



# **Civil, Structural & Architectural Design Guidelines**

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Updated August 15, 2008

## DESIGN GUIDELINES

## CIVIL, STRUCTURAL &amp; ARCHITECTURAL

## 10 General

## 1010 Project Summary:

1. These Guidelines contain information to be used by consultants in the design of Mercy facilities.
2. The criteria represent minimum levels of performance, quality and/or standards, which are sometimes different than those accepted in private and commercial industry. This is in recognition that these facilities must survive longer than normal service lives, without undue cost to the users, while still supporting the Ministry of the Sisters of Mercy.

## 1020 Project Program

1. Commissioning: Preconstruction programming and planning shall identify the party(ies) responsible for total project commissioning. The Project Manager in conjunction with the team members assembled early on in the project shall investigate the project complexity to ascertain the efficacy of enlisting the services of a third party commissioning entity; to assign commissioning to the project team; or to provide commissioning by the Owner.
2. Redundant & Integrated Systems: The facility design shall include
  - 1) the identification of mission critical systems;
  - 2) the foreseeable access, breakdown and maintenance aspects of these systems; and
  - 3) the integration of components with redundant features to reduce the possibility of total system failure. Examples for design consideration:
    - a. Double waterproof details that incorporate a rainscreen or wearing layer with an additional backup waterproof layer. (e.g., water managed drainable window openings, sealant over compressible sealant tape, rain screen exterior walls with drainable back up, metal parapet cap over roofing membrane, etc.)
    - b. Redundant valves and pipe loops to allow key components to be bypassed during their maintenance or replacement. (e.g., reverse osmosis water systems)
    - c. Multiple standby generator arrays rather than a single generator with multiple fuel supply tanks to allow using one tank while another tank is replaced or repaired.
    - d. Redundant pumps and water supply sources for fire protection systems.

## 1030 Hazardous Materials

1. Hazardous Material Content: Construction materials shall be certified as containing no hazardous material content, including, without limitation, asbestos, mercury, and Polychlorinated Biphenyls (pcb's). Construction materials include all interior finishes, firestopping, spray applied fire resistive materials, roofing, insulation, pipe insulation.

## 1040 Regulatory Reviews

1. FM Global shall be contacted as early as possible in master planning and preconstruction phases of all Mercy projects to establish FM review for insurance recommendations. Contact: Bob Aslin, Robert.aslin@fmblobal.com, 314.453.9660 ext. 2864.
2. FM Global recommendations will not be implemented without the consent of Mercy.
3. Coordinate with the Authority Having Jurisdiction to establish all reviews needed for master planning and construction projects

## A Substructure

## A10 Foundations

## A10 Foundations

## A1010 Foundations

1. Subsurface design requirements will be based on a current geotechnical investigation from which soil profiles, design parameters, compaction requirements, and foundation design options are established.
2. In instances where concrete duct banks, steam tunnels, and other concrete masses join foundations walls, steel pins for reinforcing steel anchoring will be attached to the foundation walls through use of epoxy capsules similar in material and quality to those supplied by Hilti or approved equal.
3. Structural design shall allow for penetrations of foundation walls by direct burial cable and/or small diameter penetrations through the use of sleeved or core drilled openings.
4. Crawl spaces will have concrete floor slabs, floor drains, ventilation and lighting.

## B Shell

## B10 Superstructure

## B1010 Floor Construction

1. Floor loadings will be increased as required to meet equipment loadings and conditions specified by equipment manufacturer.

2. If live load reduction is used, it will be in accordance with the latest edition of The International Building Code / ASCE 7 and must be noted on the drawings.
3. Finished floor heights will be expressed on contract documents as actual elevation based on Survey datum, not on an arbitrary one.

#### B1020 Roof Construction

1. Preferred roof decking material is steel or concrete (normal weight or light weight). Coordinate with Architect as applicable to determine cost comparison of light weight insulating concrete deck with polyisocyanurate insulation on steel deck. Do not use gypsum roof decking.
2. Design roof decks with a minimum slope of 1/4" per foot (including valleys). Positive slope for drainage will be provided by sloping the roof deck to the greatest extent practicable rather than relying on tapered insulation (except at crickets, around equipment pads, or decks to be used for future floors).
3. Minimum roof load design will comply with live load or snow / drift load, whichever is greater.
4. Roof service loading will be increased as required for external equipment, ductwork, and utility support requirements.

#### B20 Exterior Enclosure

1. General Finishes:
  - a. Aluminum door and window frames will be Class I (1.0 mil minimum) architectural anodized, or 70% PVF resin where exposed to the weather. Interior aluminum door and window frames may also be Class II or 50% PVF resin. In existing structures, the color will match the color of the existing windows and/or doors unless otherwise stipulated by the Sisters of Mercy Project Manager. The Owner will decide which color to specify and install.
2. General Enclosure:
  - a. Provide a complete humidity controlled envelope that when installed and operated correctly will prevent uncontrolled moisture accumulation caused by condensation or moisture intrusion.
  - b. Provide quality assurance of key moisture and humidity control systems to include inspections of:
    - i. Moisture infiltration barriers;
    - ii. Vapor retarders;
    - iii. Sheathing – including caulked fastener heads, and caulked and taped joints;
    - iv. Roof to wall vapor retarder transitions;
    - v. Envelope penetrations – including caulking, subsill / subjamb flashings; proper securement; head flashings; throughwall flashings; weatherstripping; and waterstops.

