherproof dock leveler at all docks. The program of some facilities may require an interior receiving bay or other receiving facility. To ensure that the dock is operated in accordance with the applicable OSHA regulations, the A/E shall review materials-handling procedures with the user to determine if a dock hook is necessary.

8.6. To facilitate shipping and receiving, provide a 6-foot by 7-foot service entrance door opening. Provide one active and one passive leaf with delayed action closure.

8.7. Loading docks shall have a powered, overhead or rollup door. Any overhead or rollup door shall have a separate entrance door.

9. Live Load Design

9.1. Floors in offices, classrooms and similar general-purpose facilities of flexible use shall be designed for a uniformly distributed live load of a minimum 100 pounds per square foot, including partition loads. For laboratory equipment, confirm and take special consideration of loading use with the end user.

9.2. Floors in mechanical rooms shall be designed for the equipment provided, but not less than 150 psf. Underground structures shall be designed for the appropriate fill and vehicle loading. Pay particular attention to structures that could be subject to fire truck or other vehicular traffic.

9.3. The design development and contract document drawings shall show the design live loads for all floors, roofs and underground structures. Areas that are heavier than the standard design load shall be clearly delineated.

9.4. Assumed unit stresses of materials and soil bearing capacities shall be identified on all of the contract documents.

10. Service Elevator

10.1. Include elevators in buildings that are two stories and higher. Locate the service elevator adjacent to the service entrance. In smaller buildings, the service elevator may perform a dual function with the passenger elevator(s).

10.2. Provide direct service to all floors in the buildings, including floors where mechanical and electrical rooms are located.

10.3. Service elevator interiors shall be a minimum of 5 feet, 8 inches wide by 7 feet, 5 inches deep by 8 feet high with a cab door opening 4 feet wide by 7 feet, 6 inches high.

10.4. A Door Hold feature with activation via momentary push button actuation shall be provided to facilitate loading and unloading.

10.5. To limit access of mechanical rooms to authorized personnel, elevators that open directly into mechanical rooms and building service areas shall be equipped with a security access device. The device shall be located on/in the car station operating panel.

11. Room Numbering System Standards

11.1. Twin Cities Campus

11.1.1. University Planning shall assign room numbering systems and floor level designations for new construction and remodeling projects before becoming final. The architect shall contact University Planning when room numbers are being established to arrange the review and approval process.

11.1.2. The starting point for the building room numbering system shall be the main entrance for the building, that is, the front door. Room numbering shall then proceed throughout the floor in a logical sequence. Whenever practical and possible, the room numbering system should follow a similar and logical sequence between floors of a building, so the general public senses a familiarity of space with each floor.

11.1.3. Beginning at the starting point, as one proceeds down a corridor or hallway, odd-numbered rooms shall be on one side and even-numbered rooms on the other side. For example, the door to room number 124 should be across the corridor from the door to room number 123.

11.1.4. Room numbers shall be in the following sequence on each level:

- A. Sub-basement: S1 - S99
- B. Basement: 1 - 99
- C. First floor: 100 - 199
- D. Second floor: 200 - 299 and so on

11.1.5. Some buildings near the mall on the East Bank in Minneapolis and on the St. Paul campus have a floor level that includes a ground floor. These buildings shall have a room number sequence as follows:

- A. Sub-basement: S1 - S99
- B. Basement: B1 - B99
- C. Ground: 1 - 99
- D. First floor: 100 - 199
- E. Second floor: 200 - 299 and so on

11.1.6. In the Health Sciences Building, a floor level designator often precedes the room number so the room number assumes the following format:

- A. Sub-basement: S-100 through S-199
- B. Basement: B-100 through B-199
- C. First floor: 1-100 through 1-199 and so on

Note: This sequence allows floors with more than 100 rooms to have nine ranges of room numbers per floor. For example, the first floor could have the following range of numbers: 1-100 through 1-199, 1-200 through 1-299, 1-300 through 1-399 and so on up to 1-900 through 1-999.

11.1.7. Rooms are given a prime room number when the door to the room opens to a corridor. Rooms that open off from another room rather than the corridor are given a suffix after the room number of the room that does open to the corridor. For example:

11.1.7.1. Room 110 opens to the corridor. There are four rooms that open to Room 110. They are numbered as rooms 110, 110A, 110B and 110C.

11.1.7.2. In the Health Sciences buildings, the suffix often times takes the form of a number rather than a letter. In the above example, the four rooms would be numbered 110-1, 110-2, 110-3 and 110-4. In the Health Sciences buildings that have a floor level designator, the four rooms would be numbered with a letter suffix: 1-110A, 1-110B, 1-110C and 1-110D.

11.1.7.3. Top-level administrative offices often have a door that opens to the reception area and another door that opens to the corridor. In these cases, it is acceptable to number the room off the reception area with a suffix rather than with a prime number off the corridor.

11.1.8. Since new room(s) could be added later, there should be a skip in room numbering to accommodate the new rooms in the future.

11.1.9. Whenever possible, reception areas, classrooms, dining areas, main conference rooms and other high-visibility rooms should be numbered with easy to recall numbers such as 100, 120, 125 and 150.

11.1.10. When a room is split by a folding partition, the rooms thus created can be numbered as prime room numbers or as suffixes. For example, Room 125 can be divided into three rooms and numbered as 125A, 125B and 125C; as 125, 125A and 125B; or as 125, 130 and 135.

11.2. Duluth Campus

11.2.1. The first floor is the floor with the main exits used for pedestrians/fire access (unless the building is between two buildings with the same non-standard floor designators).

11.2.2. The ground floor is used when the main entrance/exits are one floor above the secondary entrance/exits.

11.2.3. The basement floor is used when it is below grade with no exits.

11.2.4. A “G” or “B” prefix to a two-digit number denotes the basement or ground floor.

11.2.5. Room numbers shall be three digits unless an alphabetical character is used as a suffix.

11.2.6. Hallway areas are numbered X00 or X50. The main hallway is always 00. Doors separate hallway areas (not changes in direction or less than one-story changes in elevation).

11.2.7. Stair towers are numbered X00 A, X00 B, or X50 B, X50 C, etc. The "A" stair tower shall be on the south side or east side, and subsequent stairs numbered as you head north or west. Stair towers are numbered alphabetically across the building even if they are in different hallways. The used suffix letter is then left unused in the other hallway. Landings are numbered along with the floor below.

11.2.8. Vestibules are numbered X00 X after the stair towers are completed.

11.2.9. Closets that cannot be entered in the hallways are numbered X00 X after the vestibules have been numbered. Closets that cannot be entered within a room are not numbered unless they house mechanical/electrical equipment.

11.2.10. Elevators are numbered X00 EE1, X00 EE2, etc.

11.2.11. Rooms are numbered on odd and even sides, east to west and south to north. The first room on the south side or the east side would be X01. Room numbers are based upon the location of the primary door for each room. Room numbers shall progress orderly as you move down the hall, regardless of what side they are on. It is preferable to leave unused room numbers between rooms if possible, especially around large rooms that may later be split into multiple rooms.

11.2.12. Rooms within another room share the same number with a letter suffix. Rooms with suffix letters shall have a clockwise progression around the main room.

11.2.13. Island rooms along a sub-corridor (no doors separating it from the main corridor) are all numbered even or odd depending upon the side of the main corridor they are on, regardless of what side of the sub-corridor they are on.

12. Custodial Requirements: General Requirements

12.1. Facilities Management provides custodial service for university buildings. The Twin Cities campus includes 19.1 million gross square feet of facilities. The annual overall custodial program includes 726,000 hours of custodial service.

12.2. Starting with the programming phase and continuing throughout the design phases, verify the custodial requirements with the Maintenance and Operation staff. The equipment and supplies for each building depend on the interior finishes, program requirements and the size of the building.

12.3. Include a custodian office/locker room and a bulk storeroom adjacent to the service entrance in buildings that exceed 25,000 gross square feet of floor area. The size of these rooms shall be appropriate to the building area and use based upon square footage.

12.4. Provide a minimum of one custodial room per floor. Locate the custodial rooms so that the maximum distance between rooms is approximately 250 feet and the area served by each room does not exceed 15,000 gross square feet of floor area.