- vi. Under slab to wall vapor retarder transition details;
  - vii. Joint backer rods and sealants including peel test results for all surfaces.
- c. Design exterior entrances with ample weatherstripping, vestibules, power operated doors, revolving doors or other features as may be necessary to provide adequate control of exterior air infiltration.
  - d. Locate critical humidity controlled areas away from building entrances.
  - e. Isolate building plenum spaces from vestibules to prevent infiltration of vestibule air into plenum air.

### B2010 Exterior Walls

1. Exterior building materials will be selected to maintain and/or compliment the harmonious nature of the facility(ies). Care will be given to provide a consistent image to the historical character of the facility(ies). Materials should be practical, low-maintenance, durable, and cost effective.
  - a. Exterior wall systems of brick veneer over block backup are preferred.
  - b. Exterior wall systems that use steel stud backup will be acceptable upon satisfactory review of wall details by the Regional Project Director or the Staff Architect of Sisters of Mercy Health System.
  - c. Exterior insulation and finish systems [EIFS], stucco, and cement plaster will only be acceptable as the primary finish of a building or renovation if approved by the Regional Project Director or the Staff Architect of Sisters of Mercy Health System. Use for small areas or soffits is acceptable with the approval of the Project Manager.
  - d. The use of aluminum and glass curtain walls will require review and/or production of details and specifications by an independent curtainwall consultant.
  - e. At all transitions from one material to another that are exposed to moisture penetration, the Drawings shall provide a clear detail that shows how the water will be managed and prevented from penetrating the building. Redundant barrier system or drainable system details are required for all permanent construction. Coordinate site visits to coincide with visual review of all moisture resistance details (moisture barriers, flashings, joint seals, sheathing, etc.) prior to their being covered by exterior wall finishes.
2. Acoustical isolation performance of walls, windows and doors shall be provided on all projects with I-2 occupancy (non-ambulatory patients staying more than 24 hours), at all project locations adjacent to noisy equipment (standby generators, air handling units, compressors, chillers, elevator equipment rooms, etc), and at facilities subjected to objectionable off-site noise (airports, major highways, bars, etc.).

### 3. Precast Concrete Design Criteria

- a. The consultant will specify allowable deflections to be used in the design of the panels to maintain integrity of the panel.
- b. Panels will be designed with adequate structural integrity to permit handling, transportation, storage, and erection.
- c. Waterproofing and water repellent materials are discouraged on new concrete surfaces.

### 4. Masonry

- a. Design and construction guidelines and technical notes of the Brick Institute of America (BIA)([www.bia.org](http://www.bia.org)), will be followed for brick; and the National Concrete Masonry Association (NCMA) ([www.ncma.org](http://www.ncma.org)) and Masonry Advisory Council (MAC) for concrete masonry unit (CMU) construction.
  - b. Use of stone coping for modification to existing facilities with stone coping will be allowed. Use of stone coping for design effect will require specific approval from the PM.
  - c. Masonry units will not be used for foundations walls below grade.
  - d. Waterproofing and water repellent materials are discouraged on new masonry, or stone surfaces. Use will require project manager approval. Areas subject to vandalism, graffiti, dirt splash and other areas prone to regular cleaning will consider the use of water repellent coatings. Stone exposed to rising damp conditions will consider the use of back coating of dampproofing.
  - e. The designer will evaluate the expected movement for each wall and require adequate expansion joints to accommodate the movement of clay and stone masonry, and control joints to accommodate the movement of concrete masonry.
  - f. Cast stone (steam cured architectural precast concrete) units will be permitted provided all units conform to the requirements of The Cast Stone Institute ([www.caststone.org](http://www.caststone.org)) including performance standards as tested by ASTM C 1364.
5. The building envelope will comply with the latest edition of ASHRAE/IES Standard 90 and the International Energy Conservation Code – whichever is most stringent.
6. Exterior wall insulation may be semi rigid, blanket batt type, glass fiber, complying with ASTM C665 and the following ASTM E84 values:
- a. Flame spread less than 25
  - b. Smoke development and fuel contributed less than 50
  - c. Exception: Spray applied foam or cellulose insulation will also be acceptable provided products meet or exceed the above ASTM E84 values.
7. Perimeter foundation walls, walls below grade, and perimeter slab on grade, will be provided with closed-cell, extruded polystyrene insulation board with “R” value of 5.0 per inch and density of nominal 15 pcf and detailed in compliance with the International Energy Conservation Code.

8. All foundations walls with accessible or occupied space on one side and soil on the other will be waterproofed below grade. Bentonite type waterproofing will not be used where salty or brackish water will be present. Damproofing will not be acceptable.

#### B2030 Exterior Doors

1. Doors at facility perimeters will have a rating commensurate with the wall system in which they are located.
2. Minimum door size shall be 3'0" in width and 7'0" in height.

#### B2030 Exterior Windows

1. Windows required to be operable by regulations will not be supplied with screens.
2. Glazing in exterior windows will have a low emissivity coating and will match the color of the tint for existing tinted glass units. The use of reflective, mirror-like coatings will not be used unless approved by the Regional Project Director or the Corporate Architect of Sisters of Mercy Health System. Such approval will be contingent upon life cycle cost savings justification demonstrated by the consultant and will provide 100% payback within a maximum of three years.
3. All exterior glass systems will be insulated (double pane) glass with aluminum thermal break frame construction, butyl or silicone primary seals and silicone secondary seals, with manufacturer's ten year warranty against premature seal failure that causes obstruction of vision, fogging, or film formation.
  - a. No steel framing should be exposed to the exterior.
4. Replacement window sash will be thermally broken aluminum. In restoration projects, wood or clad wood window sash may be allowed if approved by the Owner's Project Team.
5. All new construction and major renovations will use low-E glazing. Glazing on window replacement projects will be evaluated on a life cycle cost basis to determine viability of the low-E type.