13. Custodial - Equipment and Supplies: The following is a list of the type, approximate size and quantity (determined by finishes and square footage) of equipment and supplies that shall be stored in the buildings:

- A. Auto scrubber: minimum 3 feet by 5 feet of space, one per floor
- B. Carpet extractor: minimum 3 feet by 3 feet of space, one per floor
- C. 36-inch diameter trash barrel: one per custodial room
- D. Vacuum cleaner: minimum 3 feet by 3 feet of space, one per closet
- E. 24-inch diameter floor buffer and 5-gallon pails of floor wax: one per floor
- F. Case of toilet paper: minimum 2 feet by 3 feet floor of space, one per closet
- G. Case of paper towels: minimum of two, 2 feet by 3 feet floor of space, one per closet

14. Custodial Rooms

14.1. All custodial rooms shall be a minimum of 120 square feet with no less than a 6-foot width in any area.

14.2. Include a floor-mounted slop sink, hot and cold water, hose faucet with 4 feet of hose, mop rack, GFI duplex outlets and shelving for cleaning supplies. To minimize damage from overflowing slop sinks, spilled cleaning chemicals and spilled equipment reservoirs, provide a floor drain adjacent to the slop sink. Provide a 5-foot long board 6 feet above the finished floor with hooks or pegs at 6-inch intervals to hang brooms, dust and wet mops (hung by the head with the handle down), vacuum cleaner hoses and dust pans. Ensure that there is discussion with the architect and maintenance staff to determine whether one equipment storage room with an eyewash station is necessary.

14.3. To accommodate the storage of custodial equipment, provide 36-inch wide doors that open out.

14.4. Ensure that there is adequate ventilation for the hydrogen gas that is produced when the battery-operated equipment is recharged.

15. Waste Disposal: General Requirements

15.1. During each design phase, verify with the Facilities Management Waste Management and Recycling Department the requirements for the waste collection areas and the method of disposal, compaction and hauling. These requirements will vary depending on the program needs and the size of the building.

15.2. If the volume of trash warrants, a stationary compactor shall be located at the service entrance. The compactor will reduce collection costs and keep the dock area clean and clear of trash. For lower waste volumes, dumpsters shall be located outside of the building, adjacent to the dock area. The dumpster location should facilitate the loading of the dumpster without manual lifting.

15.3. Provide a room located adjacent to the service entrance for receiving and storing recyclable materials. The room shall provide space for six hampers that are 30 inches wide by 44 inches long by 40 inches high. This space should allow for easy ingress and egress of hampers (subject to verification according to 16.1.).

15.4. For new buildings and for buildings with food service operations, comply with Appendix EE - Food Service Construction Guide. Refer to the section on Solid Waste and Recycling Materials.

15.5. For storage areas of bedding waste and carcasses, comply with Appendix EE - Food Service Construction Guide. Refer to the section on Solid Waste and Recycling Materials.

15.6. For new or renovated food facilities and research animal quarters, comply with Appendix U - Insect and Rodent Control.

16. Hazardous Wastes

16.1. For all buildings, provide two shelves for storage of spent fluorescent lamps in the room allocated for recycling (refer to item 14. above). One shelf shall be 18 inches wide by 108 inches long with filling access from the end. The other shelf shall be 24 inches wide by 54 inches long with 30 inches clearance above for filling. The shelf shall be located so it does not interfere with the recycling hampers or block movement of the hampers in and out of the room.

16.2. For buildings that include centralized storage areas for hazardous wastes, verify with the Hazardous Waste Officer (HWO) in DEHS that the design is in compliance with hazardous waste regulations.

16.3. For buildings that have programs that include laboratories, verify with the HWO that the proper amount of space is allocated in the laboratory area to store chemical waste and radioactive waste.

17. Recycling

17.1. During each design phase, verify with the Facilities Management Waste Management and Recycling Department the quantity and location requirements for the recycling collection areas on each floor of the building.

17.2. Designate space throughout the building for quads, which are a group of four separate waste containers for recycling that include cans and bottles, newspaper, office paper, as well as trash. Each quad requires floor space for four, 16-inch by 16-inch recycling containers. Also provide space for one battery collection container (one-gallon bucket) near each set.

17.3. It is the experience in the Facilities Management Department that buildings designed prior to the use of the quad system have occupants who move recycling and trash containers into hallways, stairwells or other unsafe or inaccessible areas. Quads typically are not moved when space for them is included in the design. Therefore, provide space for a quad adjacent to each entrance within each classroom, laboratory and conference room. For either open office designs, private offices or office suites, provide dedicated space in a central location for one quad per every 10 to 15 people.

18. Public Toilet Rooms

18.1. Design public toilet room entrances to screen fixtures from external view. Corridor and vestibule doors shall swing in the same direction.

18.2. Provide ceramic tile finishes on the floors and walls.

18.3. Toilet room ceilings shall be painted plaster, painted concrete or other approved moisture resistant material.

18.4. Toilet partitions shall be stainless steel and corrosion resistant.

18.5. To facilitate maintenance, provide accessible isolation valves for each restroom group. Provide a 2-foot wide maintenance pipe chase with a man door in restrooms where there are 10 or more fixtures located back-to-back.

19. Mechanical and Electrical Equipment Rooms/Spaces/Locations

19.1. Facilities Management maintains all building shell and infrastructure including, but not limited to, fire and life safety, mechanical, electrical and utilities.

19.2. Consistent with OSHA, 29 CFR 1910 General Industry Standard, all building shell and infrastructure including, but not limited to, fire and life safety, mechanical, electrical and utilities shall be designed and installed so that it is

accessible for preventative maintenance and repair work. Repair work shall be done weekly, monthly, quarterly and annually as required. This will result in the most efficient use of time and money for the maintenance and operations staff (optimal life cycle costs), as well as reduce the possibility of injury to maintenance and operations personnel. Review the section drawings through mechanical rooms with the Facilities Management Standards Exception Committee. Refer to Division 15, Section 15010 - Basic Mechanical Requirements. The Exception Committee shall make the final determination if the adequacy of maintenance accessibility is in question.

19.3. The A/E shall design and engineer solutions for implementation of OSHA 29 CFR 1910 General Industry Standard. If the A/E cannot find an engineering solution, the Facilities Management Safety Department shall assist in coming up with an acceptable administrative control or acceptable personal protective equipment. The frequency of a maintenance activity is directly related to the potential for an injury accident to the employee and a claim to the university workers compensation insurance. Before 1993, the university paid more than \$2 million annually in workers compensation claims. Since 1993, the university has reduced the number of injury accidents and annual workers compensation pay out.

19.4. The University of Minnesota must comply with federal law, OSHA, 29 CFR 1910 General Industry Standard for the preventative maintenance and repair work conducted by the maintenance and operations staff in university buildings. The State of Minnesota enforces this federal law.

19.5. Incorporate the following items into the design of mechanical and electrical equipment rooms:

19.5.1. PROHIBITED: Stairs to the floor where the equipment room is located.

19.5.2. PROHIBITED: Vertical ladders for access to areas where maintenance personnel need to carry toolboxes and other materials.

19.5.3. Adequate access to and clearance around equipment so that routine preventative maintenance can be conducted.

19.5.4. Indicate on the contract documents, the necessary maintenance service areas adjacent to the equipment. For example, an area one and a half times the length of the chiller tube is required to service the tube.

19.5.5. Design the equipment rooms so that the necessary maintenance service areas adjacent to the equipment are free of other equipment.

19.5.6. Equipment that requires service shall be placed in equipment rooms. When it is located in other spaces such as ceiling or floor plenums and chases, it is difficult to service, creates interruptions to activities in occupied spaces and can be unsafe to access to maintain.

19.5.7. The service door into the rooms shall be a minimum 6-foot-wide by 7-foot-high opening with one active and one passive leaf delayed-action closure. Wherever the width is not needed to meet code and/or provide adequate access or clearances around equipment, service doors to small electrical rooms and/or closets need not be a minimum of 6 feet wide, nor be a double door.

19.5.8. Equipment rooms shall be on the same level as the elevator.

19.5.9. Provide a wall-mounted service sink with a hose attachment on the faucet in all mechanical rooms.

19.5.10. Provide a beam/trolley/chain fall lifting point (beam must be free of fireproofing or insulation) to facilitate the removal of chiller end caps and the replacement of elevator hoist machines and elevator generators.

19.5.11. Provide floor drains at all pumps, chillers and air-handling units.

19.5.12. Pitch floors to the floor drains.

19.5.13. Provide emergency lighting so maintenance and operations staff can exit safely during a power outage.

19.5.14. Consider the safety of maintenance personnel when locating equipment. Provide adequate lighting and ventilation, electrical outlets, access routes, walkways, stairs, protective enclosures and barriers.