#### B30 Roofing

##### B3010 Roof Coverings

1. From the pre-approved systems, the consultant will select roof systems which are suitable for the facility. To evaluate possible systems, the consultant will consider the following design parameters:
  - a. Life of the roof system. Preferred systems and associated useful lives include:
 

Built Up	
Conventional	20 years
Coal Tar	20 years
Single Ply	
Fully-adhered EPDM	15 years
Modified Bitumen (SBS)	20 years
Slate	50 years
Cement/Clay Tile	50 years
Composition shingles	25 years

## Metal

- Preformed architectural
- Structural standing seam
- Architectural – custom fab

- b. If other systems, such as PVC, TPO, CSPE/Hypalon, mechanically-attached EPDM, APP type modified bitumen are, in the opinion of the consultant, the most appropriate system. It will be evaluated by the project team.
  - c. Initial (first) cost of the roof system and additional building costs required for recommended roof system.
  - d. Maintenance costs and requirements.
  - e. Life cycle energy costs associated with recommended roof system.
  - f. Building height/roof slope/wind resistance requirements
  - g. Present and future use of building, including specific uses in the building that could affect the roof system.
  - h. Local environmental issues/contaminants and pollutants
  - i. Life expectancy of building
  - j. Structural properties of roof superstructure
  - k. Type of roof deck
  - l. Slope/drainage
  - m. Vapor retarder requirements
  - n. Roof traffic/access and penetrations
  - o. Code/Insurance requirements and restrictions
  - p. Aesthetics
  - q. HVAC internal pressures
  - r. Application issues, such as staging, access, building use and occupancy, etc.
2. After establishing design parameters, Systems should be evaluated by the consultant based upon:
    - a. Minimum established Mercy standards (refer to Specification Guidelines)
    - b. A choice of roof systems with properties, which, considering all factors, are best suited to the project
    - c. Requirements for a total system warranty
  3. The consultant will follow the roofing guideline recommendations of the National Roofing Contractor's Association and the following roofing guidelines when designing the roofing system:
    - a. Use only recommended roofing systems as identified in these Guidelines, Owner's Guide Specifications, or as approved or directed in advance by the Owner's Project Team.
    - b. Single-ply ballasted roofs and spray foam roofing systems will be installed only as approved or directed in advance by the Owner's Project Team.
    - c. New buildings should have a minimum ¼" per foot slope provided by sloping the structure to the greatest extent practicable. Additional slope will be provided as required to prevent water ponding 48 hours following rain.

- d. If an existing roof has less than ¼” foot slope a serious evaluation will be done to determine if achieving ¼” foot is feasible. If additional slope is required on re-roofs, tapered insulation should be used.
- e. Exception: Coal tar roofs shall not exceed 1/8” foot slope.
- f. Use crickets, saddles, and edge strips to direct water flow away from parapets and penetrations. Backslope is to be confirmed during detailing.
- g. Overflows are required by code. Overflows shall not be piped into the primary roof drain system. Highly visible and dependable systems such as scuppers and “daylighted” drains are preferred.
- h. Provide roof walkways to and around rooftop equipment and other areas as directed by the owner and as required by roofing manufacturer’s warranty requirements.
- i. At the design development phase, a review should be undertaken by the consultant to include vapor retarder requirements (especially at operating rooms and other artificially humidified spaces located directly below roof decks), deck type (avoid the use of built-up asphalt or coal tar roofing systems on bouncy metal decks), expansion joint locations and details, salvageability of existing roof insulation, drainage, roof access, roof contaminants, fire rating, and wind uplift factors (including canopies, large wall openings, corner and edge conditions), hail resistance in hail prone areas, and all other applicable parameters.
- j. Existing roof decks will be checked by a registered structural engineer if new roof loads are in question or if preliminary deck inspections reveals substandard conditions.
- k. For re-roof projects, an evaluation will be done by the consultant and the owner to determine if a roof survey by nuclear meter, IR imaging, or other means may be performed. Core samples will be taken and results recorded and evaluated.
- l. Roof access will be evaluated to determine if and the location of roof access hatches, ladders and other components that may be required by the owner.
- m. Avoid complex flashing details. Eliminate the use of pitch pans or sealant pockets. Maintain minimum 8" flashing height, 12" is preferred.
- n. Minimize roof penetrations. If structural penetrations are unavoidable, use round or square structural steel shapes to facilitate flashing. Equipment supports for rooftop mounted equipment shall be a minimum 14" height. Use prefabricated equipment supports where possible. Equipment support frames or stands shall provide following working clearances:

Width of Equipment	Height of Legs
Up to 25"	14"
25-37"	18"
37-49"	24"
49-61"	30"
Over 61"	48"