19.5.15. If the service time for equipment is more than 20 minutes, provide service platforms to access equipment.

19.5.16. Provide either guardrails or anchor points on service platforms at heights of 4 feet or higher to minimize a free fall not greater than the distance to the floor or 6 feet, whichever is less.

19.5.17. Provide non-compact fluorescent lighting.

19.6. Provide a means for replacing equipment access panels and knockout panels in the future.

19.7. Fall Protection at Roofs: The A/E shall review fall protection anchorage requirements with the Facilities Management Safety Department. Each employee

on a walking/working surface (horizontal and vertical surfaces) with an unprotected side or edge, which is 4 feet or more above a lower level, shall be protected from falling by guardrail systems with toe boards or a personal fall arrest system. Examples of such work include, but are not limited to:

- A. Maintenance on rooftop such as repairing roofs, unplugging roof drains and other building system maintenance
- B. Work on platforms that are designed to access and maintain specific equipment
- C. Work on any other walking and working surface not otherwise addressed with a possibility to fall more than 4 feet to another level/surface

19.8. All fall hazards shall be identified and alleviated for maintenance personnel performing work on rooftops (which shall include low slope roofs and steep slope roofs), work platforms or any other walking/working surface by providing the following:

- A. A guardrail system with toe board. Refer to 1910.23 (e) 1 through 6 for construction specifications.
- B. A personal fall arrest system. Anchorage must be installed whenever personal fall arrest systems have been chosen as the form of fall protection.

19.9. DBI/Sala shall be the manufacturer of anchorage used for attachment of personal fall arrest equipment. Personal anchorage shall be independent of any anchorage being used to support or suspend platforms. Personal anchorage also shall be capable of supporting at least 5,000 pounds per employee attached. (LINK TO ROOFING SECTION - DIVISION 9)

20. Access to Change Lamps in Light Fixtures: See Division 16, Section 16510 - Indoor Luminaries for access requirements of maintenance personnel for changing light fixture lamps and ballasts in high-ceiling spaces.

21. Access Panels/Doors

21.1. Wherever valves, clean-outs, dampers, controls, and other mechanical and electrical components are concealed in ceilings or walls and require service, adjustment or replacement, provide 2-foot by 2-foot hinged, lockable panels that are keyed to the University Best lock system. The panels shall be located in close proximity to the equipment to be serviced. Consideration shall be given to providing service platforms when frequent inspection or service is necessary on equipment such as kitchen duct clean-outs. There shall be no equipment located on the floor beneath the access panels and/or doors that would restrict the placement of a ladder or other lift device needed to service equipment above the

ceiling. Panel material and finish shall be resistant to damage or soil by normal anticipated use.

21.2. Provide a roof access scuttle or an access door from a non-public area to all major roof areas where rooftop equipment needs to be serviced.

22. Telecommunications Equipment Room: Refer to Appendix T - OIT Wiring Standards.

23. Chutes

23.1. PROHIBITED: Linen or trash chutes.

23.2. Linen and trash shall be collected in containers and taken directly to collection rooms adjacent to the service entrance.

24. Fresh Air Intakes: Fresh air intakes shall not be located where exhaust fumes could enter the system. Refer to Division 15, Section 15850 - Air Handling.

25. Building Overhang Requirements: PROHIBITED: Occupied building spaces that hang over unheated exterior spaces to avoid mechanical systems from being subject to freezing.

26. Building Security and Access Control: Refer to Division 16, Section 16722 - Centrally Managed and Hardwired Electronic Security and Access Control Systems.

27. Recycled Materials: The university recommends and supports the use of recycled materials. Refer to Appendix FF - Recycled Materials for the list of recommended recycled materials to be used in new construction. The A/E shall incorporate these recycling recommendations in the appropriate specification sections.

28. VOC Content Levels: The university recommends and supports the use of low VOC content levels. See Appendix GG - Definition of Low Content Levels for the list of allowable VOC levels to be used in new construction. The A/E shall incorporate these VOC levels in the appropriate specification sections.

29. Planters

29.1. PROHIBITED: Installing planters immediately adjacent to buildings or on top of buildings as part of the roof structure.