## C Interiors

## C10 Interior Construction

1. General: Furnishings such as carpet, wall coverings, furniture and cabinets will comply with "Fire Spread Ratings Requirements" contained in NFPA101 Life Safety Code and other pertinent ANSI standards.
2. Refer to Guidelines for Design and Construction of Hospital and Health Care Facilities for finish requirements.
3. Custodial (Janitor) Closets
  - a. General: Each floor of a building will have a minimum of one custodial closet per 20,000 sq. ft. or portion thereof. The main floor closet may be combined with a central storage closet. The closet will be 60-80 sq. ft. and rectilinear. Custodial closets will serve that specific use only and will not contain building systems, equipment or permanent roof access ladders. Furnish with the following:
    - (1) 24" x 24" floor mounted mop sink with stainless steel edge caps, vandal proof drain, stainless steel splash plates, and a hose connection with a vacuum breaker.
    - (2) Two duplex electrical outlets (GFCI).
    - (3) 16 lineal feet of 18" deep shelving, 14" vertical measurement between shelves, with the lowest shelf being 20" above the floor. The shelves should be of sturdy construction, capable of holding bulk cleaning supplies with ledge to prevent items from rolling off.
    - (4) A locking storage cabinet 2'W x 20"D x 6'H.
    - (5) Ladder and mop/broom hangers mounted on one wall.
    - (6) Lighting at the 20' candle level. The light fixture(s) shall have safety guards.
    - (7) A floor drain.
  - b. Each building will have a central storage closet on the main floor, accessible to the main corridor, and as close as practical to access doors and an elevator. The size of the room will be a minimum of 144 sq. ft. The door will be a minimum of 36" wide with a storeroom function lockset. The door should open outward if allowed by code (not more than 50% encroachment into required corridor width). Buildings 50,000 sf and larger should consider an adjacent storage room to accommodate specific storage requirements. Central storage closets will serve that specific use only and will not contain building systems equipment or roof hatches. Furnish with the following:
    - (1) 24" x 36" floor mounted mop sink with stainless steel edge caps, vandal proof drain, stainless steel splash plates, and a hose connection with a vacuum breaker.
    - (2) Two duplex electrical outlets (GFCI).

- (3) 36 lineal feet of shelving that is 18" deep, 14" between shelves, with the lowest shelf being 20" above the floor. The shelves should be of sturdy construction, capable of holding bulk cleaning supplies.
- (4) A locking storage cabinet 2'W x 20"D x 6'H.
- (5) Ladder and mop/broom hangers mounted on one wall.
- (6) Lighting at the 20' candle level. The light fixture(s) will have safety guards.
- (7) A floor drain.
- (8) Telecom-data telephone in each

#### C1010 Partitions

1. Provide minimum 5/8" thick gypsum wallboard with 20 gage steel studs at 24" on centers unless otherwise required.
2. Provide nominal 25 gage steel studs at 24" on centers for administrative and office areas not subject to impact by gurney traffic.
3. Corridor Partitions: minimum 2 layers of 5/8" gypsum board on corridor traffic side and one layer of 5/8" gypsum board on non-traffic side.

#### C1020 Interior Doors

1. Interior Doors:
  - a. Provide minimum 3'-6" clear opening width for all doors that are subject to use by wheelchair users.
  - b. Provide minimum 47-1/2" clear door width for all doors that are subject to use by hospital bed traffic.
  - c. Wood veneer preference: plain sliced wood veneer oak doors on SCL cores where wood veneer doors are used. Rotary cut oak are not preferred unless rotary cut is required to match an existing condition.
  - d. If there is reason to use a more expensive wood veneer species, such as maple or cherry, then Mercy prefers the use of plastic laminate faced SCR core doors.
  - e. In high abuse areas, or fire label doors greater than 90 minutes, a steel hollow metal wood grain textured door (such as CECO Modera or Steelcraft Grintech) will be the Mercy preference to match adjacent wood veneer doors.
  - f. Standard hollow metal doors will be used where aesthetics are not a concern.
2. Wall and ceiling access doors
  - a. Access will be supplied for all concealed valves or other equipment that may require operation or adjustment.
  - b. Access doors will have a minimum size of 24" x 24" if possible.
  - c. Both mechanical and architectural drawings will note the need for access doors,

- d. Number of doors needed, and general locations. Exact locations are not desired.
- e. Design should require access doors be located to allow access to valves or other equipment.

### C30 Interior Finishes

#### C3000 Finishes, General

1. Hazardous Material Content: Interior finishes shall be certified as containing no hazardous material content, including, without limitation, asbestos, mercury, Polychlorinated Biphenyls (pcb's) and lead.

#### C3010 Wall Finishes

1. Wall Finishes & Substrates:
  - a. Consistently wet areas such as cart wash areas, kitchens, etc. should have the following wall system or approved equal: concrete masonry unit wall with 1/8" fiberglass panel bonded to the wall with mastic and nylon anchors.
  - b. Water resistant drywall will be used in intermittently wet areas (such as restrooms, wash rooms, custodial closets, etc.).
  - c. Public stairways in academic buildings should have very durable wall finishes (such as CMU or concrete) and floor finishes.
  - d. All mechanical rooms should have sealed concrete floors and painted masonry or concrete walls. Provide waterproof membrane coating for elevated slab floors subject to standing water (leaks, cleanouts, condensate, etc.).
  - e. Restrooms will have a ceramic tile wainscot with a minimum of 54" in height and will have porcelain paver floors.
  - f. For high use areas, consideration should be given to the use of modified acrylate copolymer multi-color coating similar to Zolotone or Polomyx.
  - g. In general, wallcovering should be used only in private offices, conference rooms, or other low traffic areas. Wall covering should not be used in corridors or on exterior building walls. All wall covering will be commercial grade. Vinyl wall covering will be standard Type II, 54" width. Ease of cleaning and serviceability will be criteria for selection
  - h. For conference rooms and similar areas, consider chair rails to prevent wall damage.
  - i. Thin coat veneer plaster provides a good durable finish and are particularly useful when matching existing plaster walls.
  - j. Acoustical wall panels will be used sparingly. The need for a chair rail will be considered and panels will be terminated a minimum of 4" above the finished floor.