29.2. Install waterproofing systems in planters to avoid water damage in building roofs and walls.

ENERGY EFFICIENT DESIGN

1. Design Objectives

1.1. Architects, engineers and design consultants shall design energy efficient buildings in compliance with the latest version of ASHRAE 90.1.

1.2. The A/E shall consult Excel Energy Assets Custom Energy Assistance Program or approved and equal program to assist in its efforts to design an energy efficient project. These services consist of modeling the projected energy use of proposed designs, suggesting strategies to reduce the projected energy use, and projecting the construction costs and energy savings associated with the suggested strategies. Review the suggested, project-specific energy conservation strategies with the Facilities Management Energy Conservation Group.

1.3. The A/E and the university shall choose and incorporate energy efficient strategies into the design. Energy efficient strategies with a payback of seven years or less shall be incorporated into the project.

1.4. One percent of GME costs shall be allotted for energy conservation measures for projects more than 25,000 gross square feet.

1.5. Energy efficiency measures are to exceed code by 30 percent. The A/E shall provide documentation of these measures for university review and approval.

2. Lighting Systems: Select and design lighting systems and controls to ensure minimum consumption of energy while providing quality illumination for the visual tasks in each room or space. Avoid high levels of general illumination except in the most critical applications. Provide specialized supplementary lighting sources at the task area in lieu of uniform high-level illumination throughout. Switching or other lighting control devices shall provide variable levels of lighting. Minimize decorative lighting. Consider the principles of day lighting for new buildings.

3. Evidence of Compliance: The A/E shall submit calculations and other data with the design development documents to demonstrate compliance with the energy efficient design policy and the estimated cost impact on construction and operation.

HAZARDOUS MATERIALS MANAGEMENT

1. PROHIBITED: The installation of any material or equipment that contains asbestos. No lead-containing coatings shall be applied at the university without approval from the Hazardous Materials program manager. Refer to Bidding Requirements, Contract Forms, Conditions of Contract - 00200 - Information Available to Bidders for the procedure that shall be followed to identify existing hazardous materials.

2. The A/E shall work with the Facilities Management Hazardous Materials program manager to determine which of the Appendix K specification sections are to be included in the project manual.

UTILITY INFRASTRUCTURE REQUIREMENTS AND SERVICES

Approval: Review utility infrastructure requirements, services and budget with Facilities Management Energy Management at the beginning of Schematic Design. For specific requirements, refer to Division 16 - Electrical.

MAIN SERVICE TRANSFORMERS

1. Location: Locate main service transformers required for new or remodeled buildings in electric vaults within the building or buildings they will serve. For specific requirements, refer to Division 16, Section 16305 - Electrical Vaults.

2. Upgrading Existing Supply: Main service transformers that are needed in an existing building to upgrade supply shall be installed in electrical vaults within the building, provided there is no major renovation scheduled. If such installation is impractical, construct a subsurface electric vault on an exterior wall of the building.

UNIVERSAL DESIGN REQUIREMENTS

1. Universal Design: The purpose of universal design is to design projects that accommodate all people to the greatest extent possible without the need for individual adaptation. When designing projects at the university, consider the following guidelines:

1.1. Equitable Use: Provide the same means of use for all users, identical whenever possible, equivalent when not. Avoid segregating or stigmatizing any users. Make provisions for privacy, security and safety equally available to all users. Make the design appealing to all users.

1.2. Flexibility in Use: Provide choice in methods of use. Accommodate right-handed or left-handed access and use. Facilitate accuracy and precision for users and provide adaptability for their space.

1.3. Simple and Practical Use: Eliminate unnecessary complexity. Be consistent with expectations and intuition of the users. Accommodate a wide range of literacy and language skills and arrange information consistent with its importance.

1.4. Perceptible Information: Use different modes such as pictorial, verbal and tactile for repeated presentation of essential information. Maximize legibility of essential information. Differentiate elements in ways that can be described.

Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

1.5. Tolerance for Error: Arrange elements to minimize hazards and errors. The most used elements shall be the most accessible. Hazardous elements shall be eliminated, isolated or shielded. Provide warnings of hazards or errors.

1.6. Minimal Physical Effort: Allow users to maintain a neutral body position. Use reasonable operating forces. Minimize repetitive actions. Minimize sustained physical effort.