#### C3020 Floor Finishes

1. Comply with the regulations of the State Department of Health for floor and base finish requirements. In non-regulated rooms and spaces, comply with the following unless otherwise programmed:
  - a. Lobby & Public Areas: Hard, durable, non-slip surfaces requiring minimum maintenance such as porcelain paver tile, slate, quarry tile, marble chip epoxy filled tile, VCT, or thin set epoxy terrazzo.
  - b. Classrooms: Chemically welded VCTT (vinyl cushion tufted textile), VCT or sheet vinyl. Limit standard carpet use to spaces with specific program needs such as impact sound dampening and aesthetic requirements.
  - c. Auditoriums & Lecture Halls: VCT, stained sealed concrete, or epoxy in seating areas and VCTT or carpeting in aisles.
  - d. Laboratories: Sheet vinyl, VCT (Dry labs only), seamless epoxy matrix topping, or sealed concrete based on program requirements. Provide seamless reinforced polyester or epoxy floor systems for flooring subject to steam cleaning.
  - e. Offices & Conference Rooms: Carpet. Consider carpet tiles in high traffic areas and as approved by the project manager. If carpet is used, consideration should be given to soil hiding characteristics like yarn fiber, color, pattern and yarn density.
  - f. Mechanical Rooms, Janitor closets, storage rooms: Sealed concrete.
  - g. Stairwells: Painted steel pan stairs with sealed concrete treads.
  - h. Computer Labs: VCT, plastic laminate, carpet, or carpet tile, static electricity grounded over access flooring panels.
  - i. Corridors: VCT in classroom and lab buildings. Carpet in office buildings and suites. VCTT in Patient Wing Corridors. Seamless resilient flooring as required by Department of Health Guidelines.
  - j. Patient Rooms: seamless, wood grain pattern, welded resilient.
  - k. Food Preparation & Service: Non-slip Quarry tile or epoxy coating.
  - l. Necropsy Laboratory: Epoxy seamless topping
  - m. Hospital & Clinic application & exam rooms: Sheet vinyl and VCT in procedure rooms.
  - n. Public Restrooms: Porcelain paver tile.
  - o. Avoid mixing floor coverings within one room unless dictated by program needs.
2. Entrance mats:
  - a. Provide entrance mats, at all main building entrances.
  - b. Low to medium volume entrance traffic:
  - c. Removable, recessed, floor mats will be provided.
  - d. Use minimum 50 oz, drop-in carpet mats specifically manufactured for entrance mat use.
  - e. Size and exact location of mats should be of sufficient size to handle foot traffic, but not exceed manufacturer's maximum size recommendation for removal and cleaning.
  - f. Recess(es) may be formed by porcelain paver surround or by concrete slab recess.

- g. Medium to high volume entrance traffic: Removable, recessed, tread rail type floor mats will be considered for use with framed and drained recessed pan.
- h. Include floor drain in recessed pan for ease of cleaning and hosing down.
- i. Size and exact location of mats should be of sufficient size to handle foot traffic, but not exceed manufacturer's maximum size recommendation for removal and cleaning.
- j. Coordinate with Sisters of Mercy Project Manager for specific entrance walk off mat requirements.
- k. Consider the use of approximately 36 feet long entrance mat (10 to 12 foot falls) integrated with regular carpeting with flush design between carpet types.

### C3030 Ceiling Finishes

#### 1. Ceilings:

- a. Comply with State Department of Health requirements and Facility Standards for washable ceilings.
- b. Comply with Building Code Requirements for seismic provisions for the project's occupancy type.
- c. Provide sound attenuation at partitions and ceilings between major areas. Review criteria for acoustical separation with the Project Manager.
- d. Suspended ceiling systems will be designed with a 2' x 4' grid pattern in most areas. Use of a 2' x 2' grid in public corridors, auditoriums, lecture halls, and other areas subject to frequent above ceiling access or upgraded appearance should be considered. Reveal edge tiles may be used in selected areas with approval of the Project Manager. Concealed spline or tongue and groove ceiling systems will not be used.
- e. Provide hold down clips for suspended grid acoustical panels that are located within 8' horizontal measurement of entrance doors to prevent panel flutter.
- f. Drywall ceilings should typically be limited to consistently wet areas (such as kitchens, Operating Rooms), soffits / bulkheads in special public areas, and in spaces as regulated by the Department of Health. Access must be maintained to the plenum space with 24" x 24" minimum size access panels or adjacent lay in panel ceilings. Provide gasketed access panels in wet areas.

## D Services

### D10 Conveying Systems

#### D1010 Elevators and Lifts

1. All elevators shall be inspected by state certified inspectors and certified by the state of jurisdiction before final acceptance.
2. Passenger elevators are preferred to be holeless or roped holeless hydraulic. Hydraulic elevators shall be used for four stories or less. Elevators serving more than four floors shall be electric traction.
3. Where an elevator pit is required, the pit will have a sump pit, a sump pump with an alarm connected to the Building Automation System, and no floor drain.
4. Elevators will be wired and equipped with telephone and supplied with a vandal proof instrument.
5. For each installation, designer will evaluate expected usage of elevator to determine the need for vandalism-resistant construction. Controls shall always be vandalism-resistant at parking garages.
6. The following shall apply to the Vertical Platform Lifts necessary to provide wheelchair user accessibility within facilities:
  - a. Avoid the use of vertical platform lifts in new construction. Possible exceptions include access to performing areas in assembly occupancies or to provide access to incidental occupiable spaces and rooms which are not open to the general public and which house no more than five persons.
  - b. Lifts may be used in existing facilities built prior to 1991 as part of an accessible route and only when the use of an elevator or ramp is not feasible.
  - c. Lifts shall comply with ADAAG and ASME A18.1 – 1999 and Addendum 2.10.1a Safety Standard for Platform Lifts and Stairway Chairlifts.
  - d. Lifts shall be installed such that all lift enclosure walls are securely attached to adjacent walls, structure, or supplemental structural supports as required for stability and proper operation of the unit.
  - e. The use of vertical lifts is preferred over the use of inclined (stair) lifts.
  - f. The lift platform should be fully enclosed whenever possible. The minimum platform size is 36" x 54".
  - g. Lifts shall allow unassisted entry, operation, and exit. Operating controls shall be large push-button or paddle controls.
  - h. The preferred drive type is recirculating ball screw. The minimum weight capacity is 750 lbs.

#### D1030 Materials Handling

1. Pneumatic tube systems shall be galvanized steel minimum 6" diameter pipe.

## D20 Plumbing

## D2040 Rain Water Drainage

1. Drain tiles are to be installed at footings and tied to sanitary or storm sewer system as allowed by local municipalities. Down spouts will be tied into storm sewers (in lieu of foundation drain tiles) and will not discharge on grade.

## D40 Fire Protection Systems

## D4030 Fire Protection Specialties

1. A ten-pound ABC multipurpose fire extinguisher (provided by the Owner) will be provided for each fire extinguisher cabinet. Provide emergency showers and eye-washers as required for Laboratory Spaces and as may be directed by the Project Manager for Chemical Mixing Locations such as in Maintenance and Housekeeping.
2. Fire extinguisher cabinets will be included in Corridors as defined by the Building Code. Cabinets may be recessed or semi-recessed models as required for fire extinguisher sizes and partition thicknesses. Fire hoses will not be provided; however, standpipes and standard two and one half inch (2-1/2") fire department connections are required.

## D50 Electrical Systems

## D5030 Communications and Security Systems

1. Telephone and Data Rooms
  - a. All telephone and data network topology will conform to EIA/TIA Building Telecommunications Wiring Standards and Sisters of Mercy Standards.
  - b. Telephone and data rooms
    - (1) All telephone and data rooms should be considered as separate space from ancillary electrical equipment and basic termination of cable/wire/fiber circuits.
    - (2) Minimum size requirements: 5' x 6' with door opening out or 5' x 8' with door opening into the room.
    - (3) Ceiling height: minimum 8' to ceiling grid or cable distribution system.
    - (4) Doorways: minimum size requirements - nominal 3' W x 6'-8" H. Must be equipped with a storeroom function (always rigid) locking door. Handle to have knurled finish unless otherwise required to match existing Facility Standards.
    - (5) Locations:
      - (a) Provide a minimum of one telephone/data room on each floor.
      - (b) Provide one additional room for every 10,000 gross square feet of floor area.

- (c) Provide additional rooms as may be required by distance limitations or other considerations.
  - (d) Locate rooms as close to the structural core as possible and vertically stacked in multiple story buildings.
  - (e) Average cable runs should not exceed 150' with no single cable run exceeding 295' unless otherwise approved by Owner's Project Team.
- (6) Floor finish: vinyl composition tile or sealed concrete.
- c. Centralized telephone and data equipment rooms
- (1) Centralized telephone and data equipment rooms are special purpose rooms that serve space and environmental needs of large pieces of telecommunications and data equipment and may not be required in all buildings. The need for these rooms should be discussed with Campus Telecommunications and Campus Computing.
  - (2) Size: minimum size requirements - 15' x 15' (225 net square feet).
  - (3) Ceiling height: minimum 8'-6" to ceiling grid or cable distribution system.
  - (4) Doorways: minimum size requirements - nominal 3'W x 6'-8"H. Must be equipped with a storeroom function locking door (may be integrated with building electronic security system). Handle to have knurled finish.
  - (5) Floor finish: install vinyl composition tile or sealed concrete.
  - (6) Design floor load: minimum 100 lbs/sf equipment load plus live load and dead load.
- d. Construction cost will include installation of telephone and data cabling and installation of conduit/raceways to the main telephone room and to all outlets.

## E Equipment and Furnishings

### E20 Furnishings

#### E2010 Fixed Furnishings

1. Specify prefabricated, stock cabinets, and benches to encourage competitive bidding for larger projects with economies of scale. For smaller scope projects with limited casework, custom architectural millwork will be acceptable.
2. Signage:
  - a. Signs will be installed on the wall adjacent to the latch side of the door whenever possible. If wall space is not available on the latch side of the door, coordinate placement of the sign with the Sisters of Mercy Project Manager. Meet all other requirements of ADAAG when choosing an alternate placement.
  - b. Mounting height will be 60" above the finished floor to the centerline of the sign. Mount signs 2" from door trim.
  - c. Do not mount signage on or above doors unless so directed by Sisters of Mercy Project Manager.
  - d. The consultant should confirm whether signs are to be provided by the Owner or specified by the consultant. As a default, include campus standard signage for public toilets and stairways as required to achieve certificate of occupancy unless otherwise directed by Sisters of Mercy Project Manager.
2. Window Treatments:
  - a. Preferred standard window treatment is 1" horizontal mini-blinds or vertical blinds as standard with the facility. These should be bid and budgeted as a part of the construction contract.
  - b. Roller shades: Consider use of black out roller shades for windows in conference rooms used for visual projector presentations. Consider the use of 70% (nominal) screened roller shades for windows and storefront as required to control glare. Consider motor operated roller shades for large glass areas to reduce solar heat gain. Coordinate with Project Manager for special requirements for roller shade, black out, vertical, or drapery window treatments.