1.7. Size and Space for Approach and Use: Provide a clear line of sight to important elements for any users that are seated or standing. Make all components reachable for any users that are seated or standing. Accommodate variations in hand and grip size and provide adequate space for users of assisted devices or personal assistance.

1.8. Noise Criteria

1.8.1. Quiet space is a necessary condition for a person to comfortably rest, study or do research. Unwanted periodic noise or loud noise and reverberation interfere with these activities. Poor acoustics are a barrier to those with mild to moderate hearing loss, speech impairments and learning disabilities. Poor acoustics also interfere with communication for individuals who use English as a second language. HVAC systems, water circulation pumps and other mechanical systems can be the source of intolerable acoustical stimuli. The A/E shall determine appropriate noise criteria for a project, and design systems and select equipment that achieve the criteria.

1.8.2. The following background noise criteria are suggested: concert halls, NC 20; sleeping rooms, NC 30; classrooms and lecture halls, NC 30; libraries, NC 30; open-plan office areas, NC 40; laboratories with fume hoods, NC 45.

1.8.3. The following reverberation times for unoccupied rooms are suggested: Classrooms and lecture halls, 0.6 to 0.7 seconds maximum. Outside of buildings, noise must be less than 50dBA at night in residential areas and similar Noise Area Classifications. When measured outside of a building, noise caused by building mechanical equipment must meet Minnesota Rule 7030.0040, Noise Pollution Control.

2. General Information

2.1. PROHIBITED: Wheelchair platform lifts for accessible routes to primary areas in new construction.

2.2. The A/E shall address the needs of people with disabilities both in the building design and within the contract and construction limits. Indicate on the drawings, circulation patterns and disability parking that may be affected by the construction.

2.3. The A/E shall request a copy of the Accessibility Guide and Map from Disability Services prior to completion of predesign for implications relative to access during construction and/or project design. Site planning shall include consideration for accessibility for people with disabilities. Areas adjacent to the construction project shall remain accessible to people with disabilities. Conduct construction activities in such a way that potential hazards to disabled people are eliminated. If there is a change in A/E following predesign, the A/E responsible for further development of the project shall review site and landscape plan with DEHS during schematic design.

2.4. Projects shall be designed according to the Americans with Disabilities Act (ADA) Accessibility Guidelines. Use State Building Code requirements where they are more restrictive.

2.5. The contract documents shall use terms such as "disability" or "accessible" in lieu of "handicap."

2.6. Locate equipment in wheelchair-accessible areas. The most frequently used materials shall be placed on lower shelves.

3. Power Doors

3.1. Each new building and major remodeling project shall provide one power-operated building entrance door at all accessible entrances, operated on demand by push buttons. This shall include parking ramp, tunnel and skyway projects.

3.2. The operating buttons shall be mounted in locations convenient to people with disabilities. The top button shall be mounted at 30 inches centered above the finish grade or floor. Buttons may be mounted side-by-side as long as both buttons are 30 inches centered above the finish grade or floor.

3.3. For exterior and interior doors, the operating buttons shall be located 30 inches beyond the swing of the door and 30 inches from the door jam. Operating buttons shall be located on the same side of the wall or mounting surface.

3.4. The operating buttons shall be a minimum of 5 inches square or round in diameter.

3.5. Buttons may be wall-mounted or mounted on a bollard, depending on site conditions.

3.6. In a vestibule where the depth between two sets of doors is less than 7 feet, both sets of doors shall open and close at the same time to ensure efficient movement of people in wheelchairs.

3.7. Timing for power doors shall be five seconds to open, 10 seconds to remain open, and five seconds to close.

3.8. Installation of power-operated doors shall be coordinated with security hardware requirements, including card access readers. Design the installation to allow for future modification of controls. Minimum requirements include conduit to the doorjamb and a weatherproof, blank junction box near the operating button for installing keyed controls.

3.9. On the primary floor for new and major remodeled buildings, provide accessible, power-operated doors on bathrooms for each sex and/or on the unisex/family bathroom if provided.

4. Curb Cuts: To be consistent with state standards, curb cuts shall comply with the Minnesota Department of Transportation Standard 7036D.