#### E2020 Movable Furnishings

1. Furniture in public areas will be fastened to the structure with tamper resistant fasteners where safety or security concerns exist.

## F Special Construction and Demolition

### F10 Special Construction

#### F1030 Special Construction Systems

##### 1. Loading Dock Facilities

- a. For new construction and building additions, consultant should review loading dock facility requirements with the Sisters of Mercy Project Manager.
- b. Potential needs to be addressed could include:
  - (1) Trash dumpster/compactor equipment
  - (2) Recycling containers (paper, cardboard, cans). All buildings will have accommodations for recycling containers and material. Those areas can be alcoves, closets, or rooms suitable for such storage, near a building service entrance or preferably at an exterior covered loading dock.
  - (3) Truck dock bays (at grade and/or at loading height)
  - (4) Service vehicle parking (two minimum)
  - (5) Receiving area
  - (6) Holding areas (hazardous materials, chemicals)
  - (7) Dock leveler(s), dockboard(s), dock seal(s), dock shelter(s), dock bumpers, loading dock swing out type lighting fixtures, overhead sectional or coiling type doors, manual or power operation of doors.

##### 2. Toilet Rooms

- a. Toilet partitions will be either floor supported-overhead braced or floor and ceiling supported. Provide hard surface partitions – no metal / no plastic laminate. At Springfield, MO campus, partitions and screens shall be solid polymer plastic resin (DuPont Corian or approved equal) and as demonstrated in mock up toilet room.
- b. Accessible toilet stalls will be designed to meet current requirements of ADAAG.
- c. One restroom liquid all purpose soap dispenser will be installed at each washbasin. Coordinate with Sisters of Mercy Project Manager for dispensers to be provided by the Owner.
- d. Waste receptacles: Wall mounted, recessed waste receptacles are not desired. An alcove is preferred to accommodate a freestanding waste receptacle.
- e. Provide push plate actuated low energy type door openers for toilet room entrances.

## G Building Sitework

## G20 Site Improvements

## G2010 Roadways, Parking Lots, and Walkways

1. Curbs: Portland cement concrete.
2. Pavements: Design pavements to accommodate the Design Vehicle for the pavements use. Comply with AASHTO, State and Local Departments of Transportation for lane width requirements where applicable. Provide, in all cases, minimum lane width of 10-feet, excluding curb and 12" shy distance (concrete pavements), curb and gutter and 12" shy distance from curbs (asphalt pavements), bicycle lanes, or striping. Curve radii and intersection radii shall accommodate the Design Vehicle's design speed and turning movements.
3. Design paved walks less than eight feet wide with a cross slope of two percent to facilitate drainage. Design walks equal to or greater than eight feet wide with minimum slope of one percent. Maintain positive drainage away from walks to prevent or reduce crossing of surface water.
4. Sidewalks minimum width: 4'. Where a sidewalk abuts to a road or driveway, minimum width is 6'. In heavy pedestrian traffic areas, minimum widths are 7' (one way traffic) and 9' (two way) respectively. Walks adjacent to roads or driveways will not have grass strips between sidewalk and road or driveway unless approved by PM. A medium broom finish will be applied perpendicular to traffic flow. All brooming directions will be shown on the drawings and described in the specifications. Sidewalks abutting a curb line shall be pinned to resist differential movement. Include expansion joint where needed.
5. Coordinate with PM to determine which, if not all, accessible parking spaces will be "universal spaces." Parking spaces, other than disabled, will typically be 9' in width. PM will approve the location of compact car spaces.
6. Striping colors:
  - a. Yellow striping in designated employee parking areas,
  - b. white striping in public parking areas.
  - c. Blue striping for accessible logo and stripes.
7. Where a parking lot abuts lawn areas, include a mowing strip, 18"-24" in width, on the lawn side of the curb or parking bumpers allowing the lawn to be mowed while parking spaces are occupied unless otherwise directed by PM.
8. Where directed by PM, provide accessible ramps adjacent to buildings with a snow melt system installed, controlled by the Energy Management Control System. Coordinate with PM for curb cuts for disabled access to will use the campus standard detail. Comply with maximum slope requirements for both the approach directions and the cross path directions.
9. Preferred material for sidewalks, ramps, and other paved, exterior walking surfaces is concrete. All materials must be slip resistive.

## G2040 Site Development

1. Site Exterior Equipment: Locate and landscape/screen exterior equipment, such as ground mounted transformers, air conditioning units, etc. to be aesthetically compatible with surrounding area and adjoining buildings.

### G30 Site Civil/Mechanical Utilities

#### G3020 Sanitary Sewer

1. Sanitary sewers shall be designed in accordance with the standards and requirements of the State Department of Natural Resources and local requirements (Metropolitan Sewer Districts, and City requirements).
2. Sewer systems shall be designed to carry traffic loads in all locations.
3. Sewer piping installation shall include granular bedding with fines and backfill within the pipe envelope.
4. The minimum service line size shall be 6". The minimum sewer line shall be 8".
5. Sanitary sewer pipe material shall be as described in Specifications and Details.
6. Pre-cast concrete manholes shall comply with ASTM C478 or ASTM C76, Class 3. Cast-in-place manholes shall be detailed in the construction documents.
7. Cleanouts may be used at the end of a sewer line where the distance to the downstream manhole is 150-feet or less. Cleanouts are required on service lines outside a building footprint and at horizontal or vertical bends in a service line. The deflection should utilize a wye with the cleanout as an upstream extension of the downstream line's alignment.

#### G3030 Storm Sewer

1. This section applies to stormwater conveyance systems outside the footprint of buildings. Building systems are covered in Mechanical Systems Guidelines.
2. Trunk storm sewers are defined as the primary spine(s) of the piping system and generally carry the flow from more than one site.
3. Stormwater systems shall be designed using the actual time of concentration. The worst case of complete development, per the current Master Plan, or current conditions shall be used for calculation of offsite flow.
4. Generally, a Rational Formula shall be used for areas under 200-acres. Runoff coefficients shall consider percentage of impervious area and average site grade (slope).
5. Return periods will be 25 years with actual time of concentration (duration) for all building sites, pedestrian malls, streets, and Trunk Storm Sewers.
6. Return periods will be ten (10) years with actual time of concentration (duration) for parking lots, park space, and open areas.
7. Project Manager (PM) will establish "return periods" for all other areas.
8. Return period must satisfy governing municipality's regulations.
9. No significant and long duration ponding is allowed on paved areas. Detention basins shall be labeled on the drawings.

10. Designer will compare above return periods with those required by the local municipality. Coordination with municipality may be required and should be reviewed with the PM. Any discrepancies will be discussed with the project manager.
11. All buildings and structures will be developed such that no entry of water through entrances, window wells, area ways, basements, drains, etc. will occur during a maximum sustained storm as experienced over minimum one hundred year record. Design shall maintain positive drainage away from building entrances.
12. Connections to building drains shall be designed to prevent surcharge from the storm sewer for the 100-year storm.
13. Sidewalk grade shall be set to prevent surface from collecting and channeling surface drainage.
14. Particular attention will be paid to bicycle and wheelchair safety in the design of storm drainage systems. Grate bars will be placed perpendicular to direction of traffic flow or otherwise protected. Size grates in pedestrian areas to avoid catching heels of shoes.
15. Coordinate with PM for specific facility requirements that may apply governing modifications to the standard City curb inlet that may be used for all work not in the public right-of-way.
16. Storm drains (except small area drains), are to be reinforced concrete pipe (RCP) conforming to ASTM C76 or AASHTO M170, Class 3 minimum, for 12" or larger.
17. Coordinate with PM for piping material requirements for small area drains in courtyards, small yard areas, and building area ways that are to required to be 8" or larger.
18. Storm drains less than 36" in diameter shall run on a straight line and grade between structures. Horizontal and vertical bends are permitted in 8" and 10" lines provided a cleanout is included. The deflection should utilize a wye with the cleanout as an upstream extension of the downstream line's alignment.
19. For Missouri and Kansas projects, consultants shall use the Missouri Department of Natural Resources document "Protecting Water Quality – A field guide to erosion, sediment and storm water best management practices for development sites in Missouri and Kansas". All projects shall use the EPA guidance "Storm Water Management for Construction Activities" as Best Management Practice guidelines for the preparation of site plans and construction details relative to erosion control on construction sites.

### G3010 Water Supply

1. All piping shall conform to AWWA standards and the requirements of the State Department of Natural Resources.
2. All water meters will be located inside buildings.
3. The preferred material for water distribution systems is C-900, PVC with ductile iron fittings wrapped in plastic except as otherwise directed by the Project Manager.
4. Fire hydrants shall be provided in accordance with the requirements of the local fire district or department. Hydrants shall be provided with an auxiliary valve, installed

with the streamer directed toward a street or drive, and with hydrant base flange 6" above finished grade. Coordinate with Project Manager for any standard details.

#### G2050 Landscaping

1. Preservation of existing trees and landscaping will be a primary consideration. Coordinate with PM to determine if landscaping materials, installation, and landscape design is provided by the campus. Grading shall be at 6" below finish grade to allow for topsoil placement.
2. Finished lawn areas will have a finished slope no steeper than one (1) foot vertically to three (3) feet horizontally. Steeper areas will be covered with ground covers or modified with walls or other treatments.
3. Selection of landscape plant materials will be based on plant hardiness and on growth success within the area used.
4. A planting schedule will be provided and timed in relation to planting season and on Owner's acceptance of the project.
5. Specific treatments will be identified for project limit lines or edges.
6. The following planting schedules will be used unless otherwise approved by PM:
  - a. Spring schedule
    - (1) Trees (Deciduous and Coniferous Evergreen): Will be planted between March 15 - May 15
    - (2) Shrubs: same as trees
    - (3) Ground covers and herbaceous perennials: same as trees
    - (4) Turf: will be seeded (sodded) between April 1 and May 15
  - b. Fall schedule
    - (1) Trees (Deciduous): will be planted between October 15 and December 15
    - (2) Trees (Coniferous Evergreen): will be planted between September 1 and October 30
    - (3) Shrubs: will be planted between September 15 and December 15
    - (4) Ground covers and Herbaceous Perennials: will be planted between September 15 and October 15
    - (5) Turf: will be seeded between August 25 and October 1; will be sodded between September 1 and November 15

END OF A/S/C GUIDELINES