5. Accessible Toilet Rooms

(LINK FROM DIVISION 10, SECTION 10800)

5.1. PROHIBITED: Large jumbo toilet paper dispensers in accessible toilet stalls and restrooms.

5.2. Stall Door Hardware: Locking mechanisms shall be easily operable with one hand, and be of a paddle or slide-latch design. A door pull shall be placed on both sides of the door near the latch. Doors are required to have gentle, spring-loaded action.

5.3. Coat Hooks: For reach and safety reasons, mount coat hooks in accessible stalls on a sidewall, 48 inches maximum above the floor.

5.4. Grab Bars: To be within reach and function, provide horizontal grab bars 33 inches maximum above the floor.

5.5. Toilet Paper Dispensers: To ensure access to grab bars, mount a single-roll or double-roll toilet paper dispenser below the horizontal grab bar.

5.6. Sanitary Product Disposal Unit: To ensure access to the water closet, mount the disposal unit between the toilet paper dispenser and the rear wall, unless the disposal unit is recessed into the wall.

5.7. Mirrors: Provide a full-length mirror that everyone can use.

5.8. Urinals: The accessible urinal in the men's room shall have flushing floor drains in lieu of floor-mounted urinal in order to be usable by men with urinary bags and limited mobility.

5.9. Toilet Room Entry Door Hardware: Provide a push/pull device instead of a latch mechanisms.

6. Assembly Areas - Sightlines

6.1. PROHIBITED: Rails that are 34 inches high to 42 inches high because they block sight lines.

6.2. To ensure adequate sightlines in rooms with sloped floor or tiered seating, the height of the railing in front of seating shall be 26 inches maximum above the floor.

7. Elevators

(LINK FROM DIVISION 14, SECTION ON CONVEYING SYSTEMS)

7.1. Car Controls in Cab: To be within reach and function, floor buttons shall be located 48 inches maximum above the floor.

7.2. Emergency Communications: To be within reach and function, controls shall be installed 35 inches to 48 inches above the floor.

7.3. The car emergency communications device shall be hands-free, accessible, and not require a door or panel to be opened for use.

7.4. Signaling devices must provide visual and audible communication. Where appropriate, include voice communication as well.

7.5. If instructions for use are provided, essential information shall be presented in both tactile and visual form.

8. Front Reception or Service Counter: The lower portion of the counter (36-inch minimum width and 36-inch maximum height as specified by the ADA and code) shall be located centrally and directly from the customer's viewpoint.

9. Podiums and Lecterns in Classrooms and Assembly Rooms

9.1. When a podium or lectern is fabricated as part of the project, provide the following features to accommodate instructors who are short or tall, seated or standing:

- A. Adjustable height feature
- B. Easily operable controls
- C. Knee clearance where possible, including 30 inches in width, 27 inches to 29 inches in height and 19 inches in depth

9.2. Refer to Appendix DD - Special Requirements for University Classrooms for complete information on classroom types and design.

10. Lighting in Classrooms and Assembly Rooms: In classrooms, auditoriums and assembly rooms with a seating capacity of more than 49 people, refer to Appendix DD - Special Requirements for University Classrooms for sign language interpreter requirements. In locating the interpreter's lighting area, the relationship to the presenter and/or multi-media presentation materials is critical.

(LINK TO/FROM DIVISION 16, SECTION 16510 - INDOOR LUMINARIES)

11. Science Wet and Dry Rooms or Laboratories

11.1. In instruction or research areas, provide one station that has the following features:

- A. Lower fixed height or adjustable height capability
- B. Knee clearance of 30 inches in width, 27 to 29 inches in height, and 19 inches in depth
- C. Large and easily operable controls
- D. A ledge along the front to prevent hazardous substances from spilling
- E. Braille identification to the left of controls

Note: A station shall include all functional activities such as fume hoods, workbench, sink, eye wash area and safety shower.

11.2. Entrances into science wet and dry rooms and laboratories shall be accessible.

12. Student and Employee Kitchens, Lounges and Break Rooms: Provide accessible features such as lever faucets, a 34-inch high counter, and knee clearance under sinks and work areas.

13. Door Opening Force: The maximum force for pushing or pulling open interior hinged doors shall be 5 pounds as required by ADA and the Minnesota Accessibility Code, current edition.

End of Program Information/Requirements
University of Minnesota Facilities Management
